An Interdisciplinary Design Process for Educational Technology Systems for Displaced War-Affected Children

Thesis

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An Interdisciplinary Design Process for Educational Technology Systems for Displaced War-Affected Children

Author
Dr George Alain

Supervised by
Dr Tim Coughlan
Prof Anne Adams
ABSTRACT

According to the United Nations High Commissioner for Refugees, there are at least 65 million forcibly displaced people worldwide. Around 25 million of these people are refugees fleeing their homeland, mostly because of war and persecution. Around 51% of refugees are children, and even in the most optimistic estimates, only 50% of these children are attending any form of schooling. Education is one of the most critical needs of displaced populations just after food and shelter. Education in emergencies faces numerous challenges, particularly when the displacement is a result of a war as it involves political and psychosocial complexities that affect the children’s wellbeing and motivation.

There has been an increasing interest from the international NGOs and academia towards harnessing technology to support the refugees, especially emergency education, after the refugee crisis in 2015. However, there is little understanding of the different challenges and possibilities for designing technology systems in the complex displacement context. Many of the projects in this do not succeed due to the complexity of the context. Moreover, no design processes exist to guide the design of educational technology systems in displacement. This research aims to develop a design process based on an understanding of the disciplines of refugee studies, emergency education, motivation and engagement, system design, and participatory design. In addition to the literature review, the process was based on discussions with several actors from the field.

The design process was then implemented and evaluated in two case studies with Syrian refugees in Greece. One case study was at Ritsona refugee camp and involved creating a digital self-learning space for displaced children. The second case study was conducted in cooperation with the Greek Ministry of Education in four formal Greek schools hosting refugee children from Ritsona refugee camp with their Greek students and led to solutions that supported the teachers and children’s learning difficulties. The data from both case studies was thematically analysed and resulted in the CRIT design method (Contextual complexity, Relevance, Involvement, and Trust). The data was later discussed and highlighted the importance of supporting motivation in the design process activities and in the resulting systems through supporting the innate needs of Self-Determination Theory (SDT) which are autonomy, competence, and relatedness. Moreover, the discussion highlights the importance of adopting the Scandinavian aspects of participatory design when designing in displacement and links it to motivation, ethics, and real democracy. Furthermore, the discussion provided an overview of the design challenges from the context of displacement, the practices that allow a better problem definition, and suggestions regarding the opportunities and challenges for the use of technology for education in displacement.
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LIST OF ABBREVIATIONS

- EdTech Educational Technology
- HCI Human Computer Interaction
- IAY I Am You NGO in Greece
- IDPs Internally Displaced Persons
- INEE Inter-Agency Network for Education In Emergencies
- IOM International Organization for Migration
- IS Instructional Systems
- ISD Instructional System Design
- MOE Ministry of Education in Greece
- NGOs Non-Governmental Organizations
- PD Participatory Design
- PTSD Post-Traumatic Stress Disorder
- SDT Self-Determination Theory
- UN United Nations
- UNESCO United Nations Educational, Scientific, and Cultural Organization
- UNHCR United Nations High Commissioner for Refugees
- UNICEF United Nations Children’s Fund
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1 INTRODUCTION

According to the UNHCR (United Nations High Commissioner for Refugees), in 2016, there were at least 65 million forcibly displaced people worldwide. Around 25 million of these people are refugees fleeing their homeland, mostly because of war and persecution (Vujadinović et al., 2011; Zetter, 1988). Displaced populations live in environments that often lack the essential needs and life resources. They are often caught in the middle of political and economic migration challenges that result in hostility against them and prevent them from the ability to work or move freely in the host countries (Bhutta, 2002; Feldman, 2014; Green, 2013; Wright, 2010; Zetter, 1988). Such a complex context results in severe psychological and social difficulties that affect both adult and children displaced people such as the lack of ambition, trust difficulties, lack of motivation (Fegert et al., 2018; Wright, 2010).

Around 51% of refugees are children, and even in the most optimistic estimates, at least 50% of these children are missing out on any form of schooling (UNHCR, 2016b, 2016a). According to UNHCR and UNESCO (United Nations Educational, Scientific and Cultural Organization), education comes in the highest priorities of the displaced populations right after food and shelter. Due to the extremely challenging contextual dynamics of displacement, educational interventions - where they exist - are considered emergency educational interventions. Such interventions range from non-formal educational activities at refugee camps to hosting displaced children in formal schools of host countries (INEE, 2010; Kagawa, 2005). Emergency education is typically studied from a human rights perspective based on the 1989 United Nations Convention on the Rights of The Child. The convention states directly that every child has the right to education without discrimination using diverse information and to protect children from all forms of physical and mental violence (INEE, 2010; Kagawa, 2005).

However, despite the importance of education in emergencies, interventions in this space suffer from complex displacement dynamics such as the lack of resources, displacement trauma, psychosocial difficulties, and the effect of politics and social division related to the conflicts that caused the displacement (Dryden-Peterson, 2016; INEE, 2010; Tawil & Harley, 2004). Such challenges affect the motivation, engagement, and social behaviour of the war-affected displaced children adding more burden to the educational interventions for them. The absence of education and the severe challenges to the quality of education received by these millions of war-affected and displaced children may create catastrophic consequences in the future as these children will suffer to integrate into society and be able to manage their life.
For example, Maria Calivis, a regional director of UNICEF, sums up one of the long-term problems facing displaced populations: “If failure to educate youth is left unaddressed, the children will lose hope, especially the adolescents. They will replicate and perpetuate the violence that they have seen. And they will lack the skills and knowledge that one day will be needed to rebuild their countries” (Judith, 2014).

Furthermore, failing to provide the human right of education to the war-affected displaced children can exacerbate their depression, and for others, a range of anti-social activities, and even the thoughts of revenge through a renewal of armed conflict (Jesús et al., 2003).

There has been an increasing interest from the international NGOs and academia in harnessing technology to support the refugees, especially in emergency education, after the refugee crisis in 2015. Many projects have already tried harnessing technology in different areas to support displaced communities, such as in health and education (Fisher et al., 2016; Krüger et al., 2019; Kukulsk-Hulme, Gaved, Paletta, Scanlon, Jones, & Brasher, 2015; Metatla et al., 2020; Talhouk et al., 2018; Talhouk, Aal, et al., 2019). Technology is well known and documented to support education. Nevertheless, designing in the space of displacement requires considering many aspects related to the displacement challenges, such as the psychosocial difficulties and motivation, pedagogy and learning, and the politics and social division. Many worldwide projects that tried implementing technology for the emergency education of displaced children failed to cover all the previous complexities (Tauson & Stannard, 2018). The literature review in this thesis will explore this problem in more detail with examples.

Due to the complex nature of displacement, and because different displacement locations and contexts vary in their needs and complexities, participatory approaches were suggested to be followed in interventions in this context (INEE, 2010; Kagawa, 2005; Obura, 2003; Tawil & Harley, 2004). In HCI research, participatory approaches were also favoured by the research community who used and researched participatory design methods in this context (Abou-Khalil et al., 2019; Krüger et al., 2019; Talhouk, Aal, et al., 2019; Talhouk, Ahmed, et al., 2016; Talhouk, Balaam, et al., 2019).

Using technology for the emergency education of war-affected children is being approached by international NGOs and researchers from various disciplines and backgrounds. However, there is currently no design process that can guide such a diverse community of actors and researchers and that covers the different complexities of displacement. Therefore, there is more need for research in identifying the design challenges in a displacement context and their effect on the design processes. Moreover, in such a complex context, design processes should be accompanied by design methods that specify the design values and attitudes that tackle the challenges of displacement contexts. Thus,
there are calls for more research in adapting the design processes and methods to fit the complex nature of displacement caused by war and the possibilities to situate technology for learning in this context (Tahir & Wang, 2019; Tauson & Stannard, 2018). The purpose of this thesis, therefore, is to assist in providing more understanding of the design processes, methods, and possibilities for technology in this area.

1.1 Research questions and objectives

This thesis aims to develop and evaluate an interdisciplinary design process that encapsulates the topics from different disciplines that are essential to informing designing educational technology systems for displaced war-affected children. The development and evaluation of the design process will lead us to better understand the challenges that can face designers in such a context, the methods that would support overcoming these challenges, and suggest possibilities for technology in emergency education.

Main research question: What is an effective design process for the design of educational technology systems for displaced war-affected children?

The main aim of this research study is to develop and evaluate a design process for educational technology systems for war-affected displaced children. This will be done by proposing a design process (section 3.2) based on the literature review and the preliminary study presented in section 3.1. And then evaluating this process in two case studies.

The research sub-questions are as follows:

❖ RQ1: “What challenges may affect the design process of educational technology systems in a displaced war-affected children context?”

This question will investigate the main challenges that would be faced when implementing a design process in the context of this study, covering the following topics:

- What challenges are faced while implementing the proposed design process?
- How do the challenges affect designing in such an environment?
- How do these challenges relate to the notions of motivation and trust that were addressed as core concepts in displacement?

❖ RQ2: “What design process stages, approach, and method should be followed to overcome the identified challenges?”
This research question will investigate the design process and design method that would assist in resolving the design challenges identified in the RQ1 covering the following topics:

- How should the design process stages, approach, and methods address the identified challenges?
- How should the design process stages, approaches, and methods address the concepts of trust and motivation that are core challenges in engaging with and designing for displaced people?

❖ RQ3: “What are the lessons learned from implementing the proposed design process regarding the requirements of educational technology systems to support the learning of displaced children?”

These research questions will investigate the possible future uses of educational technology based on the data from implementing the proposed design process in both case studies covering the following topics:

- Which factors and design requirements have been discussed when implementing the proposed design process that can be learned for future design work in this context?
- How do such requirements link to the notions of trust and motivation?

Research Objectives:

- Conduct a literature review on related topics such as refugee studies and displacement, emergency education, engagement and motivation, design processes, design approaches, and participatory design. This is to explore these topics, find gaps in the literature, and inform the proposed design process.
- Simultaneously with the literature review, conduct a preliminary exploratory study to scope and inform the literature review, the proposed design process, and the methodology.
- Review the different methodologies that could tackle the research questions specifying the suitable methods to be used in implementing the proposed design process and the methods used to answer the research questions
- Propose a field study plan and data analysis based on the previous objectives to be conducted for data collection
- Obtain ethical approval for the study and conduct the case studies
- Analyse the collected data based on the analysis plan resulting from the previous objectives
- Discuss the data analysis findings in light of the literature and propose a refined design process and a design methodology based on the discussion
Tackling the research questions was done by summarising the literature from refugee studies and displacement, emergency education, engagement and motivation, design processes, and participatory design. The literature review, in addition to meetings with workers and researchers in the field through a preliminary study, both informed the literature review and the proposed design process. The proposed design process was evaluated in two case studies with Syrian refugees in Greece. One case study was at Ritsona refugee camp hosting 800 displaced people, most of whom are from Syria. This study led to the design and implementation of a digital self-learning space for children. The second case study was conducted in cooperation with the Greek Ministry of Education at four formal schools in the city of Chalkida hosting displaced children from the same refugee camp as the first case study. This case study led to designing tools that allow the teachers to support student engagement and motivation in the classrooms.

The data collected in both case studies were later thematically analysed in an inductive process. The data analysis led to refining the proposed design process and suggesting a design method which was called the CRIT method (Contextual complexity, Relevance, Involvement, and Trust). The CRIT method suggests a set of values, attitudes and techniques – with a special focus on motivation- that would support the implementation of design processes in displacement and support the designers dealing with the challenges of such a complex context. The thesis findings also provide suggestions on the possible uses for technology in such a context based on the data from the case studies.

1.2 Thesis Terminologies and Delineation

This section briefly explains the meaning of the terminologies used throughout this thesis.

1.2.1 Displacement and refugees

The displacement of people refers to the forced movement of people from their locality or environment and occupational activities. It is a form of social change caused by several factors, the most common being armed conflict. Natural disasters, famine, development and economic changes may also be a cause of displacement (UNESCO, 2017). Displaced people may either be IDPs (internally displaced people), meaning those forcibly moved to another location within their home country or internationally displaced people who had to flee to another country.

Refugees are people who have fled their home country and crossed the international borders to another country due to war, violence, conflict, and persecution looking for safety in another country.
It could be seen that there is an overlap between refugees and displaced people. However, a refugee is a legal term to describe a specific type of IDPs who are defined and protected in international law via the 1951 Refugee Convention which defines refugees as:

“someone who is unable or unwilling to return to their country of origin owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group, or political opinion.”

In other words, every refugee is an IDP, but additionally, a refugee must fit within specific legal definitions – called the nexus of the 1951 convention- which means that refugee –in addition to displacement- must have a well-founded fear of persecution for reasons of race, religion, nationality, or membership of a particular social group or political opinion.

Legal-wise, some IDPs might be given refugee status if they fit the legal definition of the 1951 convention nexus. Refugees typically receive a set of rights from the host country, such as the right to stay, work, relocate their families to join them, and other rights which differ from one country to another. Other IDPs may not be recognised as refugees, but at the same time, they might be given limited permission to stay in the host country on a humanitarian basis.

In this research, we will be focusing on IDPs in general regardless of their specific legal statuses, such as refugee status or humanitarian protection status. The findings of the research may be extended to benefit the case of internal displacement; however, the research and the context in which the case studies were conducted are in an international displacement context. The term displacement and displaced people will be equivalent to the term refugees.

1.2.2 Emergencies

UNESCO’s international institute for educational planning defined emergencies as “a condition which arises suddenly, and the capacity to cope is suddenly and unexpectedly overwhelmed by events, therefore calling for prompt action” Hernes (2002,p2). UNICEF has expanded the definition of the word “emergencies” to specifically include natural disasters and human-made crises (Sinclair, 2002). Obura (2003, P27) and Hernes (2002, P2) agreed with the UNICEF definition and provided examples of natural emergencies such as earthquakes, volcanos, tornados, floods, drought, and human-made emergencies such as war, conflicts, and genocide. Pigozzi (1999) expands the definition even further to include silent/chronic emergencies such as long-term poverty in less-developed countries and the spread of diseases like HIV/AIDS.

The duration of the emergency may affect its status, and the definition of the word “emergency” is not free from debates (Kagawa, 2005; Sinclair, 2002). Sinclair (2002) discussed the debate about
whether the term ‘Emergency’ should only cover sudden crises or should be extended to consider post-conflict rehabilitation and reconstruction as ‘education in an emergency’. The author then explains how the World Education Forum (2000) in Dakar and UNESCO (1999) have reached an agreement that emergency status should last as long as the population is affected by the conflict, disaster, or instability. This PhD study agrees with the extension of the emergency status as it shows that crisis long-term effect is as critical as the sudden effect. Especially when the crisis is a conflict that may have caused the displacement of millions of people and destruction of infrastructure which will make people strive for their basic needs and survival, which is an emergency on its own.

1.2.3 War and conflicts
The terms conflicts and wars are similar as both describe incidences of armed unrest. However, the differences are generally in the size, length of the fighting, number of casualties, type of fighting groups or states, and the number of fighters. This PhD study does not differentiate between the two terms, as the effects of armed unrest that leads to displacement are the same, whether it is a conflict or a war.

1.2.4 International and national NGOs
In the context of displacement, NGOs have a critical role. International NGOs such as UNHCR, United Nations, UNESCO, Save the Children, and IOM (International Organization for Migration) are generally large organisations with tens of thousands of staff working together on an international level. They operate closely with governments which provide them with large budgets to deal with different essential world problems. UNHCR, for example, have a mandate from the world nations to deal with the refugee crises around the world, providing the essential needs to refugees and producing international policies. On the other hand, there are the national NGOs which are in most contexts, created and funded locally with basic budgets and mostly have limited staff. In the context of this research, national NGOs work in collaboration with international NGOs and national governments to tackle specific tasks in small areas such as a specific refugee camp or a specific county. Most of the national NGOs that were involved in this research consisted of staff numbers between 2 and 25 and worked on specific tasks in the refugee camp in which the case studies were conducted. For example, I Am You is a national NGO in Greece that only works on educational activities at the Ritsona refugee camp. Other national NGOs also existed at the same camp working on other problems such as medical, shelter, aid distribution, psychosocial support, and other needs.
1.2.5 Employees, staff, social workers, and volunteers

In this research, I worked in collaboration with different national and international NGOs. Some of them appoint only volunteers, and others appoint staff in addition to volunteers. Staff are normally paid either regular salaries or a stipend which covers their basic needs. Some NGOs call their staff social workers or many other titles. To avoid repetition of the previous terms, the term “staff” will be used to describe any NGO personnel who participated in this research, whether the personnel is paid or a volunteer, except where the difference affects the discussed topic.

1.2.6 System stakeholders

In this PhD study, system stakeholders refer to any group of people that are going to be the end-users for the educational technology systems, such as children and educators, or any group of people who would benefit from the systems, directly and indirectly, such as parents, NGO staff, education facilitators and planners, and government representatives. Furthermore, system stakeholders mean any group of people whose voice is essential in the system design process.

1.2.7 Type of technology

In many instances of communicating this research to different audiences, one of the main questions that were asked is regarding the type of technology being studied. In most projects using technology for emergency education, technology was in the form of tablet learning or mobile learning. However, in this research project, there is no focus on a specific implementation of technology equipment. The reason for this is that one of the issues discussed in this research is the extreme focus on technology equipment with a lack of focus on the people, the context, and the educational needs. The focus of this research project is to develop a design process that assists in designing educational technology systems that support the stakeholders’ needs rather than focusing on a specific technology.

1.2.8 Child/Children

The convention on the Rights of the Child (UNICEF, 1989) defines children as anyone below the age of 18. In this research, case studies involved children between the ages of 6 and 14.

1.3 Thesis Structure

Chapter one (Introduction): this is the thesis introduction that presents an overview of the problem definition and rationale behind the study and the importance of the topic. Moreover, it discusses the research objectives and research questions. Furthermore, this chapter explains the terminologies used and the thesis structure.
**Chapter two (literature review):** This chapter will summarise the literature from different disciplines such as refugee studies, emergency education, engagement and motivation, design processes, and design approaches. This literature review will lead to introducing a proposed design process to be evaluated in the case studies.

**Chapter three (Preliminary study and proposed design process):** This chapter will present the details regarding the preliminary design process conducted simultaneously with the literature review and the proposed design process that resulted from the literature review and the preliminary study.

**Chapter four (Methodology):** This chapter will discuss the methods used in this study. It will explain the need to use case studies as a method in this research, the research epistemology, and the position of the researcher. This will be followed by presenting the research design and the methods to be used in the case studies. Finally, this chapter will explain the data analysis process and the ethical concerns of this research.

**Chapter five (Case Studies):** this chapter will start by providing a contextual understanding of the context of both case studies, displacement, and participants.

**Chapter six (Data analysis findings):** this chapter will list the data analysis findings of the thematic analysis conducted in both case studies.

**Chapter eight (Discussion):** This chapter will discuss the data analysis findings with a reflection on the literature. It will also discuss the evaluation of the design process and the CRIT method.

**Chapter nine (Conclusion):** this chapter will summarise this study, discuss its limitations and the areas for future work, in addition, it will provide the personal reflection of the researcher.
This chapter will summarise the literature from different disciplines such as refugee studies, emergency education, engagement and motivation, design processes, and design approaches. It will start by contextualising displacement in section 2.1, which includes discussing the causes and challenges of a displacement context. Section 2.2 will provide a contextualisation of emergency education and how it is affected by the challenges of the displacement context, such as the effect of the contextual, psychological, and political aspects on education. Furthermore, it will discuss the implementations of technology in emergency education and will summarise the current gaps in this area. The discussion of sections 2.1 and 2.2 will lead to highlighting the need to focus on engagement and motivation in the displacement context and emergency education; thus, section 2.3 will conceptualise these two concepts in the context of this PhD study. This will be done by discussing different definitions, models, and theories that conceptualise engagement and motivation and inform the following discussions on design processes and design approaches. Section 2.4 will discuss the different design processes in computer sciences and instructional system design. It will compare the different design processes based on the different stages, sub-stages, and flow in the light of the challenges of displacement and emergency education. Afterwards, section 2.5 will discuss the different design approaches with a focus on Participatory Design (PD). Finally, section 2.6 will provide the literature review conclusion with listing the identified gaps and the research questions.

2.1 Contextualising Displacement

Living in displacement caused by conflicts is full of difficulties that affect the displaced communities and the people working for them. Recognised and documented for many years, alienation, persecution and forced migration are amongst the most profoundly disturbing human experiences (Zetter, 1988). We see changes in places, countries or time; however, the circumstances of the life of a refugee have been alike regardless of time or place. Moreover, the traumas of mass displacement confront those who are excluded from societies at times of acute political crises or rapid and fundamental redefinition of their economic, social or ethnic identity (Zetter, 1988).

According to the UNHCR, the causes reported by refugees to abandon their homes were: war threat, horror and insecurity, threats of an aggressive population (including hostile military formations) from their immediate surroundings, physical expulsions, destruction of property, psychological and physical harassment, death or injuries of the closest family members in addition to other similar causes (Vujadinović et al., 2011).
2.1.1 Complexity and challenges of displacement life

Lack of essential needs

After encountering terror, trauma, destruction and violence, the displaced communities still experience further traumatisation in the places they flee to. Instead of reaching a place where they can feel safe and relieved in the host countries, refugees may have to queue for days for food and shelter, sometimes having to bribe security guards and borders officials, live in camps by the borders with no or little support, being unable to work or deal with extreme work limitations (Green, 2013). Consequently, when refugees flee to a new place, they mainly count on the international community and organisations to provide them with their essential needs in addition to organising their legal status and security in coordination with the host country. This results in a lifestyle that involves an extreme lack of basic life needs such as food and shelter and many primary resources (Bhutta, 2002; Green, 2013; Vujadinović et al., 2011; Zetter, 1988).

Political nature of displacement caused by conflicts

This PhD study focuses on displaced populations who had to flee their homeland due to war and conflicts, which highlights a political aspect that may not exist in cases of displacement caused by natural disasters. Even after displaced populations flee to new countries, they might still be affected by the political stress, sanctions, and economic challenges, especially when the cause of displacement is armed conflicts. An example of this is the case of the Croatian and Bosnian refugees in the Yugoslav wars. They fled to Serbia and where they got affected by the sanctions of the UN (United Nations) against Serbia and Montenegro (Vujadinović et al., 2011). Or the case of the sanctions against Pakistan in 1998 that affected the country and the Afghani refugees living in Pakistan (Bhutta, 2002).

Another example is when the Syrian refugees who fled in millions to countries like Lebanon, Turkey, Jordan, and Greece that are already facing economic challenges, resulted in pressure on the governments, host country people, refugees, and non-governmental organisations NGOs. Thus, it often happens that certain groups and communities subject refugees and economic migrants to violent xenophobic attacks (Green, 2013). Feldman (2014) discusses how a refugee camp becomes a complex humanitarian space, political space, and emotional space for the displaced people that might be from different backgrounds and even from backgrounds that are on opposite sides of the ongoing war that caused the displacement. This means that in the same refugee camp, we might find different groups of displaced people with a tension between them due to the ongoing conflict back home. Such tension would affect any form of intervention, projects planning, education, and design in such a context.
Psycho-social challenges

The psychological effect of wars and displacement is one of the significant features of the displacement context. Wright (2010) quotes the displaced community at Dadaab refugee camp in Kenya, saying: “Our lives in the camps are far worse than you can imagine. We live in an open prison, far away from justice and humanity. We talk, but our voices are never heard. We move, but only inside a cage” (p. 1). It is worth remembering that these displaced people, in most cases, had a normal life, jobs, schools for their children, and medical service access before the war in their countries. In sharp contrast, they found themselves in a hopeless place with minimal resources with a need to almost beg for their basic life needs and looking for hope and dignity.

This complex and psychologically sensitive environment results in various challenges for both the displaced community and the NGOs and other entities working in this context. The severe lifestyle of displacement with the lack of resources affects the psycho-social status of both the displaced population and the NGO staff working in that environment. This is illustrated with high rates of PTSD (Post Traumatic Stress Disorder), depression, loss of hope, lack of motivation, and stress (Fegert et al., 2018). All of this massively affect the interaction of the displaced community with others, with NGOs staff, and within the community itself. Such aspects would also affect any design work or intervention planning in such a context.

The effect of the conflicts on children

It is suggested that children are among the most affected displaced populations (Bhutta, 2002; Gupta, 2005; Montgomery, 2011; UNHCR, 2015). Numerous studies state that displaced populations and especially children show high rates of PTSD (post-traumatic stress disorder), depression, grief and loss, violence, separation anxiety and concern for others, and lack of ambition (Abdel Jabbar & Zaza, 2014; Gupta, 2005; Hirani, 2014; Montgomery, 2011; Quosh, 2011; UNHCR, 2013). Fegert et al. (2018) also discussed that children are often affected by the trauma effect on their parents and family members. It is important to note that the psychological effect on displaced children is not only due to the war memories, but living in displacement on its own is considered a major contributor to the psychological and mental disorders that displaced populations face (Jabbar & Zaza, 2014).

All the challenges discussed in this section, such as resources, political nature, trust, PTSD, stress, and motivation, are key aspects in this PhD study. They will be discussed further in detail in the sections below as they have a direct effect on planning any intervention or project in the context of displacement.
2.1.2 Trust difficulties

Numerous studies (Hynes, 2003; Lyytinen, 2013; Mackenzie et al., 2007; K. E. Miller, 2004; K. E. Miller et al., 2006; Shannon et al., 2016) emphasised the importance of trust and relationship between researchers or intervention planners - which in the context of this research project are designers- and the research participants in the context of displaced populations especially when the cause for displacement is political conflicts. Miller (2004) discussed the concept of trust from the perspective of refugees and displaced people psychology, criticising the previous research in this area for only discussing the data without discussing how data is collected, especially regarding trust. Miller argues that researchers and intervention planners who are considered outsiders to the community that is the focus of the research cannot just walk into the community and start collecting data. The next sections will summarise the importance of trust-building in the context of displacement.

Why mistrust?

Understanding the importance of trust requires understanding the reasons for mistrust. There are numerous reasons why mistrust is a theme of displacement. First, this is due to the complex lifestyle of the displaced refugee population and the political, racial, and social aspects of displacement. Furthermore, it is related to the relationship and expectations between the displaced population from one side and the local and international NGOs and governments from the other side, especially in cases of a lack of resources that are typically controlled and distributed by the NGOs. Hynes (2003) worked on a detailed report for the UN investigating why different groups such as refugees, NGOs, governments, and members of different groups do not trust each other in the cases of displacement. Hynes (2003) provided two tables (p19 and p20) summarising the reasons of mistrust amongst all the different groups in different stages of displacement such as the period of threat, the decision to flee, in-flight (in transit), reaching safety and asylum claim, refugee camp experience, reception into a new country, resettlement, and post resettlement. The tables list the known reasons for refugees to mistrust other entities and vice versa in each of these stages. Both tables could benefit designers in understanding the possible trust dynamics that may affect both the displaced community and the actors governing them or supporting their welfare in different stages of displacement.

Importance of trust

**For data reliability:** establishing trust is essential for data collection reliability and intervention planning success (Block et al., 2013; K. E. Miller, 2004; K. E. Miller et al., 2006).

**Trust for access:** Accessing refugee camps is a challenging phase knowing that in most cases, these camps are governed by military and local authorities; additionally, community members, NGO staff,
and many other groups of people carefully monitor who enters the camps and for what reason. Thus, gaining access requires a trusting relationship with the different entities on-site (Miller, 2004).

**Trust for consent:** Getting consent is one of the well-known challenges in data collection activities in displacement contexts. This is because such people, in addition to their trust difficulties, are continuously worried about their immigration status in the host country and interacting with various organisations, especially regarding their asylum applications and aid distribution. Furthermore, signing a consent document is not something that populations from specific backgrounds are used to (Block et al., 2013; Cohen et al., 2013; Mackenzie et al., 2007; Skårdalsmo Bjørgo & Jensen, 2015). Block et al. (2013) discussed this issue when working on social networks in English classes for refugee children and minors; the authors specifically explained that the success in obtaining the consent in such a complex context was due to the trust between the researchers and the displaced families and participants.

The previous aspects of trust importance can be linked to any research or design work in the displacement, and they should be considered when developing a design process for such a context.

**Achieving trust**

Achieving trust is not a straightforward task, and there is little discussion in the literature on how to achieve a trusting relationship in such a context. Achieving trust is likely linked to understanding community dynamics such as their culture, fears, challenges, and needs, in addition to showing genuine empathy and interest in these topics. An example of this is the work of Miller (2004), where the researchers stated that their understanding of the community was essential to the success of their research:

“My research in the refugee camps would not have been possible without my having been willing to make explicit, time and time again, my opposition to the policies and practices of the Guatemalan government and military”. (Miller, 2004 p:218)

This quote creates an interesting discussion; on the one hand, someone would think that a designer or a researcher must be neutral regarding political and conflict-related topics. On the other hand, Miller justifies a different approach when needed because, in many cases, the refugees are very suspicious that the research or the intervention is aiming to hurt them or target them and their culture. Furthermore, there is always the fear of collecting personal data about their lives that can be used against them by the conflict groups that caused them to flee or by the hosting governments and NGOs regarding their asylum cases. This dilemma will need to be considered and discussed in any design process in displacement.
Even though the notion of trust has been highlighted as an essential aspect of researching with the displaced population, there is little in the literature regarding how trust can be achieved.

2.1.3 Section conclusion

This section (2.1.1) provided a general introduction to the displacement context. It discussed the different complex difficulties that affect the displaced communities and the actors and NGOs working with them and how such difficulties would affect any intervention planning or a design process for this context. Furthermore, this section discussed how trust is an essential aspect of any research in displacement for reliability, access, and consent. Moreover, it was discussed that constructing trust requires an understanding of the community dynamics ahead of data collection activities. The next section will expand the discussion on displacement with a focus on emergency education.

2.2 Contextualising emergency education

The previous section discussed the context of displacement in general, highlighting the displacement complexity and challenges which need to be researched and considered when developing a design process for this context. This section will discuss education in emergencies which describes the education of displaced populations as it also has a set of challenges that should be considered in any design process or intervention planning.

Education is a human right that is protected by many international laws. In the case of emergencies, education is a critical need for children’s wellbeing and resilience. Unlike education in ordinary settings, emergency education is directly linked to the challenges of displacement, such as lack of resources, psychosocial challenges, political challenges, and other complex contextual difficulties. Furthermore, emergency education often takes place in informal underequipped settings such as tents, caravans, or even in an open-air setting such as in the figure 2-1 below (Freedom House, 2015).
There has been extensive research on the best ways and practices of implementing education in emergencies. Most of this research work comes from the INEE (inter-agency network for education in emergencies). The INEE is a network of more than 15,000 personnel and 130 partner organisations in 190 countries where its members are national and international NGOs members, United Nations, and other government staff. The organisation publishes regular reports, standards, and guidelines on emergency education which are adopted by various organisations worldwide.

2.2.1 Contextual and psychological challenges

The INEE minimum standards of emergency education highlight how a child who attends emergency education may be hungry, lack adequate medical and hygiene care or do not have the right clothing for the weather (INEE, 2010). These conditions, along with the displacement related psycho-social challenges discussed in the previous sections, result in challenges in displaced children that affect their education, such as social skills, behaviour, student engagement, and motivation (Fazel & Stein, 2002; Fegert et al., 2018; Freedom House, 2015; Graham et al., 2016; Jabbar & Zaza, 2014; Reed et al., 2012; Save the Children, 2018; Sourander, 1998; Thabet et al., 2002).

Although education is a human right for children and should be one of the main focuses in displacement by the different groups, Dryden-Peterson (2016) reviewed 214 UNHCR documents and 208 semi-structured interviews to find that “refugee children are caught between the global promise
of universal human rights, the definition of citizenship rights within nation-states, and the realisation of these rights in everyday practices” (P. 3). In other words, the right to education is not always provided to displaced children. Even when it is provided, it suffers from the complex nature of displacement and the various actors that are typically involved in this context, such as governments, armies, international and national NGOs, and many other entities where each of them has its separate policies and goals. This results in engagement and motivational difficulties, which are illustrated in behavioural challenges. This discussion suggests that engagement and motivation should be specifically highlighted when designing an educational intervention for emergency education and should be discussed in a design process in this context. Section 2.3 of the literature review will discuss these two concepts further and explain how they can be integrated into the design process.

2.2.2 Curricula and the effect of displacement, conflict, violence, and politics

In addition to the contextual and psychological challenges discussed earlier, there is also the political aspect of the conflicts, which affects emergency education. This section will explore different ways of how the politics and war-related context affect designing educational interventions for displaced communities. The UNHCR (1995) suggested 3 phases of emergency education response when dealing with a large group of displaced populations. The first phase is recreational/preparatory involving activities such as games and sport. The second phase consists of non-formal schooling activities where basic literacy, numeracy, and life skills are taught. Finally, the third phase involves the introduction of a curriculum that both teachers and students are familiar with. The previous three phases are more of guidelines with different interpretations by different organisations (Kagawa, 2005; Obura, 2003). The INEE stresses that curricula must be suitable for the age, language, culture, capacities and needs, and developmental level of the people benefitting from education. However, several challenges arise from this in practice.

In ordinary education, curricula are mostly agreed on by government based educational systems that map the curricula with the culture and needs of the society. However, in emergency education in general and particularly in the context of this PhD study, educational activities may take place with war-affected displaced communities who live in host countries which may not share the same culture, language, and beliefs. Furthermore, the politics and social division from the conflicts also could affect the curricula and educational materials. This raises the challenges for curricula in emergency education, needing special considerations regarding the nature of displacement, the conflict, and politics. The next sections will explore some of these challenges and how they would affect the design process in this context.
2.2.2.1 References to violence and war

Violence is a known characteristic of displacement due to both the psycho-social difficulties and displacement challenges, in addition to the war-related trauma. In one of the interviews from Freij (2012), the author quoted an adult refugee living in the Al-Zaatari refugee camp for Syrians in Jordan, saying that his neighbour’s two-year-old child’s first word was “tank”, and that children learned the names of tanks and weapons because that was what their families were talking about. A study by the Migration Policy Institute (Sirin & Rogers-Sirin, 2015) included in its appendix some drawings taken from art activities with Syrian refugee children in Turkey. Some of these drawings included war scenes, death, killing, and violence. Emergency education is supposed to consider this challenge by avoiding reinforcing any violence-related topics and, on the opposite by fostering positive and hopeful learning material. Even though this aspect might be considered common sense, there are examples of professional organisations ignoring such an important topic when designing educational interventions for war-affected and displaced populations. The United Nations Relief and Works Agency for Palestine Refugees (UNRWA) created an online interactive educational system for children in Gaza that covers a small part of their curriculum (UNRWA, 2016). The system involved game style material, digital storytelling, and quizzes. However, some may have been not suitable for conflict-affected children. For example, one of the games (screenshot in Figure 2-2) has an avatar of a fully armed soldier shooting letters as a part of a literacy activity which can be seen as a direct replica of conflict violence.

![Screenshot from the UNRWA learning system in Gaza (UNRWA, 2016)](image)

The digital system discussed above has ceased to exist, possibly due to criticism about the content. The example above suggests that educational technology design processes should consider...
emphasising evaluating the educational message when it is designed for war-affected displaced children as such concept is being missed even by large international organisations sometimes.

2.2.2.2 Indirect and alienating violence

Kagawa (2005) reviewed the literature on emergency education and wrote a section on the various links between violence and emergencies. The author investigated the link between the definitions of emergency and the definitions of violence provided by Galtung (1969) that differentiated between direct and indirect violence. Direct violence refers to the physical and psychological violence against individuals caused by war, assault, and torture, whereas indirect violence refers to social injustice (Galtung, 1969; Kagawa, 2005). The previous definitions of violence did not cover the cases of indirect violence that is caused by discrimination because of identity, religion, language and race. Thus, Galtung (1996) elaborated later in another paper to include what he called “cultural violence”, which covers the aspects above. Similarly, Salmi (2004) discussed the same aspects of Galtung’s “cultural violence”, but the author called it “alienating violence”, which in his opinion is defined as the deprivation of a person’s rights of psychological, emotional, cultural or intellectual integrity. An example of alienating violence could be cultural repression, racism, living in fear, social ostracism, or alienation in the living conditions such as the right to work etc.

The previous summary suggests that when deciding the educational goals in an educational system, the culture, beliefs, and needs of the displaced population should be respected and acknowledged. Otherwise, the case could qualify to become alienating violence by depriving the displaced populations (especially parents) of their right to choose the best for their children. Graham, Minhas and Paxton (2016) conducted a systematic review of the literature on the learning difficulties of children of refugee backgrounds. He concluded that parental misunderstanding of the learning styles is one of the significant risk factors for learning problems. To highlight this, Salmi (2004) links education with human rights and freedom of choice as stated in the International Covenant on Civil and Political Rights, in which states agree to respect the parents’ liberty to choose several aspects regarding their children’s education. This challenge proved to be an interesting challenge in the second case study in this research, where a conflict of opinions occurred regarding the educational needs. The details of this challenge and how it was managed are discussed in the chapter on that case study and the discussion chapter.

2.2.2.3 Education as a tool to reinforce violence and conflict

Even though emergency education aims to reduce the effect of the conflict on children and communities, in some cases, this may not be the case when the educational intervention is not planned carefully.
Van Ommering (2011) conducted a study on elementary schools in Lebanon during and after the 2006 war with Israel. The author stressed how education in conflict-affected places might reflect and even reinforce sectarianism, violence, and identity problems due to the nature of the conflict that involved sectarian and religious aspects related to both Israel and Lebanon and may even have links to the Lebanese sectarian war. Similar results were found by (Jabbar & Zaza, 2014), who studied Syrian refugee children at “Zaatari” refugee camp, which is the biggest refugee camp in Jordan, where some educational interventions raised discussions related to the Syrian conflict.

Additionally, a group of researchers from the War-Child organisation in the Netherlands worked on a project of co-creation of digital stories to support the literacy of Sudanese and Syrian displaced children (Stubbé et al., 2016). The authors highlighted the challenge of educational content assessment by giving an example of using some specific names for characters in literacy stories that ended up being misunderstood as they have political and religious references. For example, some names may be the same as a leader of a fighting group in the Syrian conflict or names that reflect a specific religion or sect among the fighting groups in Syria, which may change the whole context of the story to something that causes sensitivities.

A final example is when UNESCO released an accelerated learning curriculum for Syrian refugees in Lebanon and Jordan in collaboration with the Syrian Ministry of Education, hoping that this might make the return of children to their home country easier in the future. However, the curriculum’s first lesson was titled “my country” with references to the Syrian government and a picture of the Syrian flag, which was a sensitive issue in the Syrian conflict. This is because, throughout the conflict, different groups fighting in Syria adopted different flags for the same country. Even though the decision to go with the government official flag can be understood, it is suggested that the priority should be for children’s learning rather than anything that may reinforce conflict-related debate with the families and children in displacement, as this could lead to abolishing the curriculum should it be rejected by the families. The researchers from the previous examples suggested that educational interventions for war-affected children should consider these challenges and aim to bridge differences for a better future, or at least prevent reinforcing differences.

This aspect must also be considered in any design process for educational technology systems as a part of educational materials assessment. In order to achieve this, Tawil and Harley (2004) wrote a paper titled “Education and Identity-based Conflict: Assessing curriculum policy for social and civic reconstruction”, where the authors discussed case studies from seven countries that had experienced conflicts. These countries are Bosnia and Herzegovina, Guatemala, Lebanon, Mozambique, Northern Ireland, Rwanda, and Sri Lanka. The authors suggested a process (Figure 2-3 below) through which the
curricula or any educational activities can be evaluated by achieving an understanding of the conflict, the actors, the politics, the conflicting issues, and how they are managed.

It can be seen from the figure above that the process aims to deal with a post-war curriculum reconstruction on a national level. The questions that Tawil and Harley (2004) suggested considering aim to understand the context of the conflict, the people, and the conflicting topics. Such an understanding would help in assessing the educational materials. However, it can also be suggested that such understanding is essential for the trust-building that was discussed earlier in section (2.1.1.3). Thus, these aspects raised by the authors are missed in the current design processes and will be considered in the design process developed in this research for both trust-building and educational intervention planning and evaluation.
2.2.3 The importance of a participatory approach

As seen in the previous sections that contextualised displacement (2.1.1) and emergency education (2.1.2), the challenges faced in situations of displacement vary from one case, one camp, one country, one emergency to another and involve severe complexity on different aspects. Thus, extensive research suggested that any intervention in this area should be planned following a participatory approach which would involve the stakeholders of the intervention from the early stages of intervention planning and design (INEE, 2010; Kagawa, 2005; Obura, 2003; Tawil & Harley, 2004). This is agreed on and strongly encouraged by both the literature from academia and the grey literature from the NGOs working in the field. The need for a participatory approach will inform the discussion later in section 2.4 on the different design approaches that could be followed in a system design process in this context.

2.2.4 Technology for emergency education

Interest in using technology for displacement in general and in emergency education, in particular, has been growing in the past decade and significantly with the refugee crisis, which started in 2014 and is still ongoing (Dahya, 2016; Fisher, 2016; Fisher et al., 2014, 2016, 2017; Hourcade et al., 2019; Mansour, 2018; NORAD, 2017; Peterson Bishop & Fisher, 2015; Pipek et al., 2019; Stubbé et al., 2016; Talhouk et al., 2018; Talhouk, Aal, et al., 2019; Talhouk, Ahmed, et al., 2016; Talhouk, Balaam, et al., 2019; Talhouk, Mesmar, et al., 2016; Tauson & Stannard, 2018; Weibert et al., 2019). Technology can be used for rapid delivery of content, to create custom audio or video recorded modules for mass dissemination, or to connect learners and teachers in different locations using SMS, email, or other forms of communication (Dahya, 2016; Mansour, 2018; Stubbé et al., 2017).

Importance of technology for education in emergencies

Another reason to support the claim that technology could help in such a context is that smartphones have become more popular in the last decade. Smartphones were reported by numerous research as a possible resource to be harnessed by technological systems, especially for education (Baranoff et al., 2015; Tahir & Wang, 2019; Tauson & Stannard, 2018; Xu et al., 2015). Fisher, Yefimova and Yafi (2016) and Fisher (2016) studied the creation of new technologies with refugee youth where more than half of the youth ideas were towards educational systems. Talhouk et al. (2016) organised multiple workshops about Human-Computer Interaction HCI for technology solutions for refugees, where they highlighted the importance of technology for education. Hourcade et al. (2019) organised research workshops on CCI (Child Computer Interaction) for refugee children with a focus on education. Tahir and Wang (2019) reviewed the literature on system design methods for refugee children highlighting that most technology systems in this area were towards education.
Educational technology for displaced populations covered both formal and informal education. Dahya (2016) provided an in-depth report of the literature on educational technology in emergencies which was a result of collaboration between the biggest organisations in this field, such as the INEE, USAID, and governments of Deutschland Germany, Australia.

**Formal learning**

The report explained that in the context of formal education, educational technology was used to strengthen the existing educational systems (Dahya, 2016). Weibert et al. (2019) designed a wizard for refugees in Germany to assist them in finding formal language classes. The UNESCO created a digital system to allow students to access their schools remotely in Gaza during the war and to support teachers activities by adding a further aspect of visualisation and interactivity (Dahya, 2016).

**Informal learning**

Numerous research discussed projects of educational technology in displacement that involved informal or non-formal education. This is because in the cases of crises, these types of education are the most urgent and common until the crises end (Dahya, 2016; Dryden-Peterson, 2011; Kagawa, 2005; Sinclair, 2002; Tauson & Stannard, 2018).

Fincham (2012) discussed the role of traditional media, TV, YouTube videos, and communication over social media in educating Palestinian refugees in Lebanon about the world they live in. Such informal education prepares the student when they join formal educational activities later. Dryden-Peterson et al (2011), Mansour (2018), and Dahya (2016) researched the relationship between trans-national support, ICT, and higher education in the Dadaab refugee camps of Kenya. In these papers, mobile phones and transnational social networks were identified as important components of the education landscape for refugees. Pipek et al (2019) initiated a computer club in the High Atlas in Morocco, listing the challenges faced in their project and mapping them to two projects, one in a refugee camp in Palestine and one for marginalised migrants in Germany.

Tauson & Stannard (2018) stressed that access to educational technology software is not enough to ensure learning takes place. The author emphasised that it is necessary to ensure that technology can link the informal learning process to the formal. Still, informal learning does not only assist in preparing the displaced community for formal education. In the case of displacement, informal learning can achieve the essential needs of children to have a sense of normality through activity, fun, and collaboration while learning (Kagawa, 2005). Digital storytelling and role-playing have been used for refugees to creatively express themselves (Sawhney, 2009), and also was used to improve their intercultural empathy when entering schools (Aylett et al., 2009; Pipek et al., 2019). Stubbé et al.
(2016) worked on digital storytelling solutions for refugees from Sudan and Syria, highlighting the challenge such as contextual sensitivities affecting how stories are perceived by the community and calling for deep contextual understanding.

NORAD (2017) designed mobile games to teach Arabic literacy to Syrian refugee children by the Norwegian Agency for development cooperation. Their self-learning games were fun to play; however, the designers stated that they did not follow a pedagogical structure and focused more on fun rather than learning. Kukulsk-Hulme et al. (2015) and (2017) researched how mobile technologies can support migrants in achieving greater language immersion through situated, informal and incidental language learning beyond the classroom. Even virtual reality and augmented reality was used for refugee children with fewer resources to increase their exposure to the world (M Aman & Shiratuddin, 2020).

**Challenges**

The previous examples illustrate the increased importance of using technology for emergency education in both the academic and grey literature fields. However, such involvement of technology is not free from many challenges faced. Tauson and Stannard (2018) from Save the Children UK, in collaboration with the INEE, reviewed 130 academic papers on educational technology in emergencies. The authors discussed how the majority of studies that they found using technology for emergency education took a sociocultural perspective to learning which suggests that individuals learn through an active process and that the context has an important role in learning. This agrees with the previous summary on displacement and emergency education which highlighted the importance of sociocultural topics and contextual dynamics on education in this context. Pipek et al (2019) and Weibert et al (2019) also emphasised the challenge of understanding the context as an essential component of any work with displaced populations.

Lack of resources was also reported as a challenge to implementing and utilising educational technology in displacement (Pipek et al., 2019; Tauson & Stannard, 2018; Weibert et al., 2019). Another challenge is that learning outcomes would not simply improve only by the provision of hardware. Educational technology must take a pedagogical standard when designed to be effective (Tauson & Stannard, 2018). Similar findings resulted from the preliminary study conducted in this PhD study (section 3.1.7). This aspect of aligning technology with educational goals and challenges has been known and evident in the literature on educational technology (Kadiyala and Crynes, 2000). Unfortunately, this aspect is missing in many projects that focus mainly on fun and gamification without a pedagogical approach.
The challenges of age and culture diversity were also reported as challenges to designing systems in displacement (Pipek et al., 2019; Weibert et al., 2019). Lack of experience in technology and other topics were also reported as possible challenges to affect designing such systems in displacement (Dahya, 2016; Pipek et al., 2019; Tauson & Stannard, 2018; Weibert et al., 2019). Literacy difficulties and the need for visuals, language barriers, trust and empathy were suggested as essential aspects for designing with displaced communities (Pipek et al., 2019; Weibert et al., 2019). Finally, motivation was reported as one of the main challenges in education in displacement in general (Dryden-Peterson, 2011; Sinclair, 2002) and in educational technology in displacement (Tauson & Stannard, 2018).

Most of these challenges were confirmed during this PhD study in addition to various other challenges. These challenges will be discussed in detail in the preliminary exploratory study (section 3.1), in addition to the two case studies in sections 5.3 and 5.4. Moreover, it will develop a design process and a design method that will tackle these challenges, specifically when designing educational technology systems for displaced war-affected children. The design process and design method will provide a special focus on motivation as an essential concept that affects both the design activities and the resulting systems.

### 2.2.5 Section conclusion

Section 2.1.1 provided a contextualisation of displacement and its challenges which were summarised in section 2.1.1.4. This section (2.1.2) provided a contextualisation of emergency education. It discussed the contextual and psychological aspects of emergency education and how they affect students’ engagement, motivation, and behaviour. Furthermore, section 2.1.2.2 discussed the political and war-related challenges of emergency education. It concluded that interventions in this area should support student engagement and motivation, avoid reinforcing direct and indirect forms of violence, and consider the political and social division caused by the conflict and any socio-cultural sensitive topics. This can be done by achieving an understanding of the conflict, the people, the social division, and how conflicting issues are managed. Section 2.1.2.3 discussed how participatory approaches are suggested in this context to tackle the complex needs and how this would inform the discussion on design process approaches in this PhD study. Moreover, section 2.1.2.4 discussed the implementation of technology for emergency education and how successful implementation requires aligning technology with pedagogy, educational needs and challenges, the need for a well-structured design process, and the need to understand the role of technology in supporting motivation and engagement.
This PhD study aims to develop and evaluate a design process for educational technology systems for war-affected displaced children. The previous sections suggested multiple topics that require considerations in such a process, including:

1- The need to achieve an understanding of the context, the people, social division, and the conflict
2- The need to build trust relationships for access, reliability, and consent
3- The need to focus on engagement and motivation as core concepts in this context
4- The evidence that participatory approaches are better suited to any intervention in a displacement context

The next sections of the literature review will start by conceptualising engagement and motivation; afterwards, it will further investigate the different dynamics of the design process, such as the design process stages, flow, and design approaches.
2.3 Engagement and Motivation

The previous sections highlighted the importance of engagement and motivation in the context of displacement and emergency education. This section will conceptualise these two concepts and discuss how they will inform the design process.

2.3.1 The rationale for the focus on engagement and motivation

There is extensive research reporting behavioural problems as one of the most common characteristics of displaced refugee children (Fazel & Stein, 2002; Fegert et al., 2018; Graham et al., 2016; Jabbar & Zaza, 2014; Reed et al., 2012; Save the Children, 2018; Sourander, 1998; Thabet et al., 2002). Similar suggestions were discussed from the preliminary study conducted in this PhD study (section 3.1). Behaviour problems range from anxiety, loss of hope, loss of ambition, depression, violence, lack of focus, and many more. Such symptoms are not limited to specific locations; they are directly linked to psychology and lifestyle challenges caused by the trauma of displacement. As will be explained in the coming sections, these symptoms are also discussed in the literature on student engagement as indicators of student engagement difficulties. This means that displacement related symptoms have a direct effect on student engagement. The UNHCR suggested that educational interventions for refugee children should focus on ensuring student engagement as a key to successful educational interventions (Pausigere, 2011).

Living in displacement has also been linked with affecting motivation. Graham, Minhas and Paxton (2016) suggested that high academic and life ambition, motivational narrative, parental involvement in education, teacher understanding of linguistic and cultural heritage, and supportive peer relationships are among the major factors of success rates in any educational intervention for children of refugee background. All of the previous factors of both success and failure in learning are strongly linked to motivation and engagement as will be discussed further in the coming sections. Furthermore, Tauson & Stannard (2018) from ‘Save the Children’ concluded that motivation is one of the aspects in which technology can support emergency education and suggested further research on the details of how can this be achieved and maintained.

Thus, understanding engagement and motivation is essential in the context of this PhD study. This is because these concepts can affect the design process implementation in a context that lacks motivation and faces several behavioural difficulties. Moreover, these concepts should be considered in the design of the educational systems to ensure that the resulting systems support motivation and engagement.
2.3.2 Conceptualising student engagement

2.3.2.1 Definition and types of student engagement

Whether it is school education (Archambault et al. 2009; Fredricks et al. 2011; Skinner & Pitzer 2012; Van Uden et al. 2014) or higher education (Trowler, 2010), the concept of student engagement has become a critical topic in education and learning.

Van Uden et al. (2014) described student engagement as “the parent of learning”, and that it is correlated with academic achievement. Wilson (1995) indicated that student engagement involves activities to achieve learning goals and linked it to ‘rich’ learning environments. The literature has identified three main categories of student engagement which are behavioural, emotional, and cognitive engagement (Archambault et al 2009; Fredricks and McColskey 2012; Skinner and Pitzers 2012; Trowler 2010; Van Uden et al 2014).

‘Behavioural engagement’ draws on the idea of participation and includes involvement in classroom discussions and extracurricular activities (Archambault et al. 2009; Fredricks and McColskey 2012). The second type is what Fredricks and McColskey (2012) called ‘emotional engagement’ and referred to as ‘affective engagement’ by Archambault et al. (2009). This type focuses on the extent of positive (and negative) reactions to teachers, classmates, academics, or school. Finally, the third type of engagement is ‘cognitive engagement’, which is defined as the student’s level of investment in learning. It includes being thoughtful, strategic, and willing to exert the necessary effort for comprehension of complex ideas or mastery of difficult skills (Archambault et al. 2009; Fredricks and McColskey 2012).

Skinner & Pitzer (2012) provided a literature review on student engagement and suggested an engagement model focusing on the conceptualisation and understanding of student engagement and motivation for coping and everyday resilience. To understand engagement, the authors suggest looking at both indicators and facilitators of engagement and disengagement, which they named disaffection.

2.3.2.2 Indicators, facilitators, and outcome of student engagement

Skinner and Pitzer (2012) and Sinclair et al. (2003) stressed the importance of distinguishing the indicators, the facilitators, and the outcome of student engagement. Such distinctions will add clarity to the conceptualisation of engagement and improve the understanding of engagement. The authors provided a non-educational example that if a study target is weight loss, then indicators might be pounds on a scale and dimensions of the body, whereas facilitators may include a healthy diet and exercises, and outcomes could be lower blood pressure.
When applying the same understanding to student engagement, the authors argue that indicators of student engagement must be active components such as the actions provided in Table (2-1) below, that provides a detailed breakdown of student engagement indicators. The authors stressed that academic performance, such as grades, tests, and scores, should not be perceived as indicators of engagement. However, they are potential outcomes of student engagement.

Table 2-1 A motivational conceptualisation of engagement and disaffection in the classroom (Skinner and Pitzer, 2012)

<table>
<thead>
<tr>
<th></th>
<th>Engagement</th>
<th>Disaffection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behavior</strong></td>
<td>Action initiation</td>
<td>Paivity, Procrastination</td>
</tr>
<tr>
<td>Initiation</td>
<td>Effort, Exertion</td>
<td>Giving up</td>
</tr>
<tr>
<td>Ongoing participation</td>
<td>Working hard</td>
<td>Restlessness</td>
</tr>
<tr>
<td>Re-engagement</td>
<td>Attempts</td>
<td>Half-hearted</td>
</tr>
<tr>
<td></td>
<td>Persistence</td>
<td>Unfocused, Inattentive</td>
</tr>
<tr>
<td></td>
<td>Intensity</td>
<td>Distracted</td>
</tr>
<tr>
<td></td>
<td>Focus, Attention</td>
<td>Mentally withdrawn</td>
</tr>
<tr>
<td></td>
<td>Concentration</td>
<td>Burnt out, Exhausted</td>
</tr>
<tr>
<td></td>
<td>Absorption</td>
<td>Unprepared</td>
</tr>
<tr>
<td></td>
<td>Involvement</td>
<td>Absent</td>
</tr>
<tr>
<td><strong>Emotion</strong></td>
<td>Enthusiasm</td>
<td>Boredom</td>
</tr>
<tr>
<td>Initiation</td>
<td>Interest</td>
<td>Disinterest</td>
</tr>
<tr>
<td>Ongoing participation</td>
<td>Enjoyment</td>
<td>Frustration/anger</td>
</tr>
<tr>
<td>Re-engagement</td>
<td>Satisfaction</td>
<td>Sadness</td>
</tr>
<tr>
<td></td>
<td>Pride</td>
<td>Worry/anxiety</td>
</tr>
<tr>
<td></td>
<td>Vitality</td>
<td>Shame</td>
</tr>
<tr>
<td></td>
<td>Zest</td>
<td>Self-blame</td>
</tr>
<tr>
<td><strong>Cognitive Orientation</strong></td>
<td>Purposeful</td>
<td>Aimless</td>
</tr>
<tr>
<td>Initiation</td>
<td>Approach</td>
<td>Helpless</td>
</tr>
<tr>
<td>Ongoing participation</td>
<td>Goal strivings</td>
<td>Resigned</td>
</tr>
<tr>
<td>Re-engagement</td>
<td>Strategy search</td>
<td>Unwilling</td>
</tr>
<tr>
<td></td>
<td>Willing participation</td>
<td>Opposition</td>
</tr>
<tr>
<td></td>
<td>Preference for challenge</td>
<td>Avoidance</td>
</tr>
<tr>
<td></td>
<td>Mastery</td>
<td>Apathy</td>
</tr>
<tr>
<td></td>
<td>Follow-through, care</td>
<td>Hopeless</td>
</tr>
<tr>
<td></td>
<td>Thoroughness</td>
<td>Pressured</td>
</tr>
</tbody>
</table>

When looking at the table above, it can be seen that many of the disaffection indicators have been discussed earlier in the challenges of displacement and emergency education. These include giving up, being mentally withdrawn, sadness and anxiety, anger, and hopelessness. These similarities support the importance of focusing on engagement in this PhD study as it shows that it can be linked to the known aspects of displacement. The information in the table above will inform the design process by
highlighting the need to understand the following engagement related questions when designing educational technology systems for children:

1. What does education mean, and what is its purpose from the perspective of the stakeholders?
2. What will cause interest, enjoyment, involvement, satisfaction, and enthusiasm for the learners?
3. What are the causes of disinterest, giving up, loss of hope, and distraction for the learners?

These questions will be included in the proposed design process to ensure that an understanding of what engages or disengages the different stakeholders, especially the learners, is achieved. It should be noted here that it is not expected that an educational technology system can resolve all the challenges faced by the displaced community. However, such a system might provide a better understanding of the educational needs and challenges. Furthermore, it would help design solutions that are engaging from the perspective of the stakeholders. This aligns with the findings from the previous sections about designing technology to fit specific educational and pedagogical needs with a focus on engagement and motivation.

### 2.3.2.3 Facilitators of student engagement

Research highlights numerous facilitators of student engagement, such as teachers, parents, peers, positive feedback (Skinner and Pitzer, 2012; Graham, Minhas and Paxton 2016), interactive teaching methods, nature of the academic tasks (Gettinger & Walter, 2012), technology (Gredone, 2010) and other facilitators. Skinner and Pitzer (2012) integrated various student engagement facilitators into a model of positive motivational development grounded in self-determination theory (SDT). The next section will summarise the literature on motivation and motivation theories.

### 2.3.3 Introduction to motivation and motivation theories

**Definition of motivation**

Motivation has several definitions, ranging from “an individual’s desire to act in particular ways” (Walter & Hart, 2009, p. 163) and “reasons individuals have for behaving in a given manner in a given situation” (Middleton & Spanias, 1999, p. 66), or the desire or disposition to engage and persist in a task (Schunk et al., 2012). These three definitions form the understanding of this PhD study for motivation as this concept will be discussed in multiple forms that focus on people’s desire to participate in a task such as the educational activities of the design process activities in addition to evaluating the resulted designs from these activities.
Irvine (2018) discusses motivation as a meta concept that incorporates several related concepts such as engagement, persistence, interest, and self-efficacy. Since it is a meta concept, the author suggests that motivation involves a wide array of theoretical constructs—such as expectancy-value or intrinsic-extrinsic—and many related theories. This section will review some of the motivational theories such as Expectancy-value theory, intrinsic and extrinsic motivation theory, ARCS model, self-efficacy theory, and Self-Determination Theory (SDT).

**Motivation Theories**

There are various motivation theories existing in a range of disciplines. This section will review some of the most reported theories of motivation in the context of education. Some of these motivation theories are used only in an educational context, whereas other theories are also used in other disciplines such as business, sport, and system design.

**Expectancy-value theory**: suggests that the two most important predictors of achievement behaviours are expectancies for success and task value beliefs (Wigfield & Eccles, 2000). Expectancies for success relate to students’ beliefs of whether they will succeed in completing an upcoming task (Irvine, 2018; Wigfield & Eccles, 2000). The more students expect to succeed at a task the more motivated they are to engage with it (Irvine, 2018; Wigfield & Eccles, 2000). This theory does not necessarily focus on the origin of motivation, such as whether it is intrinsic or extrinsic.

**Intrinsic and extrinsic motivation theory**: This theory suggests that intrinsic motivation depicts an activity done only for own contentment without any external anticipation (Gopalan et al., 2017). The challenge, curiosity, control and fantasy are the key factors to trigger intrinsic motivation. In education, a lot of willpower and a positive attitude is very much required to sustain motivation. In contrast, extrinsic motivation represents external aspects such as rewards and punishments. Extrinsic motivation results in willpower and engagement, but it might not be sustainable as motivation will be only present when external factors such as rewards and punishments are implemented (Gopalan et al., 2017; Irvine, 2018). The aspects of intrinsic and extrinsic motivation are covered by most of the motivation theories and are used in comparison models for motivation theories (Irvine, 2018). This theory explains this relationship but does not explain how extrinsic motivation can be internalised to become more intrinsic.

**ARCS model of motivation in learning**: this theory claims that students can be motivated directly through the use of attractive, satisfying and stimulating learning material (Gopalan et al., 2017; Irvine, 2018; Keller, 2016). The model name is abbreviated from Attention, Relevance, Confidence and Satisfaction attributes. It focuses on catching the attention of students, adding relevance to students’
experiences, emphasising the aspect of confidence related to students’ emotion and anticipation, and lastly, satisfaction stands for the positive feeling regarding the learning process (Keller, 2016).

**Self-efficacy theory:** is defined as people’s beliefs in their ability to perform a course of action required to achieve a specific task (Bandura et al., 1999). This can link to the confidence aspect of the ARCS model and expectancy for success in the expectancy-value theory. However, the difference is that self-efficacy represents a task-specific view of perceived competence, whereas expectancies for success tend to be domain-specific (Wigfield & Eccles, 2000). According to Bandura et al (1999), self-efficacy can be gauged through four sources—past performance, modelling, verbal persuasion, and psychological states. This theory is implemented in various disciplines and does cover aspects of intrinsic and extrinsic motivation; however, it does not explain the details of moving from an extrinsic motivation towards an intrinsic motivation (Irvine, 2018).

**Self-determination theory:** this theory focuses on different orientations of motivation that influence the quality of engagement (Deci & Ryan, 1985). SDT focuses on both intrinsic and extrinsic motivation and suggests that achieving the three innate needs of autonomy, competence, and relatedness result in internalising motivation to be more intrinsic rather than extrinsic (Deci & Ryan, 1985). The theory is implemented in multiple disciplines and provides a path from extrinsic motivation to intrinsic motivation (Irvine, 2018).

**Discussion**

The examples above are for multiple motivation theories that are discussed and reviewed in this PhD study in order to use this information to structure the motivation aspect in both the designed systems and the design process activity. ARCS model is widely used in the literature on motivation; however, it is focused on education research only (Alkaabi et al., 2017; Gopalan et al., 2017). Thus, the ARCS model would be limited to classroom activities and would not cover studying the motivation in the design process activities. In contrast, self-efficacy and self-determination theory are both very well implemented in education and research in other disciplines such as sport (Feltz et al., 2008; Hill et al., 2015; Sweet et al., 2012) business (Drnovšek et al., 2010; Gagné, 2014), and many other disciplines making both theories more suitable to this PhD study as they cover both the educational a non-educational aspects of motivation that could inform the design process activities.

Although SDT and SET have the same theoretical ideology, both theories have different views of agency. In SET, individuals act when they feel capable and able to attain the goal (i.e., self-efficacy drives the agent). Although SDT entertains the idea that feelings of capability/competence are important, SDT theorists believe that autonomy plays a larger role (Sweet et al., 2012). The role of
autonomy is essential in this research due to the use of participatory design methodologies. Furthermore, SDT also offers a detailed path from extrinsic towards intrinsic motivation (Farrell & Moffat, 2014), which would be very useful in the context of this research due to the complicated demotivating lifestyle of displaced communities.

Irvine (2018) discussed the theories above and provided a framework for comparing theories related to motivation in education. The author suggested that expectancy-value and intrinsic-extrinsic motivation theories are covered in most other theories of motivation in education. Thus, the two theories were used to create a comparison framework that includes visual representation that can be used to compare the different theories based on their focus on two axes (expectancy-value) and (intrinsic-extrinsic). Irvine (2018) provided the following figures for Self-efficacy theory and Self-determination theory.

It can be seen from the figures above that SDT is more central in covering the aspects of expectancy, value, intrinsic and extrinsic motivation, whereas self-efficacy leans more towards covering intrinsic and expectancy aspects.

In the context of this research, extrinsic motivation is as important as intrinsic motivation. This is because extrinsic motivation is one of the major challenges that face the displaced populations and displaced children where many educational and non-educational aspects are enforced through external factors such as refugee laws, education laws, and laws from the NGOs governing refugee camps. Many of the educational interventions involved in the case studies conducted in this research involved aspects of extrinsic motivation and resulted in difficulties that will be thoroughly discussed in this study in the chapters of case study, data analysis, and discussion. Moreover, the path from extrinsic motivation to the intrinsic motivation provided specifically in SDT is very helpful in analysing and discussing the results from this PhD study. Thus, SDT was chosen in this PhD study as the motivation theory that will be used in the different chapters to cover both educational activities and non-educational design process activities.
This section provided a literature review on motivation definition and motivation theories in learning. Furthermore, a discussion was provided to determine which motivational theory is most suitable for this research which was self-determination theory. The next sections will explore SDT in detail.

2.3.4 Conceptualising motivation through Self-Determination Theory (SDT)

As discussed in the previous section, self-determination theory (SDT) is derived from the psychology of human motivation. SDT assumes that “people are innately curious, interested in creatures who possess a natural love of learning and who desire to internalise the knowledge, customs, and values that surround them” (Niemiec & Ryan, 2009, p. 133). The theory is discussed in different implementations of motivation and various research in education (Niemiec & Ryan, 2009), educational technology (Chen & Jang, 2010; Delen et al., 2014; Y. Lee et al., 2015), gamification (Hamari et al., 2014; Tyack & Mekler, 2020), sport (Hill et al., 2015) and many other bodies of literature.

SDT specifies three psychological needs, which are competence, autonomy, and psychological relatedness. According to SDT, these needs motivate the self to initiate behaviour and are essential for the psychological health and well-being of an individual. SDT suggests that supporting these three needs lead to internalising motivation to become intrinsic motivation. Internalised motivation is when someone is convinced with the goals of a task, feels enjoyment and satisfaction when doing the task, and when this interest and enjoyment are internal and not regulated by external rewards or punishments. Figure 2-5 below illustrates the different types of motivation, according to SDT. The left side of the figure explains the state of no motivation or external motivation, which SDT suggests is a low-quality motivation as it is externally regulated. In contrast, the right side of the figure shows the types of more internalised motivation, which SDT suggest is healthier and more sustainable as it is internally self-regulated rather than being externally regulated.
SDT claims that internalising motivation is achieved by fostering the need for autonomy, competence, and relatedness. These three needs will be discussed in the next section in detail.

### 2.3.4.1 The needs of SDT

Self-determination theory will be a core concept in this research and will be directly linked to the findings of this PhD study in the discussion chapter. This section will explain the three innate needs for SDT with practical examples from education. The understanding below of SDT and its needs was achieved by summarising the literature and by attending an online academic course (Ryan, 2020) organised by the researchers who developed the theory.

**Autonomy**

The need for autonomy refers to the need to express one’s authentic self and to experience that self as the source of action and is hypothesised to underlie processes of self-determination (Deci & Ryan, 1985, 2000, 2002a). In general, supporting autonomy in communication and planning is done by creating an internal frame of reference that allows the understanding of how others see motivation, what challenges they face, and what needs they have; Ryan (2020) called this frame of reference an “Empathic stance”. Furthermore, autonomy can be supported by encouraging self-initiation and ownership, providing people with many choices to choose from in their decision-making process, and by avoid using rewards in a controlling way to limit people’s freedom of choice.

In education, students with a greater sense of autonomy in school also show higher levels of classroom engagement, enjoyment, persistence, achievement, and learning (Skinner & Pitzer, 2012).
“Students’ autonomy can be supported by teachers’ minimising the salience of evaluative pressure and any sense of coercion in the classroom, as well as by maximising students’ perceptions of having a voice and choice in those academic activities in which they are engaged. Indeed, research suggests that autonomy-supportive teaching practices are associated with positive outcomes in the classroom” (Niemiec & Ryan, 2009).

Competence:
Competence refers to the need to experience oneself as effective in one’s interactions with the social and physical environments (Skinner & Pitzer, 2012). Similarly, it is defined as seeking to control the outcome and experience mastery. Competence can be supported by introducing learning activities that are challenging and thereby allowing students to test and expand their academic capabilities (Niemiec & Ryan, 2009). It is important to note that the aspect of challenge should be implemented carefully, as students will only engage with tasks that they can understand and master. This can be linked to Vygotsky’s zone of proximal development (Vygotsky, 1978), which was also discussed in the literature on emergency education by Tauson and Stannard (2018). Niemiec and Ryan (2009) suggest that positive and constructive feedback with error tolerance are keys to supporting competence.

Relatedness
Relatedness refers to the need to experience oneself as connected to other people, as belonging; it is hypothesised to underlie processes of attachment (Skinner & Pitzer, 2012). Relatedness is deeply associated with someone’s feeling of being liked, connected, respected, and valued (Niemiec & Ryan, 2009). SDT suggests that people mostly want to internalise the principles and standards of others to whom they are connected.

Spitzer (1996) argued that motivation is a neglected factor in instructional system design ISD and suggested that any activity can be made highly motivating if a motivating ‘context’ is added to the basic task. These include action, fun, variety, choice, social interaction, error tolerance, measurement, feedback, challenge, and recognition. All of these motivators can be linked to the three innates of SDT.

The discussion on SDT, autonomy, competence, and relatedness will inform different areas in the later sections, such as the choice of methods and design approaches. Moreover, it will be discussed thoroughly in the discussion chapter, where it will be linked to the findings from the case studies.

2.3.5 Section summary
This section (2.3) provided a conceptualisation of engagement and motivation in the context of this PhD study. It started by explaining the importance of engagement and motivation in displacement
for both the design process activities and the educational systems. Section 2.3.2 discussed student engagement by explaining the different definitions and types of engagement. Furthermore, a model was discussed to understand the different indicators of engagement which informed three main questions that will be included in the design process in this research. This was followed by explaining how motivation is considered a facilitator of engagement. Section 2.3.3 conceptualised motivation through self-determination theory by explaining the theory and its three needs for internalised motivation with practical examples of each need. Motivation and self-determination theory will inform the discussion in the coming sections on the design processes and design approaches. It will also be discussed in detail in the discussion chapter of this PhD study by linking it to the findings as it will inform answering the research questions.

The next sections of the literature review will focus more on the technical aspect of the design process by discussing the different design processes in computer science and instructional system design. The design processes will be discussed with regard to the process stages, flow, and design approaches. This discussion on design processes and approaches will lead to proposing a design process based on the literature review and the preliminary study, which will later be evaluated in the two case studies.
2.4 Design processes

Since this research aims to develop a design process, it is essential to understand the conceptualisations of design processes from the literature. This section will provide a literature summary on technology systems design processes. This summary will include the definition of a design process and process stages and flow. Furthermore, it will provide a mapping between the known design process types and models with the displacement challenges to discuss which models and types are most suitable for the context of this PhD study.

2.4.1 Design process definition

This section will discuss the definitions of the terms design and design process. Miller (2005) distinguished the word “design” from the word “product” by specifying that design is not a product; the product is, instead, the output of design. Fails, Guha and Druin (2012) discussed the difference between the term “Development Process” and “Design Process”. They argued that the latter term is more appropriate in the context of technology and education. This is because the word development can be confusing in the computer science context, where it could specifically mean coding and software development and can also be confusing in the educational context as it could mean the cognitive learning development of the child.

Regarding the definition of a design process, there is an agreement that it involves all the work done from the beginning to the end in the creation of new problem-solving tools, whether the tools are software, hardware, or mixed. This may involve numerous activities such as contemplating, speaking, writing, drawing, modelling, constructing, etc. (Dix et al., 2005; Fails et al., 2012; W. R. Miller, 2005). Dix et al. (2005) specified that the design process is achieving the design goals taking into account the limitations to the design process, with the design goals being prioritised, and focusing on both the technical equipment (limitations, capacities, tools, platforms) and people (psychological, social aspects, human error).

This PhD study differentiates between the following terms in comparing and discussing design processes:

**Design process stages:** the different stages that each aim to complete a part of the design process, such as requirement gathering, development, or evaluation. In other words, stages in a process that describe what needs to be done.
**Design process stages flow:** which discusses the flow from one stage to another, whether it is in one way or more, how and when to move from one stage to another, and how many times each stage needs to be visited to complete the whole process.

**Design process sub-stages:** these are the different tasks under each of the design process stages. For example, requirement analysis may require multi-tasks to be completed for different categories of needs. Such tasks would be called sub-stages in the context of this PhD study.

**Design approach:** is the approach of data collection in each stage of the process. For example, data can be collected with an expert top-down mindset where the end-users are involved as testers or with a bottom-up participatory mindset where the end-users are involved in the decision making and design. The design approach also discusses the level of involvement of the end-users in a design process. In summary, the design approach is a set of characteristics and values that constitute the implementation of the design process stages.

**Design methods and techniques:** these are the methods and activities that can be used to gather data in each stage of a design process. Examples of design techniques are post-it notes, personas, co-design workshops, focus groups.

The next section will explore examples of the different design processes from computer system design, educational technology and instructional system design, and participatory design. The examples will be discussed regarding their process stages, sub-stages, and flow, comparing their implementation context with the identified challenges of emergency education and displacement from the previous sections.

### 2.4.2 Design process stages

There are various design processes in different industries; each of these processes defines its stages and substages in a way that suits the end goals and the context.

Fails, Guha and Druin (2012) discussed the process, methods, and techniques for designing systems for children. Their design process Figure 2-6 includes defining the problem, researching the problem, creating the solutions, evaluating the solutions, and reflecting on the evaluation. The authors confirmed that the process stages in this area are only for guidance and that stage titles and the flow can be modified in any way to fit the purpose. They specifically suggested that in most cases, when following a participatory approach, designers would move back and forth or edit the process stages and flow to fit the purpose.
Similarly, there are various other known design processes and design models which also have similar stages but with different naming. The following table 2-2 compares the stages present in some of the common design processes from different disciplines. These processes will be discussed in the next section as they differ in their process stages flow. The table shows how different processes combine, expand, or change the names of any process stage depending on the needs and context of implementation. The table below (2-2) includes design models from computer science literature which are the waterfall standard (Balaji, 2012), waterfall by IBM (IBM, 2006), and agile (Balaji, 2012). In addition, the table includes design models from instructional system design ISD, which are the ADDIE model (Branch, 2008), and the SAM (Successive Approximation Model) model by (Allen & Sites, 2012). Finally, it includes an example design process from the literature on participatory design for children suggested by Fails, Guha and Druin (2012).

Table 2-2 The design process stages from different examples

<table>
<thead>
<tr>
<th>Model name</th>
<th>Model/design process stages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Waterfall (standard)</strong></td>
<td>Requirements analysis Design Development Testing Implementation Maintenance</td>
</tr>
<tr>
<td>Waterfall (IBM)</td>
<td>Requirements analysis Design Coding Integration test</td>
</tr>
<tr>
<td><strong>AGILE</strong></td>
<td>Mainly the same stages as the waterfall but with an iterative flow</td>
</tr>
<tr>
<td><strong>ADDIE</strong></td>
<td>Requirements analysis Design Develop Implement test</td>
</tr>
<tr>
<td><strong>SAM</strong></td>
<td>Evaluate (analysis) Design Develop &amp; implement evaluate</td>
</tr>
<tr>
<td>(Fails, Guha and Druin 2012)</td>
<td>Define problem Research the problem Create Solutions Evaluate solutions Reflect on the outcomes</td>
</tr>
</tbody>
</table>
It can be seen from the table above that different design processes and models from different disciplines cover similar tasks with differentiations of the focus. For example, the models from computer science design focus more on development (programming) and unit testing. In contrast, the models from instructional system design and participatory design have less focus on such areas. Moreover, the different design processes above focus mostly on the system design aspects. They have no specific mention or focus on contextual and people aspects such as the socio-cultural, psychosocial, trust, and contextual understanding aspects, which are essential to address displacement.

The design process developed in this PhD study will focus on the problem and requirement analysis, design, and evaluation in the context of displacement as such stages are the most affected in such a context. It will have less focus on the technical aspects of programming, unit testing, and code integration as they are irrelevant to the displacement context.

This section provided examples of some of the known design processes and their stages. It showed how the different names and stage count could vary from one context to another even when the processes aim to implement similar tasks overall. The next section will discuss the design process stages’ flow.

2.4.3 Design process flow

The previous section showed how design processes are often similar in their stages (what needs to be done). However, the processes and design models are different in the flow from one stage to another, such as how, when, and in what order the design process stages are performed. This concept is called “the software life cycle” in computer science literature (Dix et al., 2005). The most documented process flow models are either sequential such as the waterfall model, or iterative such as the agile model (Balaji, 2012; Dix et al., 2005). Multiple educational technology design models are based on these design models. Each type of these processes will be discussed in the next sections as a part of understanding the available processes with mapping each type against the displacement needs and context.

2.4.3.1 Sequential design processes

In the sequential process model, each stage of the process should be fully completed before moving to the next stage. For example, the waterfall model is one of the main design models in technology systems. It consists of 6 main stages, which are: analyse, design, development, test, implement, and maintain (Balaji, 2012). The stage names and count might differ slightly from one source to another, but the general process structure is the same. This process is known to be linear (one way) and
sequential, where the system requirement (end goals) should be clear ahead of the rest of the stages (Balaji, 2012; Mader & Eggink, 2014; Sureshchandra & Shrinivasavadhani, 2008).

The disadvantages of the waterfall model are that it is considered too strict and linear, allowing less flexibility to go back to previous stages, and allowing no overlap between the different stages. Furthermore, the role of the end-users in sequential system design is often limited to the requirement gathering and as testers of the resulted solutions, which means that problems in the early stages may not be discovered until the late stages. Finally, this model may prove to be problematic to implement if the requirements often change during the design process (Balaji, 2012).

![The Waterfall model](image)

*Figure 2-7 The Waterfall model*

The waterfall model is the basis for many design processes in educational technology and ISD (instructional system design), such as the ADDIE model (Branch, 2008). The ADDIE model is one of the core design models in ISD where the name ADDIE stands for analyse, design, develop, implement, and evaluate (Branch, 2008). The exact origin of this model in ISD is unknown; however, the model is based on the waterfall design model that was discussed earlier (Allen & Sites, 2012).
Even though the ADDIE model has been used vastly in ISD, there is significant criticism of the model in the ISD literature for being too general, too rigid, linear and sequential (Bichelmeyer, 2005; Molenda, 2003). It can be seen that part of the criticism for ADDIE is similar to the criticism of the waterfall model in general. This is what made many ISD researchers come up with enhanced design models which used ADDIE as a guideline (Tessmer & Wedman, 1990), but with providing more actionable and practical details for each stage, and/or with designing their models to be more iterative rather than sequential.

The next section will explore the concept of iterative design processes and will be followed by a comparison between sequential and iterative design processes in the context of displacement.

2.4.3.2 Iterative design processes

Unlike the sequential design processes such as the waterfall model, iterative design processes such as the agile model are about developing the product as early as possible in the design process stages rather than waiting until the end of the design process. Instead of going through the process stages only once, providing the product at the end of the process, and giving too much attention to each process not to get it wrong, iterative processes go through the process stages briefly but in iterations. Designers go through the design process stages several times and deliver the product in increments but from the early stages of the design process (Allen & Sites, 2012; Alshamrani & Bahattab, 2015; Balaji, 2012; IBM, 2006; Sy, 2007). Iterative design processes include several models such as the incremental, spiral, and agile models, all of which are iterative and allow for two ways movements between the process stages, but with a different focus on the requirements in each process stage. In the context of this PhD study, the primary differentiation that is discussed is whether a process is iterative or sequential: further varieties within the same process flow models - such as spiral, agile, or
incremental- are not relevant and would be left to the designing team implementing the design process resulted from this research.

The two figures above illustrate the contrast between the sequential and iterative design processes. The main advantages of an iterative process are that it provides a tangible and testable output at the end of each iteration, reduces the project risks, allows flexibility, allows better end-users and stakeholder involvement in the early design stages, and is better for complex projects where the requirements change during the design process (Allen & Sites, 2012; Alshamrani & Bahattab, 2015; Balaji, 2012; IBM, 2006; Sy, 2007).

An example of iterative design processes from educational technology and ISD is the SAM model (Successive Approximation Model). This model was created by Allen and Sites (2012) Figure 2-3. The authors are very critical of the waterfall-based ADDIE design model and argue that the ideal design
model in Educational technology should be iterative, support more collaboration, and thus end up being efficient and effective.

This section discussed different design models regarding their stage flow and software lifecycle. The next section will discuss the comparison between sequential and iterative design processes against the challenges identified from the context of displacement and emergency education.

2.4.4 Design processes and the displacement context

The previous sections provided examples and comparisons of different design processes from computer science, educational technology and instructional system design, and participatory design. The processes were discussed regarding their stages and flow, such as whether they follow a sequential or an iterative model and the pros and cons of each model. This section will discuss the conclusions from the previous discussions on design processes and map them against the context of displacement.

Both computer science literature (Alshamrani & Bahattab, 2015; Balaji, 2012) and ISD literature (Allen & Sites, 2012; Bichelmeyer, 2005; Molenda, 2003) suggest that sequential processes are better when the design requirements (end goals) are very clear from the beginning and are unlikely to change, the project is over a shorter term, little to no user involvement is required, and the project has lower risks during the implementation.

On the other hand, iterative processes are suggested when projects are complex, requirements frequently change, flexibility is imperative, the project has a high risk, and stakeholders’ involvement
is required from the early stages of the design (Allen & Sites, 2012; Alshamrani & Bahattab, 2015; Balaji, 2012).

The literature on refugee studies, emergency education, and HCI with refugees all suggested that interventions in the displacement context are strongly advised to follow participatory approaches. Such approaches require involving stakeholders and users from the early stages of intervention planning and should be reflected in the system design process to allow user involvement.

It was also discussed in the previous sections that it is the norm to have many actors and stakeholders in the case of displacement along with the communication challenges, psycho-social challenges, and other challenging dynamics which would increase the project risks. Furthermore, the overall context of displacement is very different from the ordinary professional contexts where system design work normally takes place. The identified challenges from displacement context, knowing that every displacement context is different, the fact that participants are often overwhelmed with many other challenges other than the educational challenges, all of this suggest that a design process for displacement should also be flexible in implementation.

In summary, a design process for displacement context should allow for early and continuous stakeholders involvement, adapt to high risk, and allow maximum flexibility. These aspects align with the characteristics of iterative design processes and suggest that they are much more suitable for the context of displacement.

2.4.5 Design process sub-stages

The previous sections summarised the literature regarding design processes stages and flow. This section will discuss the design processes substages, which are the tasks to be completed under each of the main stages. This PhD study aims to develop a design process for educational technology systems; thus, this section will summarise the known iterative design processes in educational technology with a focus on their sub-stages.

Most of the educational technology design processes and models are derived from the ADDIE model that was criticised as too linear and too general. Thus, most of the new design processes in ISD allow more flexibility and non-linear flow. And it provides further details regarding the tasks that need to be completed in each of the main ADDIE model stages (analyse, design, develop, implement, and evaluate). Examples of such models are the Kemp model (Morrison et al., 2010), the Dick and Carry model (Dick et al., 2005), and the backward model (Wiggins et al., 2005).
The figures above illustrate the three different models with the different tasks suggested in each model. Ibrahim (2016) provided a comparative analysis of these models in addition to similar other models; the author showed how the different models might differ in their stages, yet, all are derived
from the ADDIE model. The reason why these ISD models are discussed in this thesis is to summarise the literature on iterative design models from educational technology. It can be seen that the design models in ISD often focus on identifying the educational needs, challenges, and goals (objectives) as an initial stage in a design process. Each of the models then focuses on different stages to design and implement suitable solutions based on the identified challenges and needs. Each of the ISD models above could be more suitable for a specific context and goals.

The current ISD models are focused on the educational problem definition and design planning in an educational setting, which will be adopted in the design process developed in this research to ensure that technology tackles specific educational needs and challenges. However, these models have not been developed to cover the details of the people’s socio-cultural, psychosocial, and contextual aspects that were identified from the literature on emergency education and refugee studies. They do not cover the areas of contextual understanding and trust, which are essential to cover ahead of the educational problem definition and design. Such models can still be useful for a displacement context; however, they would better be a part of a more inclusive design process that considers and covers the distinct aspects of the displacement context.

2.4.6 Section summary

This section discussed the design processes from different disciplines such as computer science, instructional system design and educational technology, and participatory design. The different processes were compared based on their process stages which showed that most of the design processes are practically similar even when they differ in the stage names and count. Moreover, it showed that the design process stages require further details on how each of the stages would be completed. Then, the design process flow was discussed, and it concluded that the iterative design processes are more suitable to the displacement context. This was followed by discussing examples of ISD iterative design processes with a focus on the substages and tasks suggested by the different models. The discussion on the ISD processes showed that all the different processes start with addressing specific educational needs, goals, and challenges, then vary in the later design stages.

This section concluded that available design processes from ISD are focused mainly on the educational problem analysis, the design, implementation, and evaluation of the systems. They were developed to design educational technology systems for ordinary contexts rather than emergency education. Such processes cannot be used as they are for emergency education in displacement as they have to cover the displacement and emergency education challenges. Such challenges include the trust and communication challenges, the need to understand the conflicts and community culture ahead of the data collection, social difficulties, psychosocial challenges, and engagement and motivational
challenges. This PhD study aims to develop a design process that expands the currently known design processes to fit the needs and challenges of displacement. This section discusses the design processes and stages. The next section will discuss the design approaches.

2.5 Design approaches, Participatory design (PD)

The previous section discussed different design processes stages, flow, and sub-stages. In other words, it covered “what needs to be done” and the flow from one stage to another. This section of the literature review will discuss the design approach, which is the approach of data collection in each stage of the process. Data can be collected with an expert top-down mindset where the end-users are involved as testers or with a bottom-up participatory mindset where the end-users are involved in the decision making and design. Design approaches also discuss the level of involvement of the end-users in a design process. In summary, the design approach is a set of characteristics and values that constitute the implementation of the design process stages.

2.5.1 Introduction

The discussion on displacement challenges and emergency education concluded that the stakeholders in such contexts should be involved and given a voice in the planning and implementation of any intervention for them. Stakeholders involvement is also discussed in the literature on human-computer interaction. This section will discuss and summarise the literature on the design approaches that put stakeholders at the centre of the design or allow for stakeholders’ involvement in the design process.

Different design approaches allow the system stakeholders and end-users to contribute to and be the centre of the system design. These include user-centred design approaches and participatory design (PD) approaches. Both approaches contribute to allowing displaced communities to voice their opinions, sharing their experience, which resulted in facilitating inter-cultural designs (Talhouk et al., 2018). The next section will compare the two approaches.

2.5.2 Participatory design vs User-centred design

There are similarities and differences between the two design approaches. In a user-centred approach, system developers tend to research the needs of the end-user then start designing the solution. Afterwards, the system prototypes will be evaluated with the end-users at different intervals during the development cycle to get their feedback. This means that the solutions are designed with the users in the centre of the design process. However, the end-users are typically positioned as a
testing and evaluation service for the developers and end-users’ feedback is based on reaction rather than initiation (L. Sanders, 2008; Scaife & Rogers, 1999).

On the other hand, there is the participatory design approach. Participatory design (PD) is a set of theories, practices, and studies related to involving the end-users—who may have very different expertise and backgrounds—as full participants in activities leading to the design of new technologies (Greenbaum and Kyng, 1991; Muller and Kuhn, 1993; Schuler and Namioka, 1993; Leinonen, Toikkanen and Silfvast, 2008; Leinonen, 2009). When adopting a participatory design approach, developers involve the end-users from the early stage of system design as design partners, this means that the users and stakeholders are not only contributing as testers but as decision-makers and partners in the different design process stages (Brandt, 2006; Carroll, 1998; Chin Jr. et al., 1997; Derboven et al., 2015; E. B. Sanders et al., 2008; Scaife & Rogers, 1999). The rationale for end-users’ involvement in PD is to give the users an equal and responsible role, anticipating that this approach will lead to empowering the users, allow for mutual learning between users and designers based on trust and mutual respect, and result in designs that are sustainable, usable, and fit the end-users’ needs (Blomberg & Karasti, 2012a; Muller & Druin, 1993; Robertson & Wagner, 2012; E. B. Sanders et al., 2008; Scaife & Rogers, 1999; Simonsen & Robertson, 2013). Historically, PD aimed at reinforcing democracy by acknowledging and supporting a diversity of voices catalysing democratic engagement and empowerment of the end-users (Halskov & Hansen, 2015; Thinyane et al., 2018).

The main difference between user-centred design and participatory design is that the first approach interacts with users from the perspective of an outsider expert collecting data, whereas in the latter, designers are more immersed with the participants giving them more power by allowing them to make core decisions by forming an equal design relationship throughout the design process. Sanders (2008) provided a map (figure 2-15) of design practices organised by the design approach.
The figure above illustrates that even though both user-centred design and PD both focus on the users and put them in the heart of the system design. User-centred is closer to the expert mindset rather than a participatory mindset. It should be noted that the categorisation between different design approaches and design methods is not always the same in the literature. Leinonen, Toikkanen and Silfvast (2008) argued that the key is not in the methods themselves but in how the methods are implemented. They suggested contextual inquiry and other methods as participatory design methods even though they appear in the figure above as user-centred methods.

2.5.3 Participatory Design and HCI in displacement

Various research projects have involved participatory design in the past few years as a response to the refugee crisis in 2015. Talhouk et al. (2016), Talhouk, Balaam, et al. (2019), and Talhouk, Aal, et al. (2019) discussed the role of HCI in response to the refugee crisis, the lessons learned from involving refugees in design research and highlighted the importance of creating safe spaces through PD for the participants to voice their opinions. Almohamed, Vyas and Zhang (2018) discussed designing tools to assist the integration of adult refugees in European host countries and emphasised the importance of the cultural and social aspects of designing with refugees, such as mistrust and language barriers. Abu-
amsha et al. (2019) discussed the implementation of PD to support refugee adults access to higher education.

Gaved et al., (2013) and Kukulska-Hulme et al. (2015, 2017) from the UK Open University discussed several projects of mobile learning to support refugees and migrants’ inclusion in the new host countries. Gaved et al., (2013) emphasised the importance of the social dimension in learning. Charitonos and Kukulska-Hulme (2017) highlighted the importance of contextual relevance in the learning material to match the learners’ context and needs and linked the contextual relevance to learners motivation. Furthermore, Kukulska-Hulme et al. (2015) emphasised the importance of motivation in such learning and discussed implementing gamification elements such as rewards and coins as a part of the digital learning applications. Even though relevance and motivation have been discussed repeatedly in a different context in PD and educational technology, these aspects are not yet addressed as essential components of design processes in this area. The discussions on contextual relevance and motivation as essential components of design processes and design methods are core discussions and contributions of this PhD study.

PD was also documented with refugee children. Fisher, Yefimova and Yafi, (2016) conducted PD workshops with refugee children at the Alzaatari refugee camp to design solutions that help the children, but the designs were not implemented as the scope was to explore the interests of refugee children designs. Their work will guide the co-design workshops with children in this PhD study. However, in this research, work carried out by Fisher, Yefimova and Yafi, (2016) will be adopted to focus on designing educational solutions. It will be extended to cover the implementation and evaluation stages. Hourcade et al. (2019) discussed the role of design and child-computer-interaction literature in supporting the critical needs of refugee children. The authors highlighted the possible area for technology in education to support the challenges of displaced children who are under prolonged stress and are facing challenges in their basic literacy and numeracy learning. Tahir and Wang, (2019) provided a literature review of the different methods and guidelines of designing for refugee children with an emphasis on participatory design.

In the context of this PhD study, the identified displacement and emergency education challenges suggest that participatory approaches in general and PD, in particular, are better approaches for design with and for displaced populations. The reason for this is that participatory design approaches touch on many critical challenges such as empowering the stakeholders, giving people a voice, and supporting mutual learning based on respect and trust. Furthermore, this research suggests that PD can be strongly linked to the discussion on motivation in previous sections as it supports more
autonomy to the stakeholders and support more relatedness when the designers and the end-users are immersed together in the design process.

Krüger et al (2019) and Tahir and Wang, (2019) suggested that regardless of the existing literature on PD and HCI approaches for displaced and marginalised communities, practitioners and designers in this area have to reimagine their craft in light of the global changes and the emerging challenges. Therefore, more research is required regarding the methods and practices of designing for such populations.

This section discussed two different design approaches which involve the end-users in different ways. It concluded that the participatory design approaches are more suitable to the complex context of displacement, especially after providing various examples from the literature on how PD was implemented in the displacement context. Moreover, this section highlighted the need for further research in the practices, methods, and design processes in the areas of designing with displaced and marginalised communities, especially in the areas of context, relevance, and motivation.

The purpose of this PhD study is to develop a new design process for educational technology systems in displacement. For this purpose, the next sections will discuss participatory design in more detail discussing end-users involvement, values of PD, the definitions of methods and techniques in PD, and evaluation of PD processes and methods. This summary will assist in forming the proposed design process (section 3.2).

2.5.4 Participatory design throughout a design process

As was discussed in the section on design processes, most design processes have the following or similar stages: problem and requirement analysis, design, develop, implement, evaluate and reflect.

Although PD is often linked to the design stage in a design process, since PD is a set of theories and more of a design approach rather than specific methods or processes, it has often been expanded to cover the whole design process. Chin Jr., Rosson and Carroll (1997) studied how PD can be implemented as early as the requirement analysis stage by involving teachers with the designers in the analysis of the existing analysis scenarios and practices, and they called this method “participatory analysis”. According to the authors, involving the end-users and stakeholders from the stage of requirement analysis was significantly successful as it led to more in-depth and better problem analysis. The same concept could apply to the rest of the process stages, making all design process stages follow a participatory approach (Leinonen et al., 2008; Robertson & Wagner, 2012). It should be noted that when following a participatory design approach in a design process, stages such as requirement analysis, design, implementation, and evaluation are not always separate, as when
following a PD approach, prototyping and requirement analysis happen on an iterative model, meaning that overlap often happens between different stages to allow flexibility (Stappers et al., 2009).

Robertson & Wagner (2012) suggested four main questions to ask when considering PD, which are: Who do we engage as participants?; How do we engage with them?; How do we represent them?; What can we offer in return?; These questions will be used to structure the literature review on PD in the coming sections. Furthermore, the questions will need to be considered in the design process developed in this PhD study.

2.5.5 Who do we engage as participants?

This section will summarise the literature on stakeholders’ involvement in the design process. One of the main topics in PD is who to involve as participants in the design process and why do we involve each group.

Parnell et al. (2008) explored the process of involving the whole school community, especially teachers and students, in the design of schools. The authors suggested a design model on the basis that there are many opportunities from involving a variety of stakeholders in the design process that are not being recognised and exploited. Similarly, Wake & Eames (2013) suggested a diagram for the ecology of learning, suggesting that different stakeholders should be involved in a design process. However, involving participants is not always a straightforward task. Challenges for participants’ involvement range from issues such as participants being too busy, do not have the required experience, unable to participate due to any reason such as work politics and sensitivities, or if they are not interested in participation (Parnell et al., 2008; Robertson & Wagner, 2012; Wake & Eames, 2013) Thus, it is essential always to remember to identify the stakeholders who might be excluded and get their views and input (Chambers, 1994; Robertson & Wagner, 2012).

In the case of displacement in general and the context of this PhD study in particular, it is essential to involve all possible groups of people whose voice is important in the system design process and/or who would benefit or be affected by the design or the design process. Thus, there was a preference for using the term system stakeholders rather than end-users. Stakeholders may not be direct users of the system, yet, they may benefit from it indirectly or provide valuable input to its design. Although the existing research does have examples of involving the displaced population in the design processes, there is little mention of which groups should be involved, their level of involvement, and what expertise each of these groups can provide to the design process in an educational system design context for children within the identified challenges that we discussed in the previous sections. Understanding this gap is one of the goals of this PhD study.
2.5.5.1 **Involving children**

This PhD study aims to develop a design process for educational systems for children. Thus, children themselves are the main stakeholders in any technology system designed for them. Involving children was also suggested from numerous interviews from the preliminary study in chapter 3 of this PhD study. For these reasons, a literature review was conducted on involving children in a design process.

There is extensive research on involving children in creating systems and solutions that are designed for them (Druin et al., 1997; Muller & Druin, 1993; Scaife & Rogers, 1999). Much of this research has been done in an educational context since the majority of the systems for children typically have educational purposes (Fails et al., 2012).

Traditionally, researchers have observed children using technology tools, and when appropriate, asked them to take tests using standardised instruments. Such technology evaluations may be well-suited to understanding the impact a specific technology can have on a child’s learning; however, it can do very little to tell researchers what new technologies should be created for the future. While children may not be programmers or engineers, they are experts in what they want and why they want it, and they can communicate it in methods that suit their age, such as using sketches, talking, writing and (Benford et al., 1999; Hourcade et al., 2004; Scaife & Rogers, 1999). Thus, the rationale behind involving children is the belief that children have a great deal to say about the world they live in and the technologies they use. This argument was the spark behind using PD with and for children. This ideology is linked to the constructivist educational environment, according to (Druin et al., 1997).

Livari and Kinnula (2018) discuss children’s involvement as one way of empowering them. However, more empowerment can be done by following the original Scandinavian values where children have the power of influence and decision making rather than decorative participation.

Most of the work in the literature on participatory design with children is based on the categories of child involvement introduced by Druin (2002), which suggests four roles that children can play in the design of new technologies. These roles are a user, tester, informant, and design partner (figure 2-16). Each of the different roles suggests different ways through which a child can contribute to the system design. The user role suggests the least participation from a child where the child is only a tester, whereas the design partner suggests that
the child has much more power and can participate at the very initial design process stages and activities as a co-designer. Involving children in general and the role of child design partner, in particular, requires work on the relationship and trust in the communication between adults and children to maintain equal voices and support for children to voice their opinions (Fails et al., 2012; Guha et al., 2008; Jones et al., 2003). Jones et al. (2003) suggested that more equal design roles result in better behaviour for children with behaviour difficulties. Frauenberger, Good and Keay-Bright (2011) suggested that adults may assist and help children in some tasks that children may encounter difficulties in completing, such as drawing specific objects. In designing with marginalised children, Metatla, Read and Horton (2020) discussed the aspect of using proxy design with children. This method involves using objects such as toys and stuffed animals as proxies where children design for the toy rather than for themselves, minimising the load on the child designer. Such a method can be very effective when dealing with children with special needs or who have difficulties expressing themselves.

Druin (2002) compared the different child-involvement roles using three main categories which are: relationship to adults, relationship to technology, and goals for inquiry (Table 2-3).

Table 2-3 Comparison of the three dimensions for each role Druin (2002)

<table>
<thead>
<tr>
<th>Role of child</th>
<th>Relationship to adults</th>
<th>Relationship to tech</th>
<th>Goals for inquiry</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>indirect</td>
<td>feedback</td>
<td>dialogue</td>
</tr>
<tr>
<td>User</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Tester</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informant</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Design partner</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

It can be seen that the user role consists of an indirect relationship with the designers to test a product, which aims to help to evaluate the impact of theories behind a product. The tester role extends the user role and adds direct feedback in the relationship with the designers, and this feedback can be used to create new prototypes and assess the usability. The informant role extends the tester role and adds the concepts of limited dialogue with the designers towards suggesting new ideas for the prototypes and products. Finally, the design partner role extends all the previous roles. It adds the concept of elaboration in the communication with the designers, which shows that the child would be able to have more in-depth communications with the design team.

However, it should be noted that the relationship between the designers and children in the Druin model is discussed within the scope of the product design only and does not cover the aspects of
personal relationships outside the system design scope. This is an essential aspect that this PhD study will expand on and contribute to.

Iversen, Smith and Dindler (2017) suggested an additional role for the child in a participatory design process, which they called “child as a protagonist”. The authors described the role as one where “researchers encourage children to be the main agents in driving the design process and thereby to develop skills to design and reflect on technology and its role in their life” (Iversen, Smith and Dindler, 2017, P. 5).


![Figure 2-17 The complementary roles that adults and children play in co-design (Yip et al., 2017)](image)

The provided framework specifically expanded the dimension of the child-adult relationship taking it from a relationship within the co-design activity to a broader relationship that is extended to non-design social fun activities to build a deeper and more balanced adult-child relationship.

![Figure 2-18 Visual comparison of co-design sessions along with the dimensions (Yip et al., 2017)](image)

Yip et al (2017) suggested the dimensions above for a balanced partnership between adults and children, emphasising relationship building, facilitation that involves children in facilitating the co-
design workshops, and balanced support from adults to children during the design activities. Moreover, the authors stressed the aspect of power dynamics between adults and children, explaining that adults have unequal access to power, influence, and knowledge compared with children, which is why focusing on the dimensions above is extremely important. However, the discussion of the dimensions above does not include anything about displacement or how such involvement links to motivation. Furthermore, even though the authors emphasise the dimensions shown in the figure above, such dimensions are not linked to a design process or a design method. This PhD study will discuss the work of Yip et al. (2017) in the context of displacement based on the findings from both case studies and will translate that discussion into a design process and a design method that is developed and evaluated for educational technology in a war-affected displacement context.

Druin (2002) noted that the children’s contribution may not always be directed towards the system design but could still be used for the design. The author provided examples where researchers used input from their indirect discussions with children as inputs to the design. An example is when a researcher knows that children play together by climbing trees after school, then such information can be used to create systems that could imitate or include aspects of the activities that children usually enjoy and find interesting in the system design and user interface. This aspect can link to the literature on student engagement in section 2.3.2, where it was suggested to understand what interest the different stakeholders – especially children- in an educational context. However, this section showed that understanding what interests children can also be useful for the system design.

There has been increasing research that discusses the involvement of displaced children in a participatory design process (Fisher et al., 2016; Peterson Bishop & Fisher, 2015; Talhouk, Aal, et al., 2019). For example, Fisher, Yefimova and Yafi (2016) conducted co-design workshops at al Zaatari refugee camp for Syrian refugees in Jordan. The workshops were flexible and encouraged children to participate in the creation of a magical machine that would help them in their lives. Children would choose the purpose, name, and operation of the machine and represent it using drawing and photography. Most of the resulting designs targeted resolving educational problems, which shows the children’s interest in education. As discussed before, this PhD study followed the same structure of the co-design workshops by Fisher, Yefimova and Yafi (2016), but they were adapted to focus on designing educational systems.

Although there is an increased interest in PD with displaced and refugee children, there are few details or suggestions regarding which roles children should play in this context. Especially in an educational technology context, there is little to suggest what might be expected from the children, how to involve them, challenges that might be encountered, and the methods of involvement (Tahir & Wang, 2019).
2.5.6 How do we engage with the users?

Several papers from HCI and other disciplines discussed how to engage with and involve users. Parnell et al. (2008) suggested that opportunities, such as creative development and learning, giving people a voice, ongoing partnerships, and pedagogical transformation, should be explored and used for more successful interventions. Exploiting such opportunities is suggested to be done by focusing on capacity building to overcome experience difficulties, organisational culture, participants and roles, and dialogue. Similarly, the approach from Wake & Eames (2013) focused on involving students in well-facilitated, empowering, and fun activities that would lead to better stakeholders involvement. The authors also highlighted the role of empathy and personal relationships to build trust relationships amongst the participants. In HCI, various research work on PD emphasises the importance of what is called the Scandinavian values in participatory design. These values include continuous communication, respect for the users and acknowledging their expertise in whatever role they play, trust, mutual learning, and empowerment for the users (Blomberg and Karasti, 2012a; Robertson and Wagner, 2012; Simonsen and Robertson, 2013; Halskov and Hansen, 2015; Thinyane et al., 2018). The next sections will discuss these aspects.

2.5.6.1 Trust

Trust in HCI is discussed in different forms, either between end-users and technology systems (Nickel, 2015), or between the designers and participants but with a focus on trust as a tool for successful co-design activities (Fails et al., 2012; Frauenberger et al., 2011; Kautz, 2010). Trust is also discussed in PD as trusting and acknowledging the experience and trusting the participants in the design process. Furthermore, it is discussed as an ethical aspect to ensure that the designers do not disclose any information they gather from the participants in a harmful or judgemental way. Robertson & Wagner (2012) stated that trust-building is often seen as a matter of ‘practical politics’ in PD.

Trust is discussed to a limited extent, with little details on how the trust should be initiated and how essential it is. Clarke et al (2021) summarised the literature on trust in co-design contexts. The paper stated that literature positions trust as facilitated through four main practices, formal meetings or volunteering that help grant permission (Warwick, 2017), informal conversations in response to distrust (Le Dantec & Fox, 2015), co-creation through communication artefacts or activities such as cooking (Gaudion et al., 2015), making transparent and visible particular kinds of work through creating visible artefacts that illustrate sensitive trust-related topics such as organisational structures that impact on the everyday work that people do (Manzini, 2015).

However, little has been discussed regarding positioning trust in a design process in HCI, especially in a displacement context and for education. In the literature review that Tahir & Wang (2019) conducted...
on the “methods and guidelines for child-computer interaction research with refugee children”, trust was one of the identified factors for literature comparison. Our paper (Alain et al., 2018) -which is built on the initial analysis of case study one- was the only paper from HCI that was mentioned in the review to discuss trust as an essential factor of designing with displaced communities. Other papers that highlighted trust in the review paper were from psychology and international development disciplines.

This is starting to change in the last few years, especially with regards to PD projects with marginalised people and refugees (S. Ibrahim et al., 2020; Krüger et al., 2019; Metatla et al., 2020). Krüger et al. (2019) reviewed cases in PD where one case linked trust to establishing a personal relationship between members of the designs team and the marginalised community. The authors stated how this allowed for these design team members to be the communication point with the community regarding any criticism or sensitive topics. Even though the late literature is starting to acknowledge trust and personal relationships as an essential component of PD, however, it has yet to be highlighted as a clear and separate design stage in a design process. In the context of this research, it was emphasised in section 2.1.2 that trust in the displacement context is an aspect that must be considered from the early stages of any data collection or intervention with displaced populations. This suggests that establishing trust and personal relationships should be a design process stage that is separate from the co-design stage. This research aims to produce a design process for the context of displacement, where trust is paramount and highlighted as a separate design process stage.

2.5.6.2 Mutual learning:
In their introduction to the book “International Handbook of Participatory Design”, Simonsen and Robertson (2013) defined PD as “a process of investigating, understanding, reflecting upon, establishing, developing, and supporting mutual learning between multiple participants in collective ‘reflection-inaction’. The participants typically undertake the two principal roles of users and designers where the designers strive to learn the realities of the users’ situation while the users strive to articulate their desired aims and learn appropriate technological means to obtain them p.18”.

In other words, mutual learning is the conversation of knowledge between the different participant groups and the designers. This exchange would inform participants’ ability to envisage future technologies and the uses in which they can be embedded. The concept of mutual learning will prove to be essential in the context of displacement. It will be discussed and expanded in the discussion chapter to be used to tackle many of the identified challenges in this context.

2.5.6.3 Participant’s empowerment
The Power of the users is an essential aspect of Scandinavian values. The concept of power must be addressed in the PD activities planning to avoid silencing or ignoring any group of participants,
especially the marginalised ones (Robertson & Wagner, 2012). Krüger et al. (2019) discussed this aspect in the context of marginalised and displaced communities highlighting that such communities are affected by the politics, laws, and practices of their governments and the context of displacement, which affects their ability to voice their opinion. This emphasises the need for participant’s empowerment when implementing PD in this context.

Muller & Druin (1993) discussed how the location of the PD activities could play a role in equalising the powers in PD activities. For example, if the activities are held in the workspace of one specific group, this would be empowering this group. Alternatively, activities can sometimes be held in a neutral space to maintain equal power. This would be a key way to organize activities in displacement since we have already identified that one of the possible challenges is having various actors with different goals and where many of these groups of participants are considered vulnerable for various reasons.

Another essential aspect of this category is making sure that all the PD activities planned are well structured and suitable for the participants. In other words, designers should ensure that the participants have the knowledge and the capacity to complete these activities (Robertson & Wagner, 2012). Participants empowerment will also be thoroughly discussed in the discussion chapter.

This section (2.5.6) discussed the Scandinavian characteristics of PD and how they are implemented in the participants’ involvement. The next section will discuss the aspect of participants representation.

2.5.7 How do we represent them?

2.5.7.1 Equal representation

The previous section discussed that when engaging the end-users in the design process, we should make sure that we maintain the power of different groups so all are equal in voicing their opinions. However, Robertson & Wagner (2012) summarized the research on ethics and engagement in PD and argued that equal voices do not mean equal representation. The author highlighted that even after different groups voice their opinions equally, there is the representation of these opinions, which may be problematic and might silence some of the opinions if it is not done the right way.

The authors suggested that the end-users should be included and consulted in the analysis of the partial truths that the designers conclude from what they have heard in the design activities. In other words, the authors suggest including the participants in discussions on the perceptions that the designers have acquired from the PD activities about them. This would ensure that the designers have not misunderstood the participants or indirectly silenced any of the participant groups, which would
affect the successfulness of the design process. These aspects above are essential in this research as it involves the displaced community, which is a marginalised and vulnerable group that requires empowerment and ensuring equal representation in the design process.

2.5.8 What can we offer in return?

The final question suggested by Robertson & Wagner (2012) is about what is to be offered in return to participants participating in a PD process. The main challenge in this topic is that designers can benefit from participatory design projects by collecting data and building knowledge, even in the event of the projects failing in the end. However, participants, on the other hand, may receive very little in return should the project not be successful.

This challenge is even more serious in the context of displacement, where the participants, which would be the displaced population, the actors on the ground, and the other stakeholders, are all overwhelmed by the challenges of achieving necessities for life. Therefore, involving them in activities that might not lead to anything tangible and helpful for them might be considered unethical as it would cause even further delays to their daily struggle. Thus, there should be a clear plan that ensures ethical communication and the delivery of tangible helpful outcomes to the community even if the project is unsuccessful. There is little discussion in the literature methods and practices on how to resolve such a challenge, and it has not been highlighted in design processes and methods in displacement.

In the context of this PhD study, this was resolved by offering volunteering services independently from the research. This ensured that even if the research did not result in a tangible outcome, the displaced community and the NGOs staff would receive practical support. The use of volunteering and servicing will be discussed in detail in the methodology and case studies chapters. Furthermore, it will be positioned as a component of ethnography methods in the design process and method developed in this PhD study.

The previous sections discussed the questions suggested by Robertson & Wagner (2012) and mapped them with the displacement context. The next section will discuss the definitions of methods and techniques in PD.

2.5.9 Participatory design methods and techniques

The literature on system design and PD has discussed the definitions for design processes, which was summarised in section 2.3.1. This section will discuss the definitions of design methods and design techniques in a PD context. In PD literature, there is a differentiation between the design methods
and techniques. Understanding these definitions is essential in this research as it will produce a design process, in addition to a design method which is the CRIT method.

2.5.9.1 PD Techniques
Fails, Guha and Druin (2012) summarised decades of research on participatory design for children systems. The authors discussed this distinction and defined techniques as “an activity that a design team participates in while creating a technology” and explained that the application of a technique might be a small part of a design session, or it may last for one or more full design sessions. Techniques are also categorised by the design purpose, which ranges from requirement gathering, brainstorming, iterating, evaluating, and summarizing ideas. Examples of design techniques could include activities such as activities using post-it notes (sticky notes), focus groups, interviews and group discussions, mixing ideas, and many others.

Fails, Guha and Druin (2012) provided a discussion on each of the different techniques and in which conditions each technique would be best suited. For example, the mixing idea technique involves dividing the different participant groups into small groups and working with each group separately, then mixing the ideas from the different groups into one system. The authors suggested that such a method is suited in cases where children have difficulties working together or where the participants have communications difficulties. Mixing ideas was used as a data collection technique in this research, and the reason for this will be discussed later in the case studies chapter.

2.5.9.2 PD Methods
Methods in PD are a broader concept than techniques, and a design method is defined as a collection of techniques used in conjunction with a larger design philosophy. A method can include one or many techniques, but it is more than a collection of techniques that makes up a method. It includes the attitude and values that the team brings to designing technology (Fails et al., 2012). In other words, a design method in PD is not necessarily a practical concept but rather a philosophy and attitude.

For example, Kensing, Simonsen and Bødker (1998) developed a design method for PD, which they named “MUST”. The philosophy and principles of their method were 1- Participation; 2- Close Links to Project Management; 3- Design as a Communication Process; 4- Combining Ethnography and Intervention; 5- Co-development of IT, Work Organization, and Users’ Qualifications; 6- Sustainability.

As can be seen from the naming, a design method is a set of concepts and attitudes rather than practical activities such as techniques and is also different from the actionable nature of design process stages names. This will be discussed further in the findings and discussion chapters, where we introduce the CRIT method along with the design process in this PhD study.
Some various methods and techniques have been discussed and researched in the PD literature. Tahir and Wang (2019) stated that in many cases, the methods used to design technology for refugee children are very similar to the ones used with children in ordinary contexts and that further research is needed on the methods suitable for displaced communities and children in particular. However, the authors concluded that there are no available methods and processes that discuss the design of an educational system for displaced children. Similarly, Krüger et al. (2019) emphasised the need to rethink the methods and practices used in PD for marginalised populations such as in displacement.

2.5.9.3 Ethnography and participatory design

Ethnography was researched and used in PD for various reasons related to data collection, participant’s representation, and even planning the participatory projects themselves (Crabtree, 1998; Blomberg and Karasti, 2012b; Robertson and Wagner, 2012). Blomberg and Karasti (2012) suggested that ethnography can be an asset for PD in contexts where the Scandinavian characteristics of PD are not easily applicable due to difficulties of culture and power which relates to the challenges of displacement context.

The authors suggested three different models of implementing ethnography in PD (Blomberg and Karasti, 2012a; Simonsen and Robertson, 2013). The first implementation involves a reflexive relationship between ethnography and PD, where ethnography is implemented first to understand the current situation only, followed by PD to create the future. The second type is where there is a component of PD, and they both work in an iterative process to understand the current situation, and to envisage and plan the future. The third type is where ethnography is used to inform the design, and both are used in parallel for the cases where user involvement is not possible, hence it is replaced by professional ethnographers to inform the design.

Even though ethnography is discussed as a supportive element in PD and its possible link to the challenges in a displacement context, there is little discussion on how such an element can be implemented in displacement, which implementation model is more suitable and why, and which purposes could ethnography support in such context. This PhD study will aim to investigate these aspects further and will suggest a method of positioning ethnography in PD for the displacement context in the CRIT method.

This section 2.5.9 discussed the techniques and methods in PD, including the definitions and examples of each of the concepts. Furthermore, it discussed the possibility for ethnography to serve as a component of participatory design. The next section will discuss evaluating participatory design processes and methods.
2.5.10 PD and Self-determination theory

SDT has been discussed in section 2.3.4 explaining how it can link to the context of displacement and the aspect of engagement. Section 2.5.3 reviewed research of HCI in displacement, mentioning several papers that discussed motivation. Some research has already applied PD and SDT together. Davis et al (2017) followed a participatory design approach to develop a mobile application to help youth with Asthma to control their symptoms. The authors used SDT to analyse part of the suggested features that were suggested by the participants. Similarly, Jessen et al (2017) used SDT to categorise and analyse the system requirements gathered in PD activities with patients with chronic conditions and other stakeholders for an eHealth tool. However, both Davis et al (2017) and Jessen et al (2017) used SDT minimally, SDT was not used to structure the design activities and was not incorporated in the design process or data collection activities. In other words, SDT was used to categorise the features suggested by the participants but not in PD implementation.

Little research such as Dent-Spargo (2018) suggested that PD and SDT have a lot in common and can be integrated together in a design process rather than using SDT to evaluate the outcome of PD. The paper suggested a link between autonomy, competence, and relatedness and the practices and values of PD. However, SDT was not discussed as a component of PD in a design method.

This PhD study suggests that more involvement of SDT in PD methods is possible and even essential in the displacement context. The study provides empirical examples from two case studies on how the innate needs of SDT (autonomy, competence, and relatedness) all link to PD values and are even more essential in a displacement context. Furthermore, this PhD study incorporated SDT in a developed design process and a design method to tackle the design challenges faced in cases where motivation is a major concern which is designing educational systems for war-affected displaced communities.

2.5.11 Evaluating methodologies for participatory design processes

Design processes can be evaluated in different ways, where the choice of evaluation methodology can depend on various factors such as the purpose of the evaluation, available resources, the audience of the evaluation, and the participants (Atwood & Wania, 2006; Bossen et al., 2016; Helander, 2014; Nielsen, 1994).

Bossen et al. (2016) reviewed the literature on participatory design processes evaluation methodologies. The authors suggested the following set of questions to guide the evaluation.

1. What is the purpose(s) of the evaluation?
2. Who conducts the evaluation?
3. Who participates in the evaluation?
4. Who defines the evaluation criteria?
5. What evaluation method(s) are applied?
6. Who is the intended audience of the evaluation?
7. What is the intended use of the evaluation?

Table 2-4 Seven questions for assessing PD evaluations (Bossen et al., 2016)

The questions above will be used to review the literature on each of these aspects with discussing them in the context of this PhD study.

2.5.11.1 Evaluation purpose:

First-generation design methods were product-oriented, where design methods focused on systems theory and software engineering (Atwood & Wania, 2006; Helander, 2014). Afterwards, the second generation were process-oriented design methods developed in the 1970’s, focused on user participation, communication and democracy in the design process, such as in participatory design and user-centred design processes (Bossen et al., 2016; Helander, 2014). Finally, third-generation or use-oriented design methods focus on the actual use situation and assess the quality in the use of the designed system (Atwood & Wania, 2006; Helander, 2014; Nielsen, 1994). Furthermore, Bossen et al. (2016) stated that the literature distinguishes between summative evaluation that is conducted at the end of a process or a program to inform decision making and formative evaluation that is normally conducted throughout a project or a process.

An example of evaluation purpose can be found in (Garde & Van Der Voort, 2014), where the authors assessed their design process, results, participant gains during & after the project. A similar approach will be followed in this PhD study, where the evaluation purpose will not involve the aspect of system theory and software engineering because the developed design process and design method evaluation will not be product-oriented. However, the evaluation will be focused on the following aspects:

1- The process-oriented evaluation focuses on the values of PD such as democracy, mutual learning, and empowerment.

Robertson & Wagner (2012) suggested a set of questions (table number TBC) by which a PD design process or method can be evaluated against the core values of participatory designs that were discussed in the previous sections. These questions will be used to evaluate the process in the discussion chapter in section 7.6.1
Table 2-5 Questions to evaluate a design process/method against the core values of participatory design
Robertson & Wagner (2012)

2- **Use-oriented evaluation** that will focus on the designed systems use, applicability, and sustainability. These aspects will be discussed in both the data analysis chapter (section 6.7.3) and discussion chapters (section 7.6).

3- **Formative evaluation** of the different design process activities throughout implementation, where data collection activities will be evaluated to inform the other data collection activities in later iterations. This will be explored in the case studies chapter, where reflection sections are added to discuss how each data collection activity was conducted and the lessons learned and how they inform later similar activities.

4- **Summative evaluation** of the whole design process post data analysis to inform future decision making, methods used, and process stages choice and overlap. This evaluation will be discussed in the data analysis and discussion chapters to evaluate the whole design process, its stages, how the stages overlap, and what questions should be asked in each stage.

### 2.5.11.2 Who conducts evaluation, who participates, who defines the criteria?

Evaluators can be external or internal to a project, and be independent of or closely associated with funders and central decision-makers, all of which might influence how the evaluation is designed and the information generated (Bossen et al., 2016). Various research involved using researchers that are part of the project to conduct evaluation (Garde & Van Der Voort, 2014; Gerrard & Sosa, 2014; Kapuire et al., 2015). The same will be followed in this PhD study due to time and resource limitations where the main researcher will conduct the evaluation.

Participants in evaluations might include all or a selection of stakeholders in a project such as students, heads of schools or departments, funders etc. (Bossen et al., 2016). In this PhD study, the evaluation will involve all stakeholders as participants such as children, parents, educators, volunteers, and NGOs
managers. This is to capture the perspective of all different stakeholders to enrich the evaluation process. The case studies chapter will list all the data collection activities and the structure for each activity that involve an evaluation stage at the end of each activity. Such evaluation contributes to the data collection activities formative evaluation. Similarly, interviews and group interviews will be conducted to evaluate the whole design process and the designed systems which contribute to the summative evaluation.

The evaluation criteria can be defined before a project starts, or be developed during or even after the project has been completed (Bossen et al., 2016). In this PhD research, the criteria were defined by the researchers. It was partly defined by the researchers before the beginning of the project as we had little details on the resulting systems and the possible outcome of the design activities. The criteria were improved and finalised during and after the end of the project. The criteria of evaluation is linked to using participatory design methodologies as such methods consider participant’s feedback and end-users’ feedback as core evaluation criteria.

2.5.11.3 What evaluation methods are applied?

Evaluation methodologies can be qualitative or quantitative and are normally linked to the research epistemology and ontology (Bossen et al., 2016). Whittle (2014) used a qualitative methodology that involves interviews, ethnography, focus groups, and self-participation. This PhD study will follow a similar qualitative methodology that will involve ethnography, interviews, focus groups, workshops, and active participation from the researcher in the participant’s context. The use of these methods and their relationship to the research epistemology will be discussed in the methodology chapter in section 4.5.

2.5.11.4 Who is the intended audience, what is the intended use of evaluation?

The intended audience of an evaluation process can be end-users, PD researchers, the research community, practitioners, or other groups (Bossen et al., 2016). The intended use of evaluation can be decision making, learning, theory and model building, learning and assessing outcomes (Bossen et al., 2016). In this PhD study, the intended audiences are the research community, policymakers, and designers working in educational technology and HCI research for displaced and war-affected communities. And the intended use of evaluation is to build a design process and a design methodology that can be used by designers and policymakers to tackle the various challenges existing in a displacement context to design educational technology systems that are practical, sustainable, and motivating for the stakeholders.
2.5.12 Section conclusion
This section on design approaches started by discussing the importance of participatory approaches in a displacement context. Afterwards, it provided a comparison of user-centred approaches and participatory design approaches by stating the reasons why participatory design is more suitable in a displacement context. This was followed by giving examples of the previous implementations of HCI and PD in displacement. This section highlighted the importance of context, relevance, and motivation and also showed that further research is required regarding the design processes, methods, and practices for PD and HCI in displacement.

Section 2.4.4 discussed PD in a design process and highlighted that PD is a set of theories and approaches that can be extended to cover any part of the design process and suggested four questions that would guide the planning for PD processes. Section 2.4.5 discussed who should be involved as participants, with a particular focus on involving children. Section 2.4.6 highlighted the Scandinavian values of PD and provided examples of each value and how its link to the displacement context. Section 2.4.7 stressed the importance of equal representation and how it is different from equal voice. Section 2.4.8 discussed the challenge of projects that may not result in a tangible outcome for the participants and explained how this was resolved in this research. Section 2.4.9 discussed the differences in definitions between design techniques and methods with explaining how this will affect the outcome of this PhD study that will provide a design process in addition to a design method. Furthermore, it discussed the different models of involving ethnography in PD and that ethnography can be suitable to understand the displacement context complexity. Finally, section 2.4.10 discussed the evaluation of PD processes and the questions and aspects by which the design process in this research will be evaluated.

2.6 Literature review conclusion
This section will provide a summary of the literature review followed by the identified gaps.

2.6.1 Summary
Section 2.1 discussed refugee studies and displacement, highlighting the contextual, political, and psychological aspects and their effect on the displaced community and the other stakeholders in this context. Section 2.1.2 discussed the importance of trust as an essential aspect of research in a displacement context for access, data reliability, and consents. It was also discussed in section (2.1.2) that achieving trust in a conflict-related displacement context requires an understanding of the conflict and the different needs and challenges of the different communities and stakeholders.
Section 2.1.2 provided a contextualisation of emergency education, with a discussion on the challenging contextual nature of emergency education and how it affects education, especially in regards to student engagement, behaviour, and motivation. Furthermore, it discussed the need to consider the effect of politics, violence, and conflicts when designing educational interventions in this context. This is to avoid reinforcing violence or alienating any groups. Section 2.1.2.2.3 discussed that designing educational interventions for displacement caused by conflicts requires an understanding of the conflict, the nature of the social division, in addition to the sensitive and conflicting issues. Understanding these concepts aligns with the requirements for trust relationship building discussed earlier in section 2.1.2.

Section 2.1.2.3 discussed how participatory approaches were suggested in both displacement and emergency education contexts. This is due to the complexity in these areas, which requires a rich understanding of the different dynamics from the perspective of the stakeholders.

Section 2.1.2.4 discussed the use of technology in emergency education. It highlighted several challenges in some previous projects that focused too much on the hardware with little focus on the pedagogy and learning aspects. Furthermore, this section highlighted that technology could be positively effective for emergency education and motivation. However, there is a need to investigate further how this can be done systematically.

Section 2.2 provided a discussion on student engagement and motivation since the two concepts were identified as significant challenges in displacement contexts. Section 2.2.2 provided different definitions for student engagement and explained engagement by discussing the indicators of engagement and disaffection. It showed how the indicators of disaffection are linked to the challenges discussed in emergency education and displacement. It also suggested a set of questions to conceptualise engagement from the perspective of the stakeholders to be included in the design process developed in this research.

Section 2.2.3 discussed motivation as a facilitator of engagement and explored the Self-Determination Theory SDT. With explaining the three needs for SDT, which are autonomy, competence, and relatedness.

Section 2.3 discussed the design processes, starting with the definition of a design process, followed by explaining the differentiation between design process stages, sub-stages, design process flow, and design approach. It showed how design process stages vary in names and count from different examples, but the general goals are the same regardless of the differences.
Section 2.3.3 discussed the design process flow, which is also called the software life cycle. It compared two different models, which are sequential design processes and iterative design processes. The two models were later discussed in section 2.3.4 against the identified challenges of displacement and emergency education, concluding that iterative design models are more suitable for such context as they support participatory approaches, suitable for the high risk and complexity, and are suitable for the cases where the requirements frequently change.

Section 2.3.5 explored various design processes from instructional system design, highlighting how all the different processes emphasised the importance of defining the educational needs and challenges ahead of designing the instruction, learning, and technical aspects of the system. This outcome links with the gaps identified in some projects that used technology in emergency education with little focus on matching technology with learning challenges and goals. However, this section also suggested that the current educational technology design processes are not designed for emergency education as they do not emphasise the contextual understanding of politics and socio-cultural aspects and do not mention the importance of trust-building.

Section 2.4 discussed the design approaches with a focus on participatory approaches. It started with a comparison between user-centred approaches and participatory design approaches, concluding that participatory design is more suitable for the context of displacement because it is linked to the identified challenges from displacement and emergency education and because it is linked to the discussion on motivation.

Section 2.4.4 explored the implementation of participatory design in a design process, suggesting that such approaches can be implemented in all the different stages of a design process and not only in the co-design and prototyping activities. It also suggested that when implementing a participatory design approach, design process stages tend to have an overlap and be implemented in an iterative manner.

Section 2.4.5 discussed the question of whom to involve as participants and why, including summarising the literature on involving children in participatory design processes in section 2.4.5.1. It concluded that children’s participation could be done in different models with highlighting that the current literature does not discuss the suitability of these roles in a displacement context. Moreover, it was discussed that children’s contribution to a design process could happen through the indirect discussion that would identify different aspects that children find interesting which could be included in the system design. This aspect can link to the literature on student engagement in section 2.2.2.2, where it was suggested to understand what interest the different stakeholders – especially children – in an educational context. However, section 2.4.5.1 showed that understanding what interests children can also be useful for the system design.
Sections 2.4.6 and 2.4.6 highlighted the importance of the Scandinavian values in participatory design processes such as trust, mutual learning, empowerment, and equal representation, which allow for ethical and equal participation. Section 2.4.8 discussed the challenge of providing a tangible outcome to the participants, even when the research or design project is not successful. It was explained that in the context of this PhD study and displacement in general, this challenge is of a high probability due to the high risk and complex context.

Section 2.4.9 discussed the definitions of participatory design methods and participatory design techniques. It stated that the techniques are activities that a design team participates in while creating a technology. In contrast, methods in a PD context are a collection of techniques used in conjunction with a broader design philosophy and attitudes.

Section 2.4.9.3 explored several models of implementation ethnography in participatory design and highlighted the need to check which of these models is more suitable to a displacement context. This was followed by section 2.4.10, which discussed the evaluation of participatory design processes and stated that in this PhD study, evaluating the design processes will be by the resulting systems, and against a set of questions that are designed to evaluate a design process against the core values of participatory design.

2.6.2 The literature gaps

The literature review conducted in this PhD study revealed several gaps that will be tackled in this PhD study.

Trust and personal relationships have been identified as an essential aspect of research in displacement, and trust is also a core aspect of PD. However, trust has not been emphasised in the design process as a separate stage before the other data collection activities. Moreover, there is little knowledge reported on how exactly trust can be formed in a displacement context, especially by designers in the context of educational technology system design. These aspects of trust will be the main objectives of this research.

The literature review on emergency education revealed that many of the current educational technology projects worldwide that tackle the education of displaced war-affected children are missing the complexity of politics, violence, and war. Moreover, many of these projects are designing technology without a clear link to identified educational goals and challenges. And the available educational technology design processes discussed in section 2.3.5 are not adapted or designed to tackle the complex system of displaced war-affected children. Thus, this study will develop and
evaluate a design process based on the displacement challenges, focusing on the educational aspects of the systems such as the educational needs and challenges.

Robertson and Wagner (2012) suggested a set of questions that should be asked in any design process or method (section 2.4.4) which are: Who do we engage as participants?; How do we engage with them?; How do we represent them?; What can we offer in return?; These questions assisted in structuring the literature review in PD; however, these questions have not been investigated in a design process developed for displacement context. Moreover, the questions are not investigated in the context of educational technology for displacement. This study will aim to investigate these questions in the design process implementation in the two case studies.

The literature on involving children in participatory design discussed multiple roles for children and adults in PD design processes. However, these roles have not been discussed in a displacement context. This research will investigate the roles of child involvement and connect them to the displacement context dynamics and provide suggestions in this area.

Robertson and Wagner (2012) also discussed the challenge of PD processes failing to result in a tangible outcome that supports the stakeholders and that such a challenge should be planned for. Even though this challenge is relevant to the complex nature of displacement, the literature does not suggest how such a challenge can be resolved.

Even though participatory approaches in general and PD, in particular, are favoured when designing in displacement. There is little reported on how PD design processes can be affected by the complexity of the displacement context. Such as power dynamics, conflicts, and the involvement of different stakeholders, all of whom are living in a severe context, especially children. Thus, there is a need for further research in this area in general and in an educational context in specific.

Ethnography has been suggested as a supportive component of PD, especially in complex contexts where the core values of PD are not fully applicable. Furthermore, the literature review discussed different models of implementing ethnography in this context. However, there is no research regarding how ethnography can be positioned in a design process in displacement and emergency education and which of the models is more suitable for such a context. This gap will be tackled in this study, and ethnography will be discussed and positioned in the design process and the CRIT method.

The literature on technology for emergency education suggested that technology can support children's motivation; however, there were no details on how exactly technology can be linked to children motivation in emergency education. Motivation has also been discussed in HCI and displacement, and the literature on self-determination theory. But the concept of motivation and
motivational theories have not been embedded and explained in PD design processes and methods for displacement and emergency education. The CRIT method developed from this research will position motivation in the CRIT method and will suggest further research in this area.

The discussion on PD methods and techniques stated that a design method is a set of values and attitudes that the designers adopt when implementing a design process. There are no design methods that are adapted to designing educational technology systems in displacement contexts to investigate such values, their implementation challenges, and how to apply them. The CRIT method developed in this study will aim to tackle this gap.

Self-determination theory has been explained in section 2.2.4 and its possible link to PD has been discussed in section 2.4.10. Nevertheless, contextualising SDT is PD has not been investigated as a core structure of a participatory design method. Little research has been done on the link between SDT and the challenges faced in displacement and emergency education. This study will present SDT as a core concept in PD design process for educational systems for emergency education of displaced war-affected children to tackle the design challenges in such a demotivating context.

2.6.3 Research Questions

Main research question: What is an effective design process for the design of educational technology systems for displaced war-affected children?

The main aim of this research study is to develop and evaluate a design process for educational technology systems for war-affected displaced children. This will be done by proposing a design process (section 3.2) based on the literature review and the preliminary study presented in section 3.1. And then evaluating this process in two case studies.

The research sub questions are as follow:

❖ RQ1: “What challenges may affect the design process of educational technology systems in a displaced war-affected children context?”

This question will investigate the main challenges that would be faced when implementing a design process in the context of this study covering the following topics:

- What challenges are faced while implementing the proposed design process?
- How do the challenges affect designing in such an environment?
- How do these challenges relate to the notions of motivation and trust that were addressed as core concepts in displacement?
RQ2: “What design process stages, approach, and method should be followed to overcome the identified challenges?”

This research question will investigate the design process and design method that would assist in resolving the design challenges identified in the RQ1 covering the following topics:

- How should the design process stages, approach, and methods address the identified challenges?
- How should the design process stages, approach, and methods address the concepts of trust and motivation that are core challenges in engaging with and designing for displaced people?

RQ3: “What are the lessons learned from implementing the proposed design process regarding the requirements of educational technology systems to support the learning of displaced children?”

This research questions will investigate the possible future uses of educational technology based on the data from implementing the proposed design process in both case studies covering the following topics:

- Which factors and design requirements have been discussed when implementing the proposed design process that can be learned for future design work in this context?
- How do such requirements link to the notions of trust and motivation?

This section provided a summary of the literature review, the gaps, and the research questions which is the end of chapter two. The next chapter will present the preliminary study and the proposed design process.
3 **PRELIMINARY STUDY AND THE PROPOSED DESIGN PROCESS**

3.1 Preliminary study

3.1.1 Introduction

The literature review provided in this PhD study contextualised displacement and emergency education providing various possible challenges to be faced in this context, in addition to multiple suggestions on how to tackle some of these challenges such as using participatory approaches and focusing on motivation. However, the fields of displacement, emergency education, and technology in this context are very broad, and the number of possibilities of the challenges in this context is very high. So there was a need to do an exploratory preliminary study to guide the literature review.

Moreover, his PhD study aims to develop a design process and a design method to be tested in a real context with displaced communities from Syria due to the logistical advantage of the Primary Investigator (PI) being from Syria and can speak Arabic natively and already has contacts with NGOs working with Syrian refugees in different countries. The literature review in section 2.3.2 discussed examples of known design processes that suggested stages to research the defined problem to be solved by the design process. Thus, there was an essential need to have an understanding of how the challenges faced by the Syrian displaced communities and how these challenges link to the ones covered in the literature review. This understanding is essential to this study so the PI would have the time to research these challenges from the literature ahead of the case studies to propose an adequate design process grounded in the literature, and can tackle these challenges.

Finally, there was a need to identify any available resources and contacts who could participate in this research by collaborating in hosting the activities of the case studies. Therefore, this preliminary study was designed to understand the challenges faced within the displaced communities who could be the target of this PhD study, identify the available resources (curricula and technology) and how they are used, and find contacts with whom this research can be conducted. This chapter will describe the preliminary exploratory study that was conducted during this research simultaneously with the literature review. This is not the main PhD study, but this preliminary study helped in guiding, scoping, and confirming the literature review, identifying the available resources and contacts, and informing the design of the later activities of the PhD study.
3.1.2 Study aim

This preliminary study aimed to:

- Explore the existing challenges facing both the displaced communities, the displaced children, and the NGOs staff working with them within the community with whom the case studies will be conducted.

- Enquire about the available resources and how they are used such as curricula, human resources, and any previous use of technology in any form (digital media, digital curricula, interactive apps, TVs, computers, projectors, tablets, smartphones etc) with noting how such resources are being used and what are the factors for successful or unsuccessful implementations. What can we learn from using these resources that could benefit the literature review and the implementation of the case studies.

- Exploring possibilities for future participants, collaborations, and partnerships for the later stages of this research.

These aims above can be considered research questions for this specific preliminary study.

The findings from these exploratory interviews were presented at the UNESCO headquarters during Mobile Learning Week 2017, which was focused on the use of technology for emergency education (Alain, 2017) and in the symposium “Invisible Children: Children’s Media, Diversity and Forced Migration” (Steemers et al., 2017). Findings also helped in focusing the literature review, methodology, the proposed design process, and the needed information to plan and conduct the case studies.

3.1.3 Participants

This preliminary study targeted participants who have expertise in working with the displaced communities in several countries such as Lebanon, Jordan, Turkey, and Greece as these are the countries hosting the largest population of displaced communities. Participants’ expertise varied between education (teaching, schools management), aid distribution workers, researchers in the areas of education and displacement, and workers in the areas of psychology and psychosocial support. This study did not involve any communication with any members of the displaced communities. The table below (3-1) provides a list of the participants, their initials, and their positions.
### Table 3-1 List of participants in the preliminary study

<table>
<thead>
<tr>
<th>Interview ID</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>head manager of the NGO (10 schools in Lebanon)</td>
</tr>
<tr>
<td>P02</td>
<td>head manager &amp; former manager of Jusoor NGO (3 schools in Lebanon) that has implemented technology trials to support displaced children’s education</td>
</tr>
<tr>
<td>P03</td>
<td>Head manager at “White Hands” NGO, 3 Schools in Jordan. Member of the Jordanian parliament</td>
</tr>
<tr>
<td>P04</td>
<td>Education Officer at UNHCR Jordan</td>
</tr>
<tr>
<td>P05</td>
<td>Senior Advisor on Education at UNICEF</td>
</tr>
<tr>
<td>P06</td>
<td>Manager at “Molham Team” NGO Jordan, which has more than 170 volunteers providing aid and education in several refugee camps in Jordan, Lebanon, and Turkey</td>
</tr>
<tr>
<td>P07</td>
<td>Manager at “Souriate across borders” NGO</td>
</tr>
<tr>
<td>P08</td>
<td>An employee at “Basma wa Zaitouna” NGO Lebanon (3 Schools)</td>
</tr>
<tr>
<td>P09</td>
<td>A researcher from Birkbeck university London, who researched Syrian refugee children education in Jordanian schools and refugee camps</td>
</tr>
<tr>
<td>P10</td>
<td>Emergency education researcher at Save the Children UK who conducted multiple studies on EdTech and Displaced children</td>
</tr>
<tr>
<td>P11</td>
<td>Consultant psychiatrist and Cognitive Psychotherapist. Trained many mental health supporters working with Syrian refugee children in Turkey and Jordan.</td>
</tr>
<tr>
<td>P12</td>
<td>Researcher and volunteer with MSF who visited refugee camps in Greece as a part of his PhD in emergency education and literacy.</td>
</tr>
<tr>
<td>P13</td>
<td>A researcher who conducted Participatory Design workshops at several refugee camps in Jordan</td>
</tr>
<tr>
<td>P14</td>
<td>Manager of an NGO that trains teachers at schools for displaced Syrian children within Syria</td>
</tr>
</tbody>
</table>

#### 3.1.3.1 Participant’s recruitment

Participants were chosen based on communications with several NGOs tackling the Syrian refugee crisis. Many participants were suggested by other participants. Academic participants were contacted based on their academic publications. Participants were recruited by direct communication introducing this PhD study asking them to take part in a phone or email interview.
3.1.4 Preliminary Study Methods:

3.1.4.1 Semi-Structured Interviews
Semi-structured interviews were used to gather data and sample respondents’ opinions on one or more matters. In semi-structured interviews, a specific set of questions are asked based on a set of topics, however, questions can be raised on the fly depending on the respondents’ answers which allows for extra flexibility (Cohen et al., 2013). Interviews were chosen as participants were met or contacted individually and it was not possible to group them in focus groups or workshops due to logistical difficulties of participants time and availability limitations. The topics covered in this preliminary study were the challenges, resources, and future planning in addition to other topics or questions that emerged during the interview based on participants’ answers.

3.1.4.2 Interviews’ medium
The total number of interviews was 14 interviews, they were conducted either in person (three interviews), on the phone (10 interviews), or over email (one interview). Each phone or in-person interview lasted between 20 to 40 minutes. The email interview had its limitations regarding the ability to ask follow-up questions but this was done by sending follow up emails. A total number of emails sent was 4 emails.

3.1.4.3 Interviews’ questions
As explained in the previous section, semi-structured interviews were used in this preliminary study. The table below (3-2) provides a sample of the questions that were asked during these interviews. It must be noted that due to the variety of the interviewee’s expertise and positions, the questions were reformed or slightly changed in different interviews. Other questions were added in the interviews based on the input from the participants.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1-</td>
<td>The position, the organisation, and area of work and expertise of the interviewee</td>
</tr>
<tr>
<td>2-</td>
<td>What is the general context at the location/s in which you have experience?</td>
</tr>
<tr>
<td>3-</td>
<td>What is the demography that you had experience with?</td>
</tr>
<tr>
<td>4-</td>
<td>What services are provided to the displaced community, by whom?</td>
</tr>
<tr>
<td>5-</td>
<td>What is the educational context?</td>
</tr>
<tr>
<td>6-</td>
<td>What are the general challenges faced at the location?</td>
</tr>
<tr>
<td>7-</td>
<td>What are the educational challenges, and how do you tackle them?</td>
</tr>
<tr>
<td>8-</td>
<td>What challenges remain unresolved?</td>
</tr>
</tbody>
</table>

Table 3-2 Preliminary study semi-structured interviews questions sample
9- What are the available resources that are or can be used to support the educational challenges at the location?

10- Has technology (in any form) been used? How? Was it successful? Why?

11- What resources can be expected, harnessed to support children’s education in such context? And what resources are missing?

12- Who should be involved, and how?

13- Would you be interested in participating in future stages of this study?

14- Would your organisation, or another organisation that you know be interested in collaborating in the field study of this research?

3.1.5 Ethical approval

This preliminary study was submitted to the UK Open University ethics committee seeking ethical approval. The ethics approval was granted by the OU ahead of the beginning of the study. Interviews and phone calls were recorded with the approval of participants. Consents were taken in the form of recorded voice or over emails.

3.1.6 Data Analysis

The interviews conducted in this preliminary study were analysed using the thematic analysis method according to the thematic analysis process provided by (Braun & Clarke, 2006).
### Thematic analysis process by (Braun and Clarke, 2006)

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description of the process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Familiarising yourself with your data:</td>
<td>Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.</td>
</tr>
<tr>
<td>2. Generating initial codes:</td>
<td>Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.</td>
</tr>
<tr>
<td>3. Searching for themes:</td>
<td>Collating codes into potential themes, gathering all data relevant to each potential theme.</td>
</tr>
<tr>
<td>4. Reviewing themes:</td>
<td>Checking in the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic ‘map’ of the analysis.</td>
</tr>
<tr>
<td>5. Defining and naming themes:</td>
<td>Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells; generating clear definitions and names for each theme.</td>
</tr>
<tr>
<td>6. Producing the report:</td>
<td>The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.</td>
</tr>
</tbody>
</table>

This process above can be conducted in various ways, and it involves a set of decisions to be made ahead of the analysis such as inductive or deductive analysis, semantic or latent analysis, in addition to the research questions for the study. Such decisions rule how to identify themes and codes. In the context of this preliminary study, the decisions were made as follows.

#### 3.1.6.1 Deductive vs inductive

In thematic analysis, an inductive analysis is where the data is analysed in a bottom-up manner in numerous iterations to identify and merge the themes based purely on the data. The themes identified may bear little relationship to the specific questions that were asked to participants, and coding is done without trying to fit them into a pre-existing coding frame. In contrast, a deductive approach is where the researcher is interested in specific areas in the data and is coding and creating themes accordingly where the themes are closer to the questions asked to participants. For this preliminary study, a deductive approach was chosen because the interest was in the specific areas of challenges, resources, and contacts rather than coming up with themes emerging from the data analysis in a bottom-up process. Thus, coding was done with the three areas of interest in mind with flexibility in identifying the sub-themes based more on the data. This choice was also made due to the time limitations for this preliminary study that aimed to focus on specific topics to support the design of PhD research rather than answering the PhD study’s research questions.
3.1.6.2 Semantic vs latent

A semantic approach, that is used in this preliminary study, is where the researcher is identifying themes based on the explicit surface of meaning and is not looking for anything beyond what the participant said or what has been written. Whereas a latent approach goes beyond the semantic content of the data and starts to identify or examine the underlying ideas, assumptions, conceptualisations, and ideologies that are theorised as shaping or informing the semantic content of the data, which was not the focus of this preliminary study. A semantic approach was more suitable as the study aimed to understand specific topics as they are on the ground, without the need to analyse the underlying ideas and assumptions of the participants. The latent approach was implemented in the design of the main PhD study for the case studies, but not the limited preliminary study.

3.1.6.3 The analysis process

As discussed in the previous sections, the analysis process was implemented from (Braun and Clarke, 2006) and the following table illustrates the number of iterations that were completed for each stage.

<table>
<thead>
<tr>
<th>Phase</th>
<th>iterations</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Familiarising myself with the data</td>
<td>2</td>
</tr>
<tr>
<td>2. Generating initial codes</td>
<td>3</td>
</tr>
<tr>
<td>3. Searching for themes</td>
<td>2</td>
</tr>
<tr>
<td>4. Reviewing themes</td>
<td>2</td>
</tr>
<tr>
<td>5. Defining and naming themes</td>
<td>2</td>
</tr>
</tbody>
</table>

3.1.6.4 Coding sample and themes

The following table illustrates an example of the coding that was conducted on one of the interviews.

<table>
<thead>
<tr>
<th>Output</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The interviewee (Mr ...) is the head manager of Jusoor NGO.</td>
<td>Contacts</td>
</tr>
<tr>
<td>The NGO has 3 schools in 3 different camps in Lebanon.</td>
<td>Contacts, Resources</td>
</tr>
<tr>
<td>The NGO has conducted focus groups with children’s parents to support the education of their children. However, some parents were not interested in the education of their children and preferred that they work or do something else or had other views on their children’s lives.</td>
<td>Challenges</td>
</tr>
<tr>
<td>The NGO teaches the Lebanese curriculum as they hope it may allow children to get certificates in the future from the Lebanese Minister of education. However, even though they are using the Lebanese curriculum, children are not yet allowed to be tested and to get certifications.</td>
<td>Resources, Challenges</td>
</tr>
</tbody>
</table>
The curriculum is in English. This results in most children having trouble getting used to the curriculum first for the language barriers as Syrian children only speak Arabic.

Some teachers tried using some software technology previously unsuccessfully as they did not have digital materials to play, and some teachers are against the use of technology as they don’t have experience in it. To know more about this, it is better to contact Mr H.J, another manager at the same NGO as he can explain more about this matter.

The NGO has multiple projectors, but they are rarely used and mostly for non-educational purposes because they don’t have educational material to show on them. They use them mostly to show movies and cartoons etc. Other schools are using the projectors to play interactive lessons on the whiteboard designed on PowerPoint, but we do not have someone here who can design such interactive presentations for this school.

The NGO has received a donation of a set of tablets, but failed to use them properly as all the lessons pre-installed are from the USA curriculum, and now are stored and not used. To get more details about why this happened, it was suggested that I should contact Mr H.J also who can explain more on this.

Jusoor NGO is happy to participate in the research in the future.

### 3.1.7 Findings

#### 3.1.7.1 Data analysis themes

This section will illustrate these themes in addition to a list of the key findings from this preliminary study.

![Figure 3-1 Challenges theme](figure3-1.png)
Figure 3-2 Resources Theme

Figure 3-3 Contacts Theme

The figures above illustrated the themes and generated codes under each theme. The next section will present a summary of the findings.

### 3.1.7.2 Key findings summary

This section will list the key findings from the themes presented in the previous section, these key findings will inform the literature review, the methodology, and the proposed design process.

1. Technology hardware and equipment should not be the main focus when designing educational technology systems for displacement. In many cases, refugee camps were given a donation in the form of laptops, tablets, projectors, and other equipment, however, this did not always help them achieve learning outcomes as the hardware alone cannot support
learning without being aligned with suitable educational plans. It is a must to have a pedagogy plan that suits both the learners and the educators.

2- Both learners and educators should be involved in the creation of the new Educational technology system designs as sometimes the resulting systems can suit one group but not the other which still makes it unusable in some settings.

3- Technology does not need to be complicated to work. Successful cases of technology implementation in refugee camps were where technology was designed to meet pre-identified educational goals even when technology is in its simplest forms. For example, using interactive PowerPoint slides were used in one location to add a visual aspect to language learning. This solution was beneficial and supportive according to both the teachers and pupils at a field school at a refugee camp for Syrian refugee children in Lebanon.

4- Children’s behavioural problems and lack of social skills are amongst the most reported difficulties when interacting with displaced children. This is due to the conflict trauma, and even more, to the trauma of the displacement context where they lack the basic lifestyle characteristics.

5- In some cases, such as in Lebanon, children were learning in languages that they do not speak. The Lebanese curriculum is mostly in French and English, but the refugee children did not speak these languages and spoke only Arabic.

6- Many children needed to help their parents working in the fields as they lacked the needed funds that are needed for their daily needs of food and medication meaning that they are missing on schooling.

7- Most children lacked basic literacy skills, their skills did not match their age.

8- Student engagement and motivation were both reported as key challenges as they were repeatedly mentioned by the participants. This is due to the severe lifestyle, and due to missing out on school for too long or even some children never been to a school before the war escalated. Furthermore, most of the teachers in such a setting are either inexperienced and appointed on a volunteering basis, or are extremely overwhelmed due to a large number of children and the lack of funding and equipment in addition to the language barrier.

9- Many resources exist in field schools that come from donations such as tablets, projectors, laptops, and TVs. Future designs can rely on such basic devices but the simpler the design is the higher the success rate it will have.

10- There are numerous curricula, but the ones that work best are the accelerated curricula as they compensate for the missing years of schooling and focus on the most needed skills.
3.1.8 Discussion of findings

The findings introduced in the previous section informed the literature review, the methods used, and the proposed design process.

The first finding from this preliminary study explained that the focus in educational technology design in emergency education should be on the educational needs and challenges instead of the many projects introducing technology that is not linked to a pedagogy plan. This links to the findings from Tauson & Stannard (2018) that were discussed in the literature review in section (technology for emergency education). Thus, in our proposed process, we will ensure to focus on identifying the educational needs and challenges ahead of any discussion of technology (Section 3.2.3 Problem and requirement analysis). Afterwards, technology can be designed to tackle the identified needs and challenges rather than being introduced as a standalone solution.

The second finding stresses the importance of involving both the educators and children in the design process. This would also link to the need to have a pedagogy plan aligned with the technology design discussed above as educators would participate in informing this aspect in the system design. In both case studies in this PhD study, educators have been involved from the early stages of the design process. Even in case study one, where no educators could be found, a group of educators from a similar context were involved to capture their input. Children involvement informed the literature review in section (2.4.5.1 Involving children). The implementation of the proposed design process has incorporated children involvement in all stages in the case studies chapter (chapter 5), but with a specific focus on children in substage 3.2 (requirement analysis with children) and substage 4.1 (co-design with children) in both case studies.

The third finding stated how simple technologies could achieve the required goal when they are linked to educational needs and goals. This is also important as it would mean designing technology based on the available resources where technology is simple and support end-users with low technical experience, which is a challenge that was discussed in the findings of this PhD study in section 6.4.1. This exact idea of implementing interactive PowerPoint presentations was implemented in case study two (section 5.4.6) for these reasons based on the input from the preliminary study.

The fourth finding highlighted the challenge of children’s behavioural difficulties due to their psycho-social trauma from living in displacement and the effect of war. This informed the literature review to cover the psycho-social challenges of war and displacement (section 2.1.1.3) and the effect of the conflicts on children (section 2.1.1.4). Moreover, this also informed the proposed design process by suggesting the need to understand the displaced community, their day-to-day challenges, and their psycho-social difficulties. Also, this informed covering the aspect of trust and relationship building.
(section 2.1.2, and section 2.5.6.1), engagement and motivation in section 2.3 to investigate how to engage and motivate the participant to participate in a design process. Additionally, this is why SDT was chosen as a motivation theory focusing on autonomy, relatedness, and competence not only in the context of formal learning, but also in day-to-day interactions. Finally, this finding informed the literature on participatory design with children in section 2.5.5.1 that provided many ways to involve children and highlighted some involvement roles that enhance children behaviour such as Jones et al. (2003) that discussed that more equal design roles result in better behaviour for children with behaviour difficulties. Previous concepts were included in several stages of the proposed design process, and the knowledge from covering these topics was essential to prepare the primary researcher for the context in which the case studies are to be conducted to develop personal qualities on how to interact with such children.

The fifth finding stressed the possibility of language barrier difficulties between children and curricula. This informed the literature review in section 2.2 when the INEE standards were discussed regarding language barriers and the need for learning materials to consider learners age, culture, and language. This finding also contributed to informing the proposed design process that discusses the existing educational challenges which would explore the existence of this challenge or other similar challenges to be addressed. Similarly, the sixth challenge highlighted the financial difficulties with the displaced communities. Such a challenge cannot be resolved through educational technology, however, it is important to know that such challenges exist and might affect the design process and any educational intervention and stresses the need to understand the context and people's non-education related daily challenges in addition to their educational challenges which is covered in stage one of the proposed design process that aims to understand peoples challenges and needs in general.

The seventh finding emphasised the challenge of literacy and children lacking basic literacy skills. This mainly informed the methodology section by choosing methods and activities that do not require literacy skills such as drawing, photography, and 3D modelling using LEGO.

The eighth finding stressed the challenges of engagement and motivation amongst the displaced community and the staff working with them. Thus, the literature review covered understanding engagement and motivation in section 2.3. Moreover, this also contributed to the choice of participatory approaches in general and participatory design as its values link to motivation as suggested by Dent-Spargo (2018).

The ninth finding suggested that educational technology in displacement could harness the use of smartphones and tablets that are often donated to field schools in refugee camps. This informed the proposed design process to include resource planning at a location (section 3.2.4 Design) in addition
to discussing funding opportunities when identifying these resources, which were conducted in case study one where small funding was investigated and used to build the digital self-learning space. The scenario of existing donated items was faced in case study one where the camp had tablets and laptops donated, but they were not being used due to not being linked to any educational and pedagogical plan.

The tenth finding highlighted the availability of numerous curricula, such as accelerated curricula. These resources were important to know about, yet, they were not used in the case studies as they did not fit the designed systems within the limited time given. However, some investigated literacy apps were considered and used in the creation of the digital self-learning space in case study one.

This section (3.1) discussed the preliminary study that was conducted simultaneously with the literature review, which informed many aspects of this PhD study. The next section will introduce the proposed design process that was developed based on the literature review and the findings from this preliminary study. The proposed design process will be used in both case studies.

3.2 The proposed design process

This section will introduce the proposed design process, which was a result of combining the knowledge from the interdisciplinary literature review that was conducted in Chapter 2 and the findings of the preliminary study presented in the previous section. The proposed process is based on the literature from refugee studies and psychology, emergency education, motivation and student engagement, design processes and ISD, and participatory design. The main highlight of the process is emphasising a stage of contextual understanding of the context for which the systems are built. This is followed by a trust and relationship building stage ahead of any design activities. Afterwards, the problem and requirement analysis, the design, and the implementation and evaluation can be conducted. The coming sections will list the design process stages, the rationale behind each stage mapped with the literature review.

The proposed design process (figure 3-4) follows an iterative and flexible design model, as suggested in section (2.4.4). The process adopts a participatory design approach in all the different stages.
The Guiding questions

Robertson & Wagner (2012) suggested that a design method or a process should guide the designers and researchers to develop their interest and attitude towards the participants. Thus, the design process developed in this PhD study will provide a set of guiding questions (Appendices B, C, D), that the designers and researchers should consider in each of the design processes to support their development of interest in each stage. These questions do not cover all the aspects of system design; however, they highlight the critical aspects that were identified from the literature review that should be considered in addition to the standard system design aspects.

The process will be evaluated in the case studies and then discussed and revised in light of the findings in the discussion chapter. Thus, the guiding questions in appendices (B, C, and D) will show whether the guiding questions were planned in the proposed process or were added or expanded during the PhD case studies or as a result of the data analysis findings and discussion. Furthermore, each of the questions provided will have some of the literature sources or the thesis sections that informed the question.

The methods and techniques used in this PhD study to implement the different process stages in different case studies are discussed later in the methodology in section 3.6. The next sections will explore the stages of the proposed design process.

3.2.1 Stage one: Contextual understanding of the conflict, the displacement, the stakeholders, and the culture

This is the first stage of the process, and it is a prerequisite for the later stages. The importance of this stage is derived from the literature on refugee studies, displacement psychology, emergency education, and educational technology for emergencies in addition to the preliminary study findings.

3.2.1.1 Objectives (sub-stages)

- Contextual understanding of the conflict that caused the displacement
- Contextual understanding of the displacement
- Contextual understanding of the stakeholders and culture
- Contextual understanding of the location and planning for the data collection and design activities according to the understanding achieved in this stage

The guiding questions for this design process stage are provided in Appendix B.
3.2.1.2 The rationale for the stage

The literature of displacement psychology (Block et al., 2013; K. E. Miller, 2004; K. E. Miller et al., 2006) discussed the importance of building trust with the displaced community and stakeholders stressing that building trust requires an understanding of the conflict, the displacement, the stakeholders, and culture (see section 2.1.2). Furthermore, this stage was informed by the preliminary study that emphasised the need to investigate the non-education related challenges that affect people’s lives as they may have a direct link to educational challenges in a displacement context.

Furthermore, the importance of this stage is derived from the literature review on emergency education in the context of educational content evaluation against violence and alienation (see section 2.2.2). Several examples from the literature (Van Ommering, 2011; Kagawa 2005; Galtung 1996; Salmi 2004) discussed the challenge of the indirect violence in emergency education that is caused by providing educational interventions that reinforce the conflict or alienate specific groups. Tawil and Harley (2004) (section 2.2.2) stressed that the understanding of the global context of the conflict and social division is a critical requirement for the evaluation of both the educational intervention and the educational content against alienation and indirect violence. They provided a process with guiding questions - some of which are included in this process stage - that would assist in understanding the conflict and the dynamics that may affect the design of the educational intervention.

Finally, Gaved et al., (2013), Charitonos and Kukulska-Hulme (2017), and Kukulska-Hulme et al. (2015, 2017) all stressed the importance of understanding the social and contextual aspect to deliver learning activities that are relevant to the context of the learner for better motivation.

3.2.2 Stage two: Establishing a trust relationship with the stakeholders

3.2.2.1 Objectives (sub-stages)

- Establish trust relationships with the different stakeholders for access, data reliability, consent, and to ensure an ethical interaction during the design activities.

This stage uses the guiding questions from the contextual understanding from the previous stage to inform the trust-building activities (Appendix B).

3.2.2.2 The rationale for the stage

This stage is also derived from the extensive literature on refugee studies and psychology that showed that trust is an essential ethical concept in any research with a displaced population. The stage aims to use the contextual understanding from the previous stage to establish professional trust relationships with the stakeholders. Trust was discussed as an essential factor in the displacement context for access (Miller 2004), to obtain consents (Block et al., 2013; Cohen et al., 2013; Mackenzie...
et al., 2007; Skårdalsmo Bjørø & Jensen, 2015), and for data reliability (Block et al., 2013; K. E. Miller, 2004; K. E. Miller et al., 2006).

Furthermore, the literature on participatory design approaches suggested that trust is important as an ethical and operational factor in the design process (section 2.5.6.1). This PhD study aims to use the knowledge in regards to trust from the literature on refugee studies and psychology with the literature on design processes and participatory design. This is done by emphasising trust’s importance as a prerequisite to any data collection activities, and also as an important component in the design activities themselves.

3.2.3 Problem and requirement analysis:

Problem definition and requirement analysis is a typical stage in all the design processes reviewed in the literature review. However, in the proposed process from this PhD study, this stage will have a specific educational focus with consideration of engagement and motivation.

3.2.3.1 Objectives (sub-stages)

- Understand the educational context at the location
- Conceptualising education
- Conceptualising engagement and motivation
- Managing conflicts (added post data analysis)

These objectives above are to be implemented with both adult participants and children participants. Since displacement contexts suffer from trust difficulties, and also due to ethical and practical concerns, this stage would start with adult participants first, then be completed with children participants once trust relationships have been initiated with the adults which would allow for conducting activities with children. Thus, it will be noted in the case studies chapter (section 5.1) that this stage will be split into two substages, one with adults and one with children, each has its methods to suit the participants' age and capacity.

The guiding questions to be used to achieve the objectives above are provided in Appendix C.

3.2.3.2 The rationale for the stage

The literature review on technology implementation in emergency education (section 2.2.4) stated how many projects in this context missed the essential factor of pedagogy in educational technology. Several projects tackled the educational problem by focusing on technology hardware without matching it to pre-identified educational needs and challenges. This was also highlighted in the preliminary study presented in sections 3.1.7 and 3.1.8.
The literature review from instructional system design (section 2.4.5) summarised several models that highlighted the importance of identifying the educational needs and challenges in a design process ahead of discussing the design of technology, human interaction, and hardware. Moreover, the literature review on engagement and motivation (Section 2.3) highlighted how these two concepts are essential to address in researching the educational needs in a displacement context and suggested a set of questions to ask to conceptualise engagement and motivation from the perspective of the stakeholders.

The design process provided in this PhD study aims to highlight the need to focus on understanding the educational needs and challenges, engagement, and motivation - from the perspective of the stakeholders - in the problem and requirement analysis stage.

3.2.4 Design

Conducting co-design workshops with the identified stakeholders and end-users to ideate, conceptualise, and prototype the systems.

3.2.4.1 Objectives (sub-stages)

- Resources planning (questions expanded and reorganised after data analysis)
- Identifying the system stakeholders and end-users
- Choosing the suitable methods and techniques according to the previous contextual understanding
- Co-designing the systems
- Evaluating and confirming the system designs

These objectives above are to be implemented with both adult participants and children participants. The order of implementation could differ from one case to another, but in this PhD study, this stage was conducted with children before adults as this would empower their voice in a displacement context in which the voice of children could be easily lost. Thus, it will be seen as two substages in the case study chapter sections (5.3 and 5.4), one with children followed by another substage with adults, each following a methodology that suits participants’ age and capacity.

The guiding questions to be used to achieve the objectives above are provided in Appendix D.

3.2.4.2 The rationale for the stage

This stage is a core stage in all the system design processes as seen in the literature review on design processes in section 2.4. The stage aims to guide the designers to achieve successful system designs. It is informed by the findings in the preliminary study regarding involving children in the design process, identifying resources, and considering simple technologies built on existing resources and expertise. The main highlights of this PhD study at this stage are the importance of matching the
system designs with the pre-identified educational goals and challenges Tauson and Stannard (2018), which is why this stage is proposed after the previous stage of identifying educational needs and goals. Furthermore, this stage is informed by the extensive covered literature on participatory design in section 2.5 and participatory design with children in section 2.5.5. Further details on which methods are used in such a stage will be provided in the methodology chapter in section 4.5.

3.2.5 Implementation and evaluation

3.2.5.1 Objectives (sub-stages)

- Convert the designs from the previous stage into practical systems
- Implement and evaluate the systems with the users

This stage covers the evaluation of the implementation of the designed systems. This should not be confused with the evaluation of the design process itself, which is discussed in the data analysis findings and discussion chapters. This is a regular stage in all system design processes. Its details would depend on the previous stages. No specific input was elicited from the literature review towards this stage.

3.3 Chapter conclusion

This chapter provided a summary of the preliminary study conducted in this research and how it links to the literature, the methodology, and the proposed design process. This was followed by presenting the proposed design process with linking the different stages to the literature review. This proposed design process will be implemented in two case studies where the collected data from the case studies will be analysed and discussed to answer the research questions of the PhD study. The next chapter, methodology, will discuss the research design presenting the research epistemology, the methods used to answer the research questions, and the methods used to implement the proposed design process in both case studies, with a summary of the data analysis process and the ethical considerations.
4 Methodology

4.1 Introduction

This chapter discusses the methods used in this PhD study. It will start by discussing the research epistemology in section 4.2 and the position of the researcher in section 4.3. Section 4.4 will discuss the research methodology, which is case studies. It will discuss the rationale for using case studies and the nature of the research design, which involves implementing a proposed design process that is informed by the literature review and the informal interviews. It will be followed by section (4.5) which lists the methods that will be used in the implementation of the design process in both case studies. Afterwards, the data analysis process will be discussed and explained. Finally, the ethical concerns of the research will be discussed in section 4.7.

4.2 Research epistemology

Several ontological and epistemological perspectives were considered to structure the research methodology. Positivism suggests that there is only one truth, and that reality is measurable with reliable tools which are mostly quantitative. Pragmatism says that there is not a single truth and that the truth is continuously changing based on the circumstances, and uses mixed-method tools. Constructivism uses qualitative approaches and claims that there is no one single truth because group membership constructs truth and reality must be interpreted through the members (Saunders & Lewis, 2012).

In this research, literature and theory were used to propose a design process. The proposed design process was tested in two case studies. It can be argued that there is a hypothesis that the developed design process based on the existing knowledge from the literature should be more effective in the displacement context. The research uses case studies to test and evaluate the design process. In addition to the use of multi-methods to implement the case study, including qualitative and HCI methodologies.

Moreover, the evaluation of the research process is twofold, based on the resulting systems, and based on the feedback of the stakeholders. Inductive approaches were suited to understand the effectiveness of the process implementation from the perspective of the stakeholders in the context. This analysis led to the creation of a design model and a design process.
A pragmatic approach was considered because the research aims to generate practical knowledge that can be applied in the real world. However, the constructivist approach was found to be more suitable. The reason for this is that the research uses qualitative multi-methods, linked to an inductive data analysis approach and because the evaluation of the design process effectivity in this research comes from the stakeholders themselves. In other words, the truth is dependent and constructed by the social actors, which in the case of this research, are the stakeholders in a displacement context. Furthermore, the social aspect of the ethnographic case studies and the research methodology that emphasises the opinions and participation of the people suggests that constructivism in this research is of a social constructivism type.

4.3 The role/position of the researcher

The reason why this research topic was chosen is that the researcher is from Syria, and has been a refugee himself for the most part of this study. The researcher’s interest in the topic emerged as he had technological expertise and interest in contributing with something practical that could minimise a little bit of the massive burden faced by other refugees who were less fortunate. The topic of education was chosen as it is an essential topic for the future of displaced children, and technology as a tool was chosen because of the previous technical expertise.

In qualitative research, “the goal is understanding rather than measuring and manipulating, the subjectivity of the researcher is an essential part of the production of an interpretation” (Adams, Lunt and Cairns, 2008, p.139). The position of the researcher in this study is an academic and professional position regarding the research practices. However, due to the close connection between the researcher and the researched community, the researcher does acknowledge the need for being reflexive. Reflexivity involves questioning one’s own taken for granted assumptions (Finlay, 2008). This is essential when the nature of the research is ethnographic. Such context may encourage the researcher to go native which would affect the credibility of the research. Thus, the researcher maintains the aspect of reflexivity, critical judgment, and the focus on understanding more than being over involved.

4.4 research methodology

As discussed earlier in the research epistemology, this PhD study uses case studies as primary research methodology, in addition to a set of multi-methods to implement the design process in each of the case studies.
4.4.1 Case studies

The primary research methodology in this PhD study is case studies. Yin (2018) suggests a six stages process that should be implemented in order to use a case studies methodology. The first stage is “plan”, which would assess whether the case studies methodology is suitable for the research, address the concerns and limitations of case studies. The “plan” and “design” stages will be covered in the following sections. The “prepare” and “collect” stages will be covered in the case studies’ chapters. The analysis will be covered in the data analysis findings chapter. Finally, sharing the findings will be covered in the data analysis findings and discussion chapters.

![Diagram of the six stages for case study research (Yin 2018)](image)

4.4.1.1 The rationale for using case studies

In this PhD study, the research questions aim to understand the complex context of displacement to understand the different challenges and possibilities to design educational technology systems for children living in this context. The effective understanding of such a complex environment requires capturing and analysing the data from different aspects and on different levels. Several methods were considered for this research. However, the required understanding cannot be fully and effectively conducted with other possible data collection methods such as interviews or focus groups which would be very challenging to complete without actual presence and observation of the targeted environment to capture the relationships amongst the possible stakeholders. Furthermore, since this PhD study aims to develop a design process displacement context, such a process would require to be observed and analysed as a case from the beginning to the end. Thus, case studies were more suitable.
The argument to why case studies methodology was favoured will be presented in the following section based on the literature.

Case studies are suggested in HCI to understand how technology is used or could be used. They use an extensive examination of individuals and groups facing specific challenges to understand the real and potential impacts of computing technology (Lazar et al., 2017). This aligns well with the goals and questions of this PhD study as we aim to understand the different challenges and design opportunities in the context of displacement.

Furthermore, Lazar, Feng and Hochheiser (2017) explain that case studies involve in-depth, in-context examination of a small number of cases, using multiple data sources analysed through qualitative methods to build nuanced descriptions capturing the complexities of the environments in question. This aligns with the need to cover capturing the required data from different levels and aspects in this PhD study.

Finally, Lazar, Feng and Hochheiser (2017) explained that the main goals for case studies in HCI are design opportunities; explanation of activities in context; descriptions of systems, contexts, or processes, and demonstration of the successful use of novel tools. This again links to the context of this research as we want to develop and evaluate a design process and investigate the design opportunities for a special context.

Yin (2018) suggest that one way to know that a case study is suitable for the research is if the questions start with “how” or “why”. In the context of this research, the main question does not start with “how” or “why”. However, the question “what is an effective design process for educational technology systems for displaced war-affected children” could be explained as “how do we design educational technology systems for displaced war-affected children”. Furthermore, Yin (2018) adds that a case study is suitable when we have little to no control over behavioural events. Which also applies to the displacement context. Interviews, focus groups, or questionnaires would be able to capture the required depth on their own and would require some sort of control over the events which could not be ensured in this study. Finally, the author suggests that the final reason why to use a case study is if the focus of the case study is contemporary as opposed to historical.

Four key aspects can be used to describe case studies (Lazar et al., 2017):

- in-depth investigation of a small number of cases;
- examination in context;
- multiple data sources;
- emphasis on qualitative data and analysis.
Answering the research question of this PhD study is harder to achieve with other research methods as it would be challenging to have a large and representative sample of participants. Furthermore, it would be much harder to capture and analyse the development of a design process in such a complex context. Especially that the stakeholders in a displacement context are often overwhelmed with various daily challenges that would make their participation harder without proper involvement of the researcher in their context, trust and relationship building, and day-to-day observation of their needs and challenges. All other methodologies such as interviews, focus groups, questionnaires, literature review, ethnography, design workshops, and others all could be used to cover a part of this research. However, the proper depth and observation of a design process from the early stages to the implementation and revaluation stages in such a complicated context could best be achieved using case studies which would encapsulate all the other methods. Thus, each methodology such as interviews, focus groups, ethnography etc would be implemented to cover a small part of this research. And all these methods would be discussed and analysed under the umbrella of case studies that would offer an in-depth study of an instance or a few instances within a specific real-life context through multiple qualitative data sources resulting in the rich understanding required to answer the research questions of this PhD study.

4.4.1.2 Concerns of case studies

Yin (2018) identified five main concerns and challenges of using case studies. The first concern is the rigour, where Yin stated that some case studies might lack the rigour because of allowing equivocal evidence to influence the case study. Another concern is the non-research case study, which means when a case study has no identified methodologies to maintain its structure and thus, may not be considered research. The third and fourth concerns are the challenges of generalisation and comparative advantage. Yin suggests that it is hard to generalise or compare from a case study as this would require repetition in similar contexts which is hard to achieve. Thus, he suggests that we can generalise into theories rather than facts. The fifth and final concern is the possible unmanageable load of effort. This is because case studies tend to generate a massive load of data to be analysed. Thus, the case study planning in addition to the data analysis strategy should be planned to be efficient within the allocated time for the research.

In this PhD study, the methodologies used in the case studies will be defined and discussed in advance to ensure that the case studies are following a research methodology. Furthermore, the rest of the concerns will be considered in the planning for the case studies and data analysis strategy to ensure that the findings are described with an understanding of the limitations of the case study method.
4.4.1.3 Case studies types

Case studies may have different types depending on the objective of conducting a case study. They can be exploratory, explanatory, or descriptive (Lazar et al., 2017; R. K. Yin, 2018). Lazar, Feng and Hochheiser (2017) suggest that exploratory case studies in HCI aim to understand novel problems or situations, often with the hopes of informing new designs. In contrast, explanatory case studies are used to develop models that can be used to understand a context or technology. Finally, descriptive case studies are used to describe a system, context, or technology.

The case studies in this PhD study follow an exploratory pattern as they will implement a design process in a new context to explore the challenges and dynamics that could be encountered. Moreover, the case studies in this research aim to develop new systems that could both help the participants in the case studies and be used to evaluate the process.

Besides, it could be argued that the end goal of the case studies analysis has an explanatory aspect as it would also result in a model (the design process) that would allow for a better understanding of the displacement context.

Lazar, Feng and Hochheiser (2017) suggest that exploratory case studies can benefit from implementing ethnographic approaches as it enriches the understanding of the context. Runeson and Höst (2009) discuss case studies types in the context of software engineering. The authors suggest that case studies that aim to improve something or require participants’ involvement could be considered action research.

In summary, this case studies in this PhD study follow an exploratory approach with an ethnographic component that aims to enrich the contextual understanding of the displacement context. In addition, it could be suggested that the case studies have an action research component. This is because the design process implemented in the case studies has a participatory approach that aims to improve the education for war-affected children through designing a system.

4.4.1.4 The number of case studies

Yin (2018) suggested that for a better understanding of a context or a case. Having more than one case study would be helpful for the validity of the data analysis. Thus, two case studies were conducted in this PhD study.

In this PhD study, the method that was chosen to answer the research questions is the case studies where we implement an intervention based on a proposed design process (section 3.2) that is derived from both the literature review and the input from the preliminary study. The proposed process will be implemented in two case studies, where each case study will form a data source. Both data sources
were later analysed to answer the research questions. This will be explained further in the data analysis section later in this chapter.

4.5 Methods and techniques used to implement the design process in the case studies

In the previous section, it was stated that the primary method to answer the research questions is through case studies. However, in each case study, multi-methods and techniques were used to implement the process. This section will list and provide an overview of each of these methods. Methods and techniques will be revisited in the chapter on each case study to discuss how each method was implemented in the context of that specific case study.

4.5.1 Literature review

A literature review was used for the contextual understanding of the context. This involved summarising the literature on the conflict, the nature of displacement, the stakeholders, and the locations in which the case studies were implemented.

4.5.2 Ethnography

As it was discussed in the earlier section on the case study methodology, both case studies in this research had an ethnographic component to enrich the contextual understanding of the logistical and social aspects surrounding the implementation of the design process.

“Ethnography refers to the use of in-depth observation, and often participation, of a human group, culture, or context, with the goal of developing a rich description of activities, interactions, beliefs, roles, and goals. Ethnographic research in human-computer interaction (HCI) is particularly useful for understanding environment where stakeholders interact to complete complex tasks involving the need for coordination and exchange of information. (Lazar, Feng and Hochheiser, 2017, Chapter 9 Abstract)”

Ethnography has been discussed in the literature review (2.4.9.3) to show how it could be implemented to support participatory design processes. A core belief in ethnography is that “to gain an understanding of a world that you know little about, you must encounter it first-hand. (Blomberg et al., 2009).”
In the context of this research, ethnography was implemented in the form of observation, servicing, and ethnographic interviews and communications. The scope and implementation of ethnography in the context of displacement will be discussed in detail in each of the case studies.

4.5.2.1 Observation

Observation methodology was an essential aspect of the ethnographic approach in this PhD study. Cohen, Manion and Morrison (2013) stated that “observation studies are superior to experiments and surveys when data are being collected on non-verbal behaviour P.260”.

Furthermore, the authors elaborate that in using observation, investigators can discern ongoing behaviour as it occurs, and develop more intimate and informal relationships with those they are observing. Cohen, Manion and Morrison (2013) also provided a set of guidelines for field note collection. These guidelines were followed in this PhD research. Observational field notes were collected in the form of written notes, recorded notes using my personal recorder, or typed on a password-protected application on my mobile.

4.5.2.2 Servicing and active participation

As discussed in the previous chapters, this study takes place in an environment of displacement which is considered sensitive for many identified reasons. This makes it challenging to access such context to conduct the research. In the first case study, I had to access a refugee camp with strict entry measures for the protection of the refugees and the NGOs staff working with them. It was not possible to just show up and conduct research. Furthermore, the stakeholders in that camp were overwhelmed with their daily challenges and are not expected to participate in or host a research project that may add burden to their daily work. Similarly, the second case study was in four primary schools at Chalkida city in Greece, hosting displaced children alongside the Greek student. Accessing the schools as a researcher to conduct a cs study in a context where children are present is known to be extremely challenging.

Lee (1993) suggested several sampling methods when doing research that could be classed as sensitive. One suggested method is called “Outcropping” which involves going to a particular location where the targeted group of participants are located. Moreover, another suggested method is “servicing” which highlights the possibility to offer some sort of servicing in return for their participation. An ethical concern here is that researchers need to be very clear on the benefits offered (Walford, 2001), and should be confident that they really are able to provide the services promised (Cohen et al., 2013). I find that both methods complete each other, as outcropping to a location is very important to see the real situation on the ground and understand the needs and challenges on the ground. Moreover, providing a service in return is suitable for both parties in the context that I am
researching as it will mean that I will have the chance to build a friendly relationship with participants by helping them rather than visiting as an outsider.

The organisations managing refugee camps in different countries are very used to hosting volunteers to help in the daily tasks required in the refugee camps. In this study, servicing was provided in the following areas: translation, helping the volunteers in daily activities, organising activities for children, supporting community outreach, supporting teacher’s work, and helping in the communication between the Ministry of Education with the schools, parents, and children. The previous forms of servicing were promised to the partnering NGOs in advance as a part of working at the camp. In addition, working there with the participants on analysing the problems, and designing solutions was an additional form of servicing. Nevertheless, this form as a researcher was explained to the partnering NGOs that it may or may not necessarily lead to practical solutions. This was in order to be clear not to promise the NGOs anything that is not guaranteed.

The servicing in this research can be considered a form of active participation in the stakeholders’ context. Active participation is a form of ethnography method that provides the researcher with hands-on experience of the challenges and contextual dynamics of the stakeholders’ context (Lazar, Feng and Hochheiser, 2017).

4.5.2.3 Ethnographic interviews/Informal conversational interviews:
This type of interview allows questions to emerge from the immediate context without predetermination of questions (Cohen et al., 2013). Furthermore, it allows the interview to be matched to different individuals and circumstances. Even though such interview type is less systematic; however, in the early stages of the process, some interviews are only exploratory and are only to gather basic exploratory data. This data will be in the form of written field notes and/or voice recordings.

4.5.3 Interviews
Interviews are used to gather data and sample respondent’s opinions on one or more matters. The main difference between interviews and questionnaires or surveys is that interviews allow for more free and in-depth discussion. Questions can be raised on the fly depending on the respondents’ answers which allows for extra flexibility (Cohen et al., 2013). Interviews types used in this research were informal or unstructured (ethnographic), and semi-structured. Interviews are used throughout different stages for different purposes. They were used with adult and children participants.
4.5.3.1 Semi-structured interviews:

This type of interview is semi-structured, which means that there is a number of questions and topics that need to be covered in a specific order. However, new topics or questions may emerge during the interview depending on the answers. These interviews will be used with individuals who may not be able to attend the focus groups or other research activities, but still want to participate in the research (Cohen et al., 2013).

4.5.3.2 Interviews with children:

It is essential to understand the world of children through their own eyes rather than the lens of the adult. Children can tell us what engages or disengages them (Scaife & Rogers, 1999). Additionally, Arksey & Knight (1999) pointed out that children differ from adults in cognitive and linguistic development, attention and concentration span, ability to recall, life experiences, what they consider to be necessary, status and power. Thus, when discussing abstract questions with children, it is better to allow them time to think and express their opinion in various ways rather than one way. This is by involving fun and enjoying activities such as drawing, playing, writing, speaking, playing a game, using pictures, newspapers, toys or photographs in the interview.

Furthermore, interviewing children in groups can be less stressful for them and allows them to interact with each other (Cohen et al., 2013). This research will include activities that are designed for children, which are described below. However, some activities like drawing may not be preferred by older children (Cohen et al., 2013). In such cases, group interviews will be used. Any interviews with children will follow all the guidelines on consent from their parents, guardians, and the children personally. Further ethical concerns will be discussed in the ethical concerns section below.

4.5.4 Focus groups

The collective view is very important in this research as the opinions and discussions among different types of participants such as educators, volunteers, residents and the rest of the stakeholders are very important and will empower them to speak out their mind and debate it with other participants. The main difference between focus groups and interviews is that focus groups reliance is on the interaction within the group who discuss a topic presented by a researcher (Cohen et al., 2013; Morgan, 1996). Whereas in normal interviews, the researcher will be getting the opinion of one participant from one specific group. Focus groups were used for contextual understanding, and for the problem and requirement analysis. This method is known in the HCI context for both objectives (Fails et al., 2012). This research will follow the suggestion of Morgan (1996) to involve between four and twelve people per group and suggests to over-recruit by an extra of 20% to allow people not showing up for any
reason. I am aware of some of the challenges of the focus group method and will respond to these in order to ensure successful implementation. This includes ensuring that every participant is a representative of a particular group that should be involved in the research. Moreover, to ensure that all characteristics of the groups are represented in the focus groups. Guaranteeing that the participants have enough information to participate in a focus group. Managing the balance of the discussion during the focus groups by the researcher so that every group has the chance to present their opinion and participate in a constructive discussion.

4.5.5 Drawings

Drawing has been used as a fun and engaging technique for children to express their own views and experiences. Until recently, researchers focused exclusively on what they understood the child’s drawing meant rather than on the child’s explanation of what the drawing was about (Malet et al., 2010). Drawings can be used as a good ice-breaking activity, can help children relax and establish rapport, can act as prompts and as triggers for remembering or for eliciting discussion, and may help children organise their own narratives (Cohen et al., 2013; Malet et al., 2010).

The challenge of using drawing is that some children may lack drawing capabilities and thus feel unable to communicate if that is the case, the adult participant managing the group will help the child in drawing what the child wants. Another challenge is that some children may find drawing boring and childish. Such children will be invited for a group interview instead of drawing.

4.5.6 Photography

Instant cameras have been used widely in participatory research with children. They allow creativity, fun, and are attractive to larger age groups (Druin, 2002; Fails et al., 2012; Fisher et al., 2016; Malet et al., 2010). Fisher, Yefimova and Yafi (2016) Photography will be used at some activities to illustrate children’s perception of education and as an ice-breaking activity at the beginning of the activities with children.

4.5.7 Post-it notes (sticky notes)

This technique is widely used in different disciplines, including its use with adults and children in HCI and participatory design. Such a technique is mostly helpful in evaluating an existing solution or context (Fails et al., 2012). The Post-it notes technique has been used in this research to evaluate the educational context from the perspective of the children in both case studies.
4.5.8 Co-design workshops

Co-design workshops are a core principle of participatory design, and they encapsulate many techniques that can constitute a design workshop. Fails, Guha and Druin (2012) reviewed the literature on the different methods and techniques that can be used in such workshops, explaining the purpose of each of the techniques.

In the context of this research, the co-design workshops were used to ideate and brainstorm the educational systems from the stakeholders’ perspective. The workshops with children followed the structure of Fisher, Yefimova and Yafi (2016) which designed the activity of creating a magical machine that helps children in displacement. However, in this research, the activities from Fisher, Yefimova and Yafi (2016) were adapted and scoped to the context of educational systems.

With children, co-design workshops used the bag of stuff activity, which included providing children with drawing and modelling equipment such as LEGO with giving them the freedom to represent their designs. The ideas from different children groups were later organised following the mixing ideas technique which is reported to be useful in the cases where children group work is hard to achieve or when there is a variety of design ideas for various needs.

With adults, co-design workshops involved a mixture of group interviews, focus groups, brainstorming, and drawing.

4.5.9 Usability testing

Usability testing, in general, involves representative users attempting representative tasks in representative environments, on early prototypes or working versions of computer interfaces (Lewis, 2006) (Lazar et al., 2017). Usability testing was used in this research to evaluate the implementation of the resulted systems in the case studies. Lazar, Feng and Hochheiser (2017) discussed three different types of usability testing. Expert-usability testing involves experts evaluating a product, automated usability testing which is done through software, and user-based usability testing that is performed by involving the end-users in the tests. In this research, usability testing was conducted by involving the end-users in testing the resulted solutions during the pilots and in the implementation stages. Usability testing involved observing the end-users, and interviewing the end users.

4.5.10 Classroom observation

Classroom observation was conducted in case study two to observe the learning experience of the displaced children in the formal schools, in addition to the teaching experience of the teachers. The aim was to capture and understand the educational challenges and needs in that context as an
additional input to the problem and requirement analysis in addition to the interviews and focus groups activities.

4.5.11 Methods and techniques, the design process, and case studies

This section aims to list the different methods and techniques used to implement the design process organised by the process stage and case study.

Table 4-1 Methods and techniques used in the implementation of the proposed design process

<table>
<thead>
<tr>
<th>The stage</th>
<th>Case study 1 With Adults</th>
<th>Case study 1 With Children</th>
<th>Case study 2 With Adults</th>
<th>Case study 2 With Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Understanding the conflict, the stakeholders, and their culture</td>
<td>Literature review</td>
<td>N/A</td>
<td>Literature review</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>Ethnography</td>
<td></td>
<td>Ethnography</td>
<td></td>
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<tr>
<td></td>
<td>(Servicing, active</td>
<td></td>
<td>(Servicing, active</td>
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<td></td>
<td>participation, observation, and</td>
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<td>participation, observation, and</td>
<td></td>
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<tr>
<td></td>
<td>Interviews)</td>
<td></td>
<td>Interviews)</td>
<td></td>
</tr>
<tr>
<td>2. Establishing a trust relationship with the stakeholders</td>
<td>Ethnography</td>
<td>Ethnography</td>
<td>Ethnography</td>
<td>Ethnography</td>
</tr>
<tr>
<td></td>
<td>(Servicing, active</td>
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<tr>
<td></td>
<td>Interviews)</td>
<td></td>
<td>Interviews)</td>
<td></td>
</tr>
<tr>
<td>3.1: Problem Definition, Understanding the context</td>
<td>Interviews, Focus groups</td>
<td>Photography</td>
<td>Interviews, Focus Groups</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drawing</td>
<td>Classroom</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Group interviews</td>
<td>Observation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-it Notes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.2: Problem Definition, Identifying educational goals and challenges</td>
<td>Interviews, Focus groups</td>
<td>Photography</td>
<td>Interviews, Focus Groups</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drawing</td>
<td></td>
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<td></td>
<td></td>
<td>Group interviews</td>
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<tr>
<td></td>
<td></td>
<td>Post-it Notes</td>
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<td></td>
</tr>
</tbody>
</table>

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4.6 Data analysis

4.6.1 Forms of data
The data collected throughout this research varied in different case studies. The forms of data consisted of:

- Text documents (literature, articles, transcripts, personal field notes)
- Visual data (pictures and videos), including scans of the design sketches.
- Recordings of interviews, field notes, usability testing sessions.

4.6.2 Data analysis stages
There were two phases of data analysis in this research. The next two sections, along with the following diagram, will help in understanding the aim and plan for each data analysis phase.

4.6.2.1 Data analysis to implement the process
This phase of data analysis was conducted during the field studies in the form of rapid data analysis to move from one design process stage to another leading to the system design in each case study. The purpose of this rapid analysis is solely to achieve the system design and is not linked to answering the research question.
4.6.2.2  Data analysis to evaluate the process

This phase of data analysis took place after the end of the case studies. All data gathered from both case studies was organised, fully transcribed, translated and analysed following an inductive thematic analysis process.

![Diagram of research design and data analysis plan](image-url)
4.6.2.3 Data preparation for analysis

- Visual data was transcribed
- Interviews, focus groups were fully translated to English, transcribed, and then thematically analysed.

4.6.3 Data analysis approach/process

The data were analysed using a thematic data analysis approach following the process of (Braun & Clarke, 2006). Thematic analysis is a method for identifying, analysing, and reporting patterns (themes) within data. It minimally organises and describes your data set in (rich) detail. The data analysis process phases are described in the table below.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description of the process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Familiarising yourself with your data:</td>
<td>Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.</td>
</tr>
<tr>
<td>2. Generating initial codes:</td>
<td>Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.</td>
</tr>
<tr>
<td>3. Searching for themes:</td>
<td>Collating codes into potential themes, gathering all data relevant to each potential theme.</td>
</tr>
<tr>
<td>4. Reviewing themes:</td>
<td>Checking in the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.</td>
</tr>
<tr>
<td>5. Defining and naming themes:</td>
<td>Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells; generating clear definitions and names for each theme.</td>
</tr>
<tr>
<td>6. Producing the report:</td>
<td>The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.</td>
</tr>
</tbody>
</table>

This process above can be conducted in various ways, and it involves a set of decisions to be made ahead of the analysis such as inductive or deductive analysis, semantic or latent analysis. Such decisions rule how to identify themes and codes. In the context of this preliminary study, the decisions were made as follows.
4.6.3.1 Deductive vs inductive

On the one hand, an inductive approach to thematic analysis is where the data is analysed in a bottom-up manner in numerous iterations in order to identify and merge the themes based purely on the data. The themes identified may bear little relationship to the specific questions that were asked to participants, and coding is done without trying to fit them into a pre-existing coding frame. On the other hand, a deductive approach is where the researcher is interested in specific areas in the data and is coding and creating themes accordingly where the themes are closer to the questions asked to participants in the data collection activities.

In this PhD study, we are not looking for specific themes as this is an exploratory study. The exploratory approach means that resulted themes will emerge from the data analysis rather than being specified in advance. Thus, the choice for the thematic analysis approach is an inductive approach.

4.6.3.2 Semantic vs latent

A semantic approach is where the researcher is identifying themes based on the explicit surface of meaning and is not looking for anything beyond what the participant said or what has been written. Whereas a latent approach goes beyond the semantic content of the data and starts to identify or examine the underlying ideas, assumptions, conceptualisations and ideologies that are theorised as shaping or informing the semantic content of the data.

In this PhD study, the context of the research questions and the constructive epistemology implies that the truth is dependent and constructed by the social actors, which in the case of this research, are the stakeholders in a displacement context. This requires an investigation of the underlying ideas, assumptions made by different groups and the reasoning behind it rather than taking their input at face value. Motivation theories, participatory design values, and many other ideologies and theories will be involved in analysing the collected data. Thus, a latent approach to thematic analysis is more appropriate to this PhD study.

4.6.3.3 Data analysis process

Due to a large amount of the gathered data from both case studies. The thematic analysis process had to be done over several iterations. The table below shows the count of iterations for each phase of the data analysis process.
In the first iteration, all the data was transcribed and translated into English. Visual data items were also transcribed. A large amount of the data items was in Arabic, which required a prolonged translation which was done by me as I am a native Arabic speaker. The translation and transcription allowed me to familiarise myself with the data. Afterwards, initial codes were generated. Due to a large amount of data, the generation of the codes had to happen over a long period, which resulted in codes duplicates. This required further iterations to unify similar codes. The search for themes was done afterwards by generating a large number of themes. Themes were reviewed then changed or merged where needed. The themes were then reviewed twice, then each of the themes was defined.

The resulting themes were organised to form a design model that goes along with the design process developed in this research. Afterwards, the findings chapter (chapter 6) was written explaining the resulted themes, how themes relate to each other, the sub-themes, and the codes providing data examples on the different codes.

**4.6.3.4 Data analysis validation**

The data analysis was validated by regular review with both of my supervisors. Several data items were shared in the supervision meetings with the supervisors who provided critical feedback on my coding and themes generation outcomes. Finally, the last iteration of reviewing the themes was also done with the support of my supervisors, who provided continuous critical feedback on my analysis reports until reaching the final thematic map and themes definition. You can find a sample of the thematic analysis codebook in Appendix K.

**4.7 Ethical concerns**

Ethical concerns are an essential part of this study since it deals with several groups of participants that are considered vulnerable. Ethics was a core concern in every part of this research from the
methods used, the data collection approach, the Scandinavian values, and the followed ethical guidelines. This section will discuss the ethical considerations in this PhD study.

4.7.1 Followed published ethics and legal guidelines

This study followed a set of published ethical guidelines such as the (BERA, 2011) ethical guidelines for educational research. Especially the ethical guidelines concerning children and vulnerable people. This includes complying with Articles 3 and 12 of the United Nations Convention on the Right of The Child (UNICEF, 2019). Article 3 requires that in all actions concerning children, the best interests of the child must be the primary consideration. Article 12 requires that children who are capable of forming their own views should be granted the right to express their views freely in all matters affecting them, commensurate with their age and maturity.

The research activities, their aim, and details were repeatedly explained to all participants, especially children using a language that they can understand. Parents were not only informed of the activities that will be conducted with their children; they were also consulted in the planning and preparation of these activities. This was to follow the suggestion from (Kaukko et al., 2017) that stated that “Ideally researchers should ask children, families and communities what in their opinion should be researched, and how” P.18.

It was made very clear that participation is entirely voluntary and that participants, particularly children, have the right to withdraw without the need to provide any reason at any time. Moreover, the study ensured continuous observation for children throughout the activities to ensure their wellbeing and safety at all times.

4.7.2 Research outreach

The research outreach for participant recruitment and sampling followed the ethical guidelines by the UK Open University. This included producing leaflets (see Appendix G) in both English and Arabic describing the research aim, plan, and ethical commitment towards the community. The leaflets were also discussed and agreed on in consultation with the local NGOs at the Ritsona refugee camp. Leaflets were distributed by the primary investigator with the help of community members who volunteered to help.

4.7.3 Participants protection

4.7.3.1 Personal information protection

Many of the participants in this study were asylum seekers and refugees. Thus, their personal information is extremely sensitive for various reasons such as their safety from the governments and
entities in the countries they fled from. All personal details collected in this study were always encrypted and never shared with anyone, even other participants or NGOs. The researcher was neutral in the relationships built with the different participant groups and avoided any engagement in the sensitive socio-cultural and political topics.

Several participants and families preferred to use pseudo names, especially for their family names, this was granted. No individual data nor personal information was collected or used except to administrate the study and consents. No deception was used at any part of the research. On the contrary, the clarity of the research goals and possibilities were being discussed and communicated repeatedly at all times.

4.7.3.2 Physical protection

In case study 1, activities were held in locations that were agreed on with the managing NGOs, participants, parents, and children at the Ritsona refugee camp. In case study 2, locations were specified and agreed on with the school principals, the teachers, children, and parents. This ensured the physical and mental wellbeing of all participants and principally children. Throughout the activities, any needs from children such as snacks or toilet breaks were managed. The principal researcher followed the UK Open University safeguarding policy, especially in the three aspects of children safeguarding and protection.

4.7.4 The personal safety of the primary investigator

Whenever research is conducted with a crisis-affected population, there is a chance of secondary trauma. This happens when the researcher gets emotionally affected by the information transferred or in contact with other people who are suffering because of a crisis. I am well aware of this challenge, I have attended a workshop about managing secondary trauma at the University of Oxford in 2016. In order to protect my personal wellbeing, the guidelines I learned were followed during the field study which are: keeping regular contact with my supervisors, taking breaks when needed, keeping contact with my family and wife, and finally ensuring that my personal wellbeing is a priority over my research.

Emergency contacts were logged and kept at all times in both digital and printed form. In cases of emergencies, the local NGOs instructions were followed. Both travel and medical insurances were confirmed ahead of the travel. Communication with the UK Open University’s protection staff was maintained at all times.

4.7.5 Consents

Voluntary informed consent was sought from all the participants and gatekeepers. In the case of a child, consent was sought first from the parents and then from the child personally. If the consent
from the parent is not possible for any reason, then the consent for a child will be sought from those who act in guardianship such as carers and social workers who have responsibility for the welfare and wellbeing of the participants. This procedure is suggested in the Ethical Guidelines for Educational Research from the British Educational Research Association (BERA) and Kinard (1985) who researched unaccompanied asylum-seeking children participants (BERA, 2011; Kinard, 1985).

Some individuals may have problems reading or signing any sort of a form as some people -such as in developing countries- may prefer not to sign anything as they feel it could be used against them. This challenge is particularly relevant in the case of displacement, where the displaced population are already overwhelmed and suspicious about their asylum cases. Or in the cases where a participant or a parent is illiterate. In such cases, verbal consent was recorded and saved in the records instead of the written signed consent form (Nuffield Council 2002; UCL Research Ethics Committee).

Since many of the participants were non-English speakers, they speak Arabic. Translated consent and booklets were used in a language that they fully understand (Appendices E & F). I did the consent and leaflets translation as I am a native speaker. If the consent is verbal, the translation of the consent will be verbally spoken and explained to the individuals, and any questions raised by them will be answered. If any of the children appeared to have not understood and fully agreed to the research details, then they could not be counted as consented.

4.7.6 Feedback on the ethical interaction throughout the study

This study has received very positive feedback during and after the field studies in regards to the ethical policy that was followed. Positive feedback was received from members of displaced families, NGOs personnel, and the representative of the Greek Ministry of Education. This feedback was voluntarily in the form of written and verbal communications to thank the research team for a thoughtful and respectful ethical interaction throughout the research. Furthermore, the NGO that we partnered with in the field studies provided me with a letter of reference that focused on the ethics of implementing the research. This letter was used as a reference for the Greek Ministry of Education to obtain entry permission. The letter is available in Appendix H.

Finally, an ethical application that consisted of 14 files (18000 words) was submitted to the Open University ethics committee for approval ahead of the field study. The ethics committee at the Open university approved the ethics application for this research and responded with very positive feedback commending the organising and level of details of the ethical application.
This chapter discussed the methodology that will be followed in this research to answer the research questions. It explained the argument for using case studies, presented the position of the researcher, listed the techniques used in the implementation of the case studies, followed with details regarding the data analysis and ethical concerns. The next chapter will present the case studies conducted in this research.
5 CASE STUDIES

5.1 Case studies reporting structure

One of the challenges in writing this PhD thesis was to report the case studies since both of them consist of multiple stages, where each stage consists of multiple data collection activities and outcomes. Furthermore, both case studies had timeframe and data collection overlaps which could confuse the reader. This section will explain the reporting structure for the case studies chapters, and it aims to help the reader navigate through the coming chapters.

Both case studies are exploratory and follow the chronological order of the design process presented in section (2.6). Yin (2018) suggested that, in exploratory case studies, the report can benefit from being structured in chronological order. Furthermore, Yin (2018) suggested that writing chronological case studies can be written in a backword order to ensure that each stage states all the necessary information that is required for the following stage. Thus, both case studies were written in backward order.

Each case study chapter will follow the same structure of the design process stages listed in the table (Table 5-1) below.

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Contextual understanding of the conflict, the displacement, the location, and the stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 2</td>
<td>Trust and relationship building</td>
</tr>
<tr>
<td>Stage 3</td>
<td>Problem analysis and requirement gathering</td>
</tr>
<tr>
<td>Stage 4</td>
<td>Co-Design</td>
</tr>
<tr>
<td>Stage 5</td>
<td>Implementation and evaluation</td>
</tr>
</tbody>
</table>

Each stage of the design process has a distinct aim, data collection activities, and stage outcome sections. The first stage of the design process is to achieve a contextual understanding of the conflict, the displacement, the stakeholders, and the location in which the case study is implemented. Both case studies were conducted with the same displaced population who fled the same conflict and lived in the same refugee camp. This means that there is an overlap in the first stage of the design process. Thus, to avoid repetition in the reports, the mutual outcome from the first design process stage will be provided in a separate section (5.2) before the chapters of the two case studies. 5.2 will set up the
general context of both case studies regarding the conflict, displacement, and location. Afterwards, the case studies will be presented in sections 5.3 and 5.4. The first stage of the design process will only include the distinct contextual details of that case study. The following figure (5.1) serves as an illustration of the case studies reporting structure.

Figure 5-1 An illustration of the case studies reporting structure

It should be highlighted that even though the design process stages are separate in their aim, data collection activities, and outcome. Nevertheless, in the implementation, process stages were not entirely separate in practice, as there was a chronological overlap between several stages.

Additionally, each of the design process stages will report the outcomes of that stage. The reported outcomes are only a summary of the data collection activities outcomes that were rapidly analysed for the sole purpose of designing the systems. These stage outcomes should not be confused with the data analysis findings that will answer the research questions. The whole data analysis will be done in the data analysis findings chapter (Chapter 6) where the full findings will be reported in order to answer the PhD study research questions.
5.2 the context for the case studies

This section aims to explain the context of the two case studies that were conducted in this PhD study. The two case studies were conducted with the same displaced population at the Ritsona refugee camp, which hosts a majority of Syrian displaced populations who fled the conflict in Syria. Both case studies followed the structure of the design process introduced in (section 3.2). Thus, this section will describe the mutual outcome from the first stages of both design processes, which are relevant to both case studies. Each case study section will then include a separate contextualisation section to explain the specific contextual aspects that are different between the two case studies.

5.2.1 Understanding the conflict and the nature of the social division

This section will introduce the Syrian conflict, the different ethnic groups like Kurds and Arabs, religious sects, and political proxies involved, as well as the nature of the social division. The data in this report was obtained from academic research, international reports, an intensive course on displacement and conflicts that I attended at the University of Oxford in my first year as a PhD student. Moreover, this section involves information from conversations with the displaced community throughout the work on the case study. It should be noted that I am originally from Syria and have experienced the first period of the Syrian conflict. This also assisted in the understanding of the context.

Though it might be considered lengthy, the following contextualisation of the conflict was critical in both case studies as the same social and political division was reflected on the refugee camp and the population with whom the case study was implemented.

The Syrian conflict started as a political dispute between the political regime and the Syrian people, who protested for freedom and political change against corruption. This political conflict quickly escalated to extreme violence, killing, detaining, and unlawful persecution that all led to armed clashes. Demonstrations and clashes started in 2011 that turned into a civil war among different ethnicities and groups, as explained above, this is due to the diverse nature of the Syrian population, the sensitive nature of its historical conflicts, and its links to political alliances in the middle east and world powers. Those powers are known to have a strong sectarian basis (Carpenter, 2013; Farha & Mousa, 2015; Phillips, 2015). All of this made Syria a fertile ground for civil and proxy wars between multiple nations. Different armed groups were fighting, including the Syrian national army, with control moving over the years in favour of the radical militias that are more financially supported by world powers and political regimes such as Turkey, Russia, the United States, France, Iran, Iraq, Qatar, Saudi Arabia, Lebanon, and many others.
Furthermore, due to the sectarian nature of Syria and the civil war, many of the militias have been using extremist radical religious ideologies that are linked to extreme interpretations of Islam by Muslim Sunni groups linked to Saudi Arabia and Qatar, and Muslim Shia groups linked to Iran and the Syrian regime (Kumar, 2014). Additionally, the presence of powerful militias that are considered as terrorist groups by the international community such as Al-Qaeda, the so-called Islamic State in Iraq and Al-Sham (ISIS), Hezbollah and others were also involved. Moreover, in the later years of the Syrian conflict, a new side emerged, which is the Kurdish armed forces (Syrian Democratic Army) that was mainly backed by the United States in the north-eastern area of Syria. This area is known to be inhabited by a small Syrian Kurdish majority over the Syrian Arab population. These forces also participated in the Syrian conflict to gain independence from Syria and to form a Kurdish state. Different reports suggested that different ethnic cleansing crimes happened between the Kurdish and Arab militias from all sides to gain power in that region, with Turkey heavily backing the Arab militias against the Kurdish. The reports also suggested that there were disagreements between the Kurdish forces and political parties in Syria and the Kurdish forces and political parties in Iraq that were supposed to join in an independent Kurdish state.

It should be noted that significant characteristics of the Syrian conflict include the extreme social, racial, and political division that even a symbol as typical as the flag of the country is not unified. The regime uses the pre-conflict flag in the areas it controls, the free Syrian army, and the political opposition use an old version of the Syrian flag from 1932, which was first flown at the independence of Syria. The so-called Islamic State and similar groups use a black flag that represents an Islamic symbol, and the Kurdish forces use a yellow flag, in addition to several other flags by different groups and forces. Each of these groups would ban raising any other flag other than their own in their controlled areas. A small detail like this made it very challenging for international NGOs such as the UNICEF to introduce a curriculum to the Syrian children as they used the formal pre-conflict flag in lessons about Syria. This flag issue made such curriculum unusable in areas controlled by other groups participating in the conflict.

The role of the media:

Even when refugee families flee Syria and travel to a new host country, they are still exposed to the sectarian agenda as it reaches them through major news channels and social media. A thesis from the University of Princeton (Valentine, 2014) conducted an analysis of the narratives of the largest two news TV channels in the Middle East, Al-Arabiya and Al-Jazeera. The analysis concluded that both channels promote sectarian strife in their coverage of conflicts in Syria, Iraq, Bahrain, and Yemen.
Moreover, the study suggested that this narrative is being used as a tool in the political conflict between the Arab-gulf countries and Iran, which fuels the proxy wars in the conflict (Valentine, 2014).

5.2.2 Understanding the displacement:

The conflict resulted in a massive internal displacement where six million people were displaced inside Syria, and 6.7 million were displaced around the world (Mercy Corps, 2018; UNHCR, 2019). That means that almost 55% of the Syrian population is displaced. UNHCR registered the numbers of refugees in the neighbouring countries; 1.4 million Syrians fled to Lebanon, 0.6 million to Jordan, and 3.9 million to Turkey. It is worth noting that these figures do not reflect the real number of displaced people. Moreover, millions of displaced Syrians who fled to other countries such as Egypt, Sudan, Saudi Arabia, Iraq, and countries in Europe such as 0.6 million displaced Syrians fled to Germany, crossing the sea in dinghies risking their lives and paying thousands of Euros to smugglers.

In this section, the focus will be on refugees legal and living conditions in Greece, as this is where the case studies were conducted. Displaced people live in residential areas and in refugee camps which mostly lack the basic life needs and resources. Once refugees arrive at the Greek islands and get registered with the UNHCR, they rely on humanitarian aid as they usually are not allowed to work in the host country. In countries like Lebanon, they are forbidden from working until their paperwork as refugees have been finalised, which may take years. Then the displaced people get relocated from the islands to refugee camps on the mainland within two months of their arrival on the islands. I have met some displaced people who got an asylum court hearing after two or three years.
Some refugees qualify to relocate to countries worldwide under the refugee relocation program provided by the UNHCR. They usually apply to three countries and wait for approval from one of them. Once approved, they would be relocated to that country within six to fourteen months. If no approval is received, they would need to stay and apply for asylum in whichever country they are in or voluntarily go back to their home country. It should be noted that the refugee relocation program registration stopped as of March 2016. Afterwards, all refugees who arrived in Greece were forced to apply for asylum in Greece or were trafficked to other countries by smugglers charging them thousands of Euros for the trip.

Some displaced people get relocated from the refugee camp to residential housing in Athens after spending time in the camp. That time may last between a few months to many years depending on the case of the person and if they have family members that have a disability or vulnerable individuals. However, while I was working on the cases studies, many families requested to be relocated from the residential housing back to the camp because they claimed that they were given flats that were much worse than the camp, they were bullied or discriminated against. This issue arose because the Greek government moved most of the refugees to the most impoverished areas in Athens, which already suffers from many social and economic challenges.

This section discussed the nature of the displacement of the affected Syrian people in general and more specifically, in Greece. The next section will discuss the context and demography of the displaced community at Ritsona refugee camp, which is where the two case studies were conducted.

5.2.3 Understanding the location, the displaced community, and the stakeholders and actors

The camp (location):

At the time of the case studies, the capacity of Ritsona refugee camp was approximately 800 displaced people. The camp was built on a piece of land that used to be a military base; it was destroyed due to an earthquake and remained unused until the refugee crisis. The camp had started at the beginning as only tents with no infrastructure or services. With the expansion of the camp, the Emirates Red Crescent donated good quality ISO-boxes (caravans) to replace all tents. ISO boxes included private toilets, showers, a small living space, heating and air-conditioning, which are essential as the temperature reaches 45 degrees in the summer and -10 in winter. Every few ISO boxes are equipped with shared kitchens. This transformation made the camp one of the best refugee camps in Greece.
infrastructure-wise. This advantage encouraged many displaced people to try to come and force themselves into the camp, which caused lots of problems with the Greek government.

The location of the camp was around 20 km from the nearest town or shops with no public transport at all. This means that even though the camp residents are allowed to go out of the camp if they want to such as to go shopping or to visit nearby cities, it was impossible to do so unless they get a private taxi or rent a car which will cost them money that they cannot afford. To fulfil their shopping and asylum paperwork needs, NGOs on-site organised one weekly bus trip to Athens, which they can book to complete any required paperwork or shopping.
The lack of nearby shops led many of the displaced camp residents to open grocery shops on-site where they go to the nearest city to purchase groceries and then sell them at the camp for a small profit. Similarly, the residents opened a small coffee shop and a restaurant.

![Coffee shop tent built by residents in the camp](image)

5.2.4 The displaced community

The data provided from the NGOs staff explained that the demography of the displaced community was as follow: 30% Syrian Arabs who speak Arabic, 45% Syrian Kurds who speak Arabic and Kurdish, a minority of Syrian Kurds who only speak Kurdish, 15% Syrian travellers community who speak Arabic and Kurdish, and 10% of displaced people from Iraq, Kuwait, Lebanon, Palestine.
The culture of the displaced community is a middle eastern culture of Syria and Iraq which is known to have a strong link to religious and cultural beliefs. The middle eastern communities, in general, are known to be conservatives. Thus, it was necessary to note this as the interaction with a conservative community has specific considerations that should be known in advance relating to how to speak to people, especially women, what language and expressions to use and other cultural considerations. Respect must be shown to all the different religions, sects, and races regardless of any personal opinions or beliefs from the researcher. Moreover, it was important to understand the people’s perspective of respect in order to show it. Especially regarding the prayers’ time, religious holidays such as the holy month of Ramadan (fasting), and the different holidays and national events such as Nuruz day where the Kurdish community celebrate spring.

During the case study, it was evident that there was an apparent tension amongst the different groups of the displaced community. Fights were emerging at the camp regularly between different displaced groups. Violence was also prevalent amongst children daily, especially in younger ages. Most of the fights between adults and children were based on ethnicities, for example, Arabs against Kurds, or non-travellers against travellers. These tensions were essential to capture as they were later discovered to affect the participants sampling for adults and children’s activities in the following stages.

The NGOs on-site provided me with a rigorous introduction before and after arrival to Greece. The introduction is a must for all volunteers and visitors. I was provided documents that explained the
nature of the community, the sensitivities, instructions on what to do, what to avoid, and camp regulations such as risk management plans. I was asked to sign a child safeguarding code of conduct, general code of conduct, and rules for obtaining photographs and recordings of both adults and children. This input from the NGOs was constructive, yet it was not complete as the later observations and interaction with the community revealed much more details that were important to capture for the design process.

The understanding of the community over time led to the understanding of its dynamics and the related sensitive topics. This affected the way of communication with the community in the later stages, as well as the way the participant sampling was done for both adults and children.

5.2.5 Case studies timeline

Both case studies were conducted in Greece. The first case study began in September 2017 until late December 2017. The second case study began in November 2017 and also finished in December 2017. This meant that from November to December, both case studies were conducted simultaneously where my time was split between conducting activities at the formal Greek schools (case study two) during the morning time, then conducting activities at the refugee camp (case study one) during the afternoon and evenings.

It should also be noted that the data collected in the activities of case study one influenced case study two. This is because both case studies were conducted with the same community from Ritsona refugee camp. This meant that the contextual understanding, trust and personal relationship building, and problem definition stages had an overlap and similarities between both case studies. However, additional information was discovered during case study two due to the added stakeholders and the added context such as the formal schools, the teachers, school principals. The following figure provides a Gantt chart that illustrates how design process stages were conducted during the field study conducted in Greece across both case studies.
It can be seen from the Gantt chart above how both case studies were conducted simultaneously over the time spent in the field study. Moreover, the arrows from stage 1, stage 2, and stage 3 in case study one to the corresponding stages in case study two illustrate the influence of the data collected in case study one on case study two. Finally, it can also be seen that once a design process stage starts, it does not finish until the end of the case study. This will be discussed in detail in the discussion chapter in section 7.4.7, where this overlap will be discussed and explained.
5.3 Case study one: Ritsona refugee camp

5.3.1 Introduction
This case study took place at Ritsona refugee camp near the city of Chalkida, Greece, which is hosting 800 refugees, many of whom are from Syria fleeing the Syrian conflict that emerged in 2011. The case study started with communications with different NGOs in Greece, looking for collaboration opportunities. The proposed plan was to visit the refugee camp to implement the proposed design process from this PhD study for evaluation and data collection. For this case study, the collaboration was agreed with the NGO that is responsible for the educational activity planning at the refugee camp, which is called IAY “I Am You” (IAY Website, 2020).

This case study lasted for just over three months between September and December 2017. It involved a myriad of activities with different stakeholders such as NGO staff, governmental representatives of the Greek Ministry of Education, displaced family parents, and displaced children. These activities led to the design of a digital self-learning space at the camp, which has been ongoing ever since and can be checked on the IAY website (IAY Website, 2020) children’s education section. Furthermore, the successful collaboration in this case study led to the opportunity for the second case study which was implemented with formal Greek schools in the city of Chalkida through a collaboration with the Greek Ministry of Education.

The next sections will discuss the different process stages and how they were implemented in this case study.

5.3.2 Participants
This section will present a breakdown of the participants involved in this case study. The group of participants are NGO staff, displaced children, displaced parents, and Ministry of Education staff.
NGOs staff: 32 participants (25 females, and eight males)

**Table 5-2 NGOs Staff participants breakdown, case study one**

<table>
<thead>
<tr>
<th>Country Background</th>
<th>Age group</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Country of Origin</strong></td>
<td><strong>Age group</strong></td>
<td><strong>Count</strong></td>
</tr>
<tr>
<td>Cyprus</td>
<td>18-25</td>
<td>5</td>
</tr>
<tr>
<td>Greek</td>
<td>26-30</td>
<td>9</td>
</tr>
<tr>
<td>Italy</td>
<td>31-40</td>
<td>11</td>
</tr>
<tr>
<td>New-Zealand</td>
<td>40-50</td>
<td>4</td>
</tr>
<tr>
<td>Poland</td>
<td>51+</td>
<td>3</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others (not shared)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Displaced Children**: 37 (20 boys, and 17 girls)

**Table 5-3 Displaced children participants breakdown, case study one**

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Background</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age y/o</td>
<td>Count</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Syrian Arab</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Syrian Kurdish</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Syrian Traveller</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Other backgrounds</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>
Displaced Parents: 11 (six males, and five females)

Table 5-4 Displaced parents participants breakdown, case study one

<table>
<thead>
<tr>
<th>Background</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other backgrounds</td>
<td>2</td>
</tr>
<tr>
<td>Syrian Arab</td>
<td>3</td>
</tr>
<tr>
<td>Syrian Kurdish</td>
<td>4</td>
</tr>
<tr>
<td>Syrian Traveller</td>
<td>1</td>
</tr>
</tbody>
</table>

The Greek Ministry of Education (MoE):

Two female participants, both are from Greece

5.3.3 Stage 1: Contextual understanding of the conflict, the displacement, the location, and the stakeholders

5.3.3.1 Aim

This is the first stage of the design process. It aims to understand the general context of the conflict, the dynamics of the resulted displacement, the location in which the process will be implemented, the people and possible stakeholders involved, and to prepare for the following stages of the design process. Figure 4-6 illustrates the aims and the methods and activities linked to the data source and participants involved with the order of participants’ involvement.
Please see Appendix B for guiding questions that were used to achieve the needed understanding of the conflict, displacement, location and stakeholders, and the feedback to plan the later stages. Some of these questions were planned before the case study, and other questions were added during the case study as they were found to be necessary.

In order to answer the stage questions, this stage started with a literature review of the available online content on the Syrian conflict in general and the displacement caused by it globally and more specifically in Greece, from both academic publications, grey literature, and NGOs websites. This general understanding was essential to be done ahead of any direct or face to face communication with the possible stakeholders that follows later.

The literature review was followed by communications and informal interviews with the NGO staff ahead of the travel to Greece. After arrival in Greece, this stage took the shape of ethnography work in the form of observation, interviews, informal communication, and active participation (volunteering and servicing).

The next sections will discuss each of the data collection activities of this process stage with a summary of the results from each data collection activity.

### 5.3.3.2 Data collection activities

It should be noted that the data collection activities in this stage were completed in the same order they are written below.
Reviewing the literature, online articles and reports, and social media

This stage started with summarising reports and articles from academia, grey literature, and social media that describe the conflict, the dynamics of the displacement, and in the location of the case study in specific, which is Greece. Furthermore, the summary covered the demography of both the displaced and host country populations. Additional information was collected from online articles such as news articles and social media posts about the conflict, refugees in Greece, and the refugee camp (Ritsona) where the design process will be implemented.

Informal interviews

Informal communications were initiated with experts and practitioners in the field who helped me understand the best approaches to plan the case study and form the case study proposal to the NGOs at the camp. The proposal was designed based on the identification of the challenges faced at the different refugee camps in Greece and the urgent need for support in various areas.

Afterwards, communications with staff from the NGOs at Ritsona refugee camp were initiated through their email and social media pages, followed by remote semi-structured interviews with the NGOs staff to introduce and discuss the plan for the research project. It was important for both practical and ethical reasons to communicate first with the NGO staff to have an agreement with the gatekeepers on the project plan. Furthermore, the communications with the NGOs staff were essential to get an understanding of the displaced community before any face-to-face interaction or on-site visits.

Several NGO websites, including the ones at Ritsona refugee camp, stated that researchers are not accepted at the camps. In my online communication with the NGOs volunteer coordinator and educational advisor, they stated that not accepting researchers is due to previous experiences they had with researchers who had visited the camp earlier. The concerns included people who join the camp but do not adhere to the strict rules and ethics on communication and interactions with the community, especially regarding political, religious, and racial topics. Furthermore, many previous researchers came to the camp to collect data and work on their projects which had no direct benefit to the NGOs operations nor the displaced community, which was considered a waste of time and resources.

The table below includes a sample of the questions (interview structure) conducted with NGO staff during this stage.

<table>
<thead>
<tr>
<th>Informal interviews with NGO staff</th>
<th>Question sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>15- Self-introduction, background of the PI, and overview of the research plan</td>
<td></td>
</tr>
<tr>
<td>16- The name of the interviewee</td>
<td></td>
</tr>
</tbody>
</table>
The remote communications with the NGO staff concluded the following urgent challenges that they are facing:

- Extreme lack of people who speak Arabic and English who can assist in many situations in the refugee camp. Such people are needed for daily essential interpretation and communication.
- Lack of people who understand the culture of the community and can mediate it to the NGO workers and help them improve their ways of communications and project management.
- Continuous urgent need for volunteers in translation, activities, transportation, adult education, and medical support.

Since I have the skills and ability to provide help in the areas in which the NGOs require urgent support. A proposal was reached where the NGO agreed to host and support the research project in return for me to volunteer to help the NGOs in their needs while conducting the research. The proposal included the following points:

- I, George Alain, who is an Arabic speaker from Syria, and has experience in working with the Syrian communities in general and with the Syrian refugee community in particular, am happy to volunteer with the NGO daily alongside my work on the research project.
- I am to provide volunteering services, cultural consultation, translation and interpretation, activities planning for adults and children, and other possible means of assistance while being in the camp working on the research.
- The IAY NGO will support my research in all possible ways facilitating my entry to the camp, induction, introduction to the community and other NGOs, and collaborating as partners in the project, making their resources available for the research.
- It was explained to the NGO that we could not ensure a tangible outcome of the research itself as this would depend on the design process progress and many other dynamics.

After this agreement, it became possible to travel to Greece and start the later stages starting from ethnography.

**Ethnography**

Ethnography (section 4.5.2) was used in this stage to achieve further understanding of the conflict, the displacement, the location, the stakeholders, and the planning for the design process. It should be noted that the ethnography activities extended to cover all the design process stages. Ethnography
allowed achieving data collection for the design process while simultaneously delivering the services that were promised to the NGOs and community while working on the research.

Observation
The observation was used to collect notes regarding different events at the camp, the habits, the people, the challenges, the possibilities, interaction between different groups, and any event which may be relevant to the topic.

- The context and infrastructure of the location
- The different groups and their interactions (relationships, communications)
- The available educational activities
- The stakeholders
- The available resources
- The possible locations for the research activities in later studies

The data from observation was captured in the form of notes (8000 words), photographs, and documents that were later transcribed into digital form for data analysis.

Active participation and servicing
Participation started as soon as the arrival at the camp from day one. I was working as a volunteer at the camp on the following:

Logistical support:

- Arrival at the camp at 9:00 AM weekdays with the other NGO staff to assist in preparations for the day activities.
- Helping NGO volunteers in their activities, including reaching out to the camp residents to invite adults to the adult’s English classes.
- Setting up a digital library for adults using the WiFi network at the camp that had stopped providing internet service but existed as a network. So I developed a simple website and installed it on a laptop that operated as a local server linked to the WiFi network. The website provided a broad set of e-books and language self-learning videos in English and German that were provided by Syrian teachers who developed special online language courses for refugee adults. This digital library for adults was separate from the system designed in this case study.

Translation and interpretation:

- Interpretation of communications between the NGOs’ volunteers and the residents.
- Support in translation throughout the school registration process, including translating registration documents, outreach for to families and helping the Greek Ministry of Education representatives in their communications with the residents in the camp.
- Interpretation of the residents’ communications with lawyers who visit the camp once a week.

Training and cultural consultation:
The different NGOs on site had very little Arabic speaking staff; the same was for people who understand the culture of the displaced community. Thus, I was asked a few times to meet different people to answer questions which they may have regarding sensitive cases with the residents or planning activities for them to ask questions regarding the suitability of the planning for the culture of the refugee residents.

*Informal ethnographic interviews*

Ethnographic interviews involved casual chats and discussions with different members of the community and NGO staff at the camp. The interviews were informal and aimed to understand the contextual aspects further and to introduce myself and the research project to the people at the camp.

**5.3.3.3 Stage outcome**

This section provides a summary of the outcome of this stage which informs the later stages of the design process. The data captured from this stage was extensive. The outcomes regarding understanding the conflict, the displacement, and the location were discussed in 5.2 which provided the contextual set-up for both case studies. The following sections will explain the context of the stakeholders

*The conflict*

The contextual understanding of the conflict from this stage was presented earlier in section (5.2).

*The displacement*

The contextual understanding of the displacement from this stage was presented earlier in section 5.2.

*The stakeholders*

This section will list the identified stakeholders that were chosen to participate in the design process and the rationale behind their involvement.

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Rationale for inclusion/exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGOs staff</td>
<td>The staff from different NGOs have the expertise of interacting with the displaced community. They can give input regarding the best methods of interaction with the displaced community. For example, NGO staff who deal with the displaced community know which community members are the most influencing within their community groups. Additionally, NGO staff who had organized activities with children could give input regarding the challenges that could be faced with the displaced children, and their input was invaluable. Furthermore, the NGOs staff who had experience in previous educational interventions can...</td>
</tr>
</tbody>
</table>
provide input regarding what makes an intervention successful or not. Involving NGO staff is essential to getting access to the displaced community and the available resources on-site that are essential to the implementation of the case study activities. Finally, NGO staff are possible end-users of the system; thus, their involvement is essential in the design process to make sure that the resulted designs are suitable in terms of usability.

| Displaced community (adults): | The displaced community is the main point of access to displaced children. Furthermore, their opinion is invaluable regarding the educational needs of their children, the educational challenges that they are facing, and the relationships with other stakeholders. Furthermore, displaced parents have to be involved as their involvement would influence their children to participate in the research activities. |
| Displaced children | Displaced children are supposed to be the centre of any educational intervention that is designed for them. They can provide input regarding their educational needs, what engages them, and how they want the system interaction to be to maintain usability. Several adult participants encouraged including the children in the activities and advised on how to involve them. |
| The Greek Ministry of Education representatives | The MoE representatives have experience in the educational needs of the children, especially the ones who are staying in Greece with their families. Furthermore, according to NGOs staff, the MoE representatives have to approve any educational activities in the camp done by any NGO, and their support for any educational intervention would increase its success chances. |

It was noted that the relationship between the different groups of NGOs and stakeholders involved some misunderstandings, trust issues, and even competition. This was considered in the planning of the following activities and the choice of participant sampling.

*The sensitive socio-cultural topics*

This stage also aimed to understand the sensitive socio-cultural topics that may affect the relationships between the different stakeholders. The IAY NGO had provided me with a list of topics that they had identified as sensitive. Additionally, my daily interactions with the different stakeholders improved my understanding of such topics. A list of the resulting sensitive topics is presented in the table below, these topics have been discussed thoroughly in section 5.2 that discussed the context for the case studies.
Religious diversity and their relationship with the conflict

Political opinion towards the conflicts, especially in Syria, Iraq, or other countries. This includes the symbols of the countries such as the flags of these countries and the flags of any groups that are engaged in the conflicts.

The travelling journey from home, many displaced people do not wish to discuss their methods of crossing the borders and sea as it involves reliving their trauma.

Their feelings towards their homeland, many displaced populations have depression feelings missing their homeland and being unable to go back for any reason.

Sexuality, topics that are related to sex and sexual activities, are sensitive in the culture of the displaced population. This is because it is related to religions and culture that such topics are rarely discussed in public. Any intervention should focus on the primary, most urgent educational needs rather than engaging in less urgent topics that may cause distress in the relationship with the community. And educational topics should be discussed with the families.

Cultural beliefs; some groups of the displaced population had some cultural beliefs that may sound weird to outsiders, such as banning wearing some colours for the fear that they cause medical problems. It is crucial to avoid criticising such beliefs as it damages the relationship and trust with the community.

Gender diversity and interaction with female participants. Such interactions require abiding by the cultural protocols on how to communicate with women in such a community. For example, hand shaking was not suggested to be initiated with women unless the woman initiated the hand shake.

Social division amongst the different races. Hostility towards the travellers’ community.

### Preparation for the later stages

The outcome from this stage informed the planning of the later stages of the design process. During the communications with the different members of stakeholders and community members, the later stages of the design process were discussed and customised based on the feedback received. The participatory approach and the choice of the stakeholders were discussed and approved by the different groups (NGOs, displaced communities, MoE representatives).

It should be noted that the timeline of this stage extended throughout the whole case study and informed the choice of methods the participants sampling in the later stages of the design process.

### 5.3.4 Process stage two: Trust and relationship building

This is the second stage of the design process. However, it should be noted that the focus on trust and relationship building started from the beginning of the direct communications with the different
stakeholders after achieving a general understanding. Furthermore, this stage extended to all the following stages as trust and relationship building kept improving over time, especially with the emergence of new stakeholders and participants due to relocations of the displaced community.

The aim of this stage was to establish trust relationships with the different stakeholders while continuing to understand the general context of the displacement and relationships between stakeholders from the previous stage.

5.3.4.1 Activities:
This stage used the same ethnography activities, such as servicing and active participation for different stakeholders. These activities involved translation, interpretation, cultural consultation, training, activities planning, aid distribution, and transport. Additionally, this stage involved informal discussions with different stakeholders' groups during the day, which contributed to establishing personal relationships that were improved and increased over time with different stakeholder groups.

Figure 5-8 Helping in the NGOs activities for children

Challenges faced:

The environment of this case study and displacement, in general, resulted in some challenges in establishing personal and trust-based relationships that were faced during this stage. These challenges included the need to be neutral in discussions and communications that involved any of the sensitive
topics that were researched in the previous stage. Sensitive topics include race, politics, and the relationship between the stakeholders.

During the previous stage, it was clear that there are multiple trust difficulties between the displaced community and the different NGOs, trust difficulties between the NGOs themselves, and trust difficulties between different groups of the displaced people.

For example, I am originally a Syrian Arab, and as I had stated earlier, the displaced community has a majority of Kurdish Syrians. Furthermore, I am a Syrian from a Christian background which all the displaced community can know from my name, whereas most of the displaced community were Muslims. My name and background could have affected how I could be perceived by the community, knowing that the previous stage showed that the Syrian conflict has clear ethnic and religious grounds. The displaced community, in general, were flexible and friendly, but at the same time, they were sensitive in areas that are related to the identified sensitive topics. For example, another Arabic speaking volunteer joined the same NGO I was working with, and he was known to the community that he regularly discussed topics related to the Syrian conflict with the displaced community at the coffee shop. That action by this volunteer caused some community members to complain to the NGO, which forced them to dismiss the volunteer immediately without any warning for violation of the code of conduct regardless of the urgent need for Arabic speakers in the team.

All of this required me to have a continuous clear focus on keeping equal distance with all the different groups. I identified and communicated with multiple community leaders from different backgrounds, making sure that I did not ignore any group, and avoided associating myself with any specific NGO or group, even the NGO with whom I partnered. I explained the nature of my role in different discussions, including my focus which is to work collaboratively to design a project to support children education. I also explained that this would be the only priority while making sure that all the work will be inclusive to all groups from the beginning to the end. The goal of this strategy was to distance me from any specific group or organisation and to only focus on whatever would support children education which is a mutual goal for all groups.

5.3.4.2 Stage outcome:

By the end of this stage, I managed to achieve excellent relationships with the different NGOs and with the displaced community. Different stakeholders saw me as a helpful person who was there to support and help. I was given the keys to multiple NGOs storage rooms and desks in case I needed a workspace, equipment or to organise future meetings and activities in the next stages. I had many daily positive casual interactions with the displaced community, like being invited for coffee and tea, getting approached for general casual talks, or even where community members would come to the
desk where I usually work just to have a chat. It was clear that knowing the language massively helped in establishing personal relationships with the community. The figure below is a screenshot from the formal Facebook page of IAY, where one community member tells his experience at the camp, focusing on our casual meetings and the importance of speaking the same language.

![Image of community members](image.png)

**Figure 5-9 Example of daily communications with the displaced community**

Additionally, when I was approached by the MoE representatives to collaborate on the case study two at the formal Greek schools. The MoE requested a letter of reference from the NGOs at the camp to state that I am a trusted person to be granted entry to the formal public schools with the children. The NGOs at the camp happily provided me with the letter which is attached in the appendix (number H). The letter is another indicator of the trust that was achieved during this stage of the design process.

It must be noted that the positive outcome of this stage would not have been possible without the contextual understanding of the conflict, the stakeholders, and the location that was achieved in the previous stage and then continued to improve in the following stages.
This stage discussed establishing the trust-based relationships with the community, the methods used, and the challenges faced in this stage. The next stage of the process is the problem and requirement analysis, which is where we focus on understanding the educational requirement that we want to tackle in the design process.

5.3.5 Stage 3: Problem and requirement analysis

This stage started achieving a general understanding of the conflict, the displacement, and the stakeholders, in addition to achieving trust-based relationships with the different stakeholders. This stage is aimed at understanding the educational context, needs, challenges, which would all constitute the first system requirements. This understanding will later be used in the design activities that will tackle the identified requirements from this stage. The identification of educational needs, challenges, and requirements started with adult participants through focus groups and semi-structured interviews. Furthermore, children were involved for the first time as research participants in this stage through different children-friendly activities such as photography, drawing, group interviews, and post-it notes.

5.3.5.1 The aim

The research activities in this process stage discussed the following topics:

**Understanding the educational situation at the location:** to discuss the current and previous educational projects and interventions. Furthermore, to investigate what are the aspects that affect how successful an educational project is.

**Conceptualising education:** to understand the concept of education and motivation for learning from the perspective of the different identified stakeholders and to identify the educational needs and challenges.

**Conceptualising engagement:** to identify the factors that engage children and what factors make the learning experience pleasant or unpleasant.

**Feedback on the next stages of the design process:** to consult the participants on how the findings from this stage would inform the future stages.

In order to achieve an understanding of the previous topics, this process stage consisted of two sub-stages, one with adult participants (NGOs staff and displaced parents), and the other sub-stage is with children participants. The reason for this separation is to start communicating first with adult participants to gain a general understanding of the educational context from their point of view, to discuss the details of the design process plan, and to obtain and encourage adults’ approval before
communicating with children. All the different research activities with adults and children involved members of all the different stakeholders covering the diverse demography of the displaced community.

The following figure (figure 4-9) illustrates the aim of this stage, the methods that were used to complete it in this case study, and the data sources/participants that were involved in each of the data collection activities.

In order to achieve an understanding of the previous topics, this process stage consisted of two sub-stages, one with adult participants (NGOs staff and displaced parents), and the other sub-stage is with child participants. The reason for this separation is to start communicating first with adult participants to gain a general understanding of the educational context from their point of view, to discuss the details of the design process plan, and to encourage and obtain parents’ approval before communicating with children. All the different research activities with adults and children involved members of all the different stakeholders covering the diverse demography of the displaced community. The following two sections will explain how the data collection activities were conducted with each of the participant groups starting with the adult participants (3.1) and then children participants (3.2).
5.3.5.2 Substage 3.1 Data collection activities with adult participants

Focus groups and Semi-structured interviews

The focus groups were used with adult participants consisted of three focus groups with NGO staff and two focus groups with parents. In the original plan for the case study, it was planned for the focus groups to involve NGO staff and parents in the same meetings. However, the outcomes from the previous stages identified challenges that included trust difficulties and communication and language difficulties between the displaced community and the NGOs staff. Due to these challenges, it was decided that focus group meetings with the NGOs staff and the displaced community should be organised separately.

The interviews and focus groups structure is presented in the following table. The question in the table originates from the proposed design process stage 3.1 and its guiding questions.

| Introduction of the research project and PI |
| Introduction of the interviewee/focus group participants |
| What is your perception of the importance of educating displaced children, and why? |
| What are the available/previous educational activities at this location? |
| How do you feel about the current or previous educational interventions? |
| What are the factors that make the learning experience pleasant, interesting, and motivating for the displaced children? And what makes it unpleasant, uninteresting, and demotivating? |
| What interest the displaced children in general and in education? |
| What are the educational needs and goals for displaced children? |
| What are the challenges that are preventing or have prevented children from achieving the educational needs and goals |
| What do you think about involving children in discussing their learning? What do you advise on this topic, and how do you think such a process should be conducted? |
| Would you be happy to participate in or support this process in any way? |

In addition to the focus groups, interviews were conducted with participants that had thorough experience and required a more extended slot to communicate with such as the NGO educational advisor at the camp, the representative of the Ministry of Education, or with participants that were unable to attend the focus groups.
Due to not having any educational activities for children at the camp, it was at first not possible to obtain input from participants who have experience in children education in the same context of the camp. Some NGOs staff had been in the camp for a long time and were able to provide feedback from previous attempts to establish a field school in the camp a few years before the case study. However, these participants (NGOs long term volunteers) were not educational specialists. To overcome this challenge, I was advised to visit a nearby refugee camp that has a field school managed by a British NGO and has qualified teachers specialised in emergency education in camp settings. Thus, a focus group meeting with the teachers from that NGO in the other camp of a similar context was scheduled.

A list of all focus group meetings and interviews can be found following table below:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Overview</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus group 1 (IAY NGO staff)</td>
<td>This focus group meeting took place at the volunteer house after work hours. The participants’ experience ranged between organising and conducting educational activities for adults, community engagement for formal school registration for children, pre-school teachers, and other volunteers with admin roles.</td>
<td>Six male participants and eight female participants</td>
</tr>
<tr>
<td>Focus group 2 (IOM community engagement staff)</td>
<td>This meeting took place at the IOM NGO caravans at the camp. The participants’ experience was in community engagement, community support, supporting other NGOs on-site, and communicating with the Greek formal schools and Ministry of Education.</td>
<td>Three female participants and one male participant</td>
</tr>
<tr>
<td>Focus group 3 (Greek Red Cross staff)</td>
<td>This focus group was with three members of the organisation who are responsible for organising health and safety workshops for adults and children. Their expertise was significant specifically as they used multimedia and technology in their children’s workshops and had reported that it helped them engage the children in the activities.</td>
<td>One male participant and one female participant</td>
</tr>
<tr>
<td>Four interviews with staff of NGO 03 NGO</td>
<td>The interviewed members had been organising daily activities for children and youth at the camp. Even though the activities were not educational, but the interviewed members had immensely helpful knowledge regarding how to interact and communicate with children successfully and the challenging nature of working with displaced children.</td>
<td>Three female participants and one male participant</td>
</tr>
<tr>
<td>Two interviews with members from NGO 04 NGO</td>
<td>The two interviewees had been working on art therapy workshops with children at the camp. The interviewees’ input to the design process focused on the characteristics of the children and the challenges of interacting with them in future activities.</td>
<td>Two female participants</td>
</tr>
<tr>
<td>Focus group 4 with Armando Aid NGO teachers from another camp</td>
<td>Since there were no on-site educational activities for children at Ritsona refugee camp, I was unable to meet teachers to get their input on the educational needs and challenges in such an environment. Thus, I was advised that there is a nearby refugee camp less than 15 minutes away that hosts an NGO that has an on-site school managed by six volunteer teachers from the United Kingdom and Sweden who are specialists in special education. So I visited that camp and met the teachers there for a focus group meeting.</td>
<td>6 female participants</td>
</tr>
<tr>
<td>Interview with the educational Advisor at IAY NGO</td>
<td>This educational advisor had valuable knowledge from previous failed and successful attempts to establish an on-site school at the camp from the previous years. The interviewee explained how involving the parents, ensuring suitable educational materials, and the relationship between the teachers and children are the core of having a successful educational intervention at the camp.</td>
<td>One female participant</td>
</tr>
<tr>
<td>Interview with the representatives of the Greek Ministry of Education at the camp</td>
<td>These participants have essential regarding the educational needs from both the perspective of the government and the displaced community.</td>
<td>Two female participants</td>
</tr>
<tr>
<td>Interview with the manager of IOM NGO at the camp</td>
<td>This participant has 17 years of expertise in working with displaced communities, especially children. The participant has an extensive experience and is a decision-maker who would facilitate the work at the camp.</td>
<td>One female participant</td>
</tr>
</tbody>
</table>

The adults’ activities, in general, were very fruitful in answering the questions about the topics of this stage. The activities with displaced parents showed clear evidence of motivation where the participants volunteered to help in communication with other community members about the project. The participants also volunteered in distributing the project leaflets. They tremendously assisted in obtaining the research consent from other parents to allow me to invite their children to the research activities.
5.3.5.3 Substage 3.2 Data collection activities with children participants

After finishing the activities with adults, children participants were approached to participate in a group activity that tackles the same topics discussed in the stage aim. The children group activity plan consisted of a mix of data collection techniques such as group interviews, photography, drawing, and post-it notes. The following sections will summarise what each activity involved. The structure for each activity will be provided in the respected section.

![Figure 5-11 A photo of the equipment used in the children’s activities](image)

Children group activity

Each activity started with an introduction of myself, the research project, and how the children were expected to participate. Children were given a clear explanation of how the data is collected, such as the recordings and the purpose of the data collection. They were asked to sign individual consent forms that were pre-signed by their parents earlier. If a child showed up to an activity without an invitation where I did not have the chance to contact the child parents earlier, the child would be allowed to participate in the activities. However, the child’s input would be excluded from the data analysis until the parents and the child sign a consent form.
Introduction to children activity
- Who is the PI
- what is the PI doing at the camp
- what is the project about
- what are the activities to be conducted
- what is the role of the children in the project

Ethical Considerations
- Explaining the communication with parents for consent
- Explaining how the data will be captured
- Explaining about any form of recording and who will have access to the recordings and why
- Asking the children for their consent to participate by signing under their parent’s name
- Explaining that at any moment, any child can withdraw from any activity without needing to provide any explanation.
- Explaining that any child, at any time, can request a break to go to the toilet or to go home to eat
- Children should feel free to ask for any assistance at any time in any of the activities and have the right to refuse to participate.

Photography
After the introduction, children were taught how to use an instant camera to take photos. Afterwards, the whole group would go to the camp for a walk where they would choose a scene that represents education and learning from their point of view. A group discussion later followed this in the meeting location where children presented their photos to the group and explained why they chose that scene. The activity structure can be found in the table below.

Photography activity structure
- explaining what the activity is about
- explaining how the instant camera works
- passing the camera to the different participants in order to take a virtual photo, so they learn how to use the camera hands-on
- going out to the camp and have a short walk asking the children what represents education and learning for them
- let each child take a photo of their chosen scene with assisting them if needed
- getting back to the meeting location to discuss the photos

Discussion and group interview
After presenting the individual photos, the whole group would discuss what is the meaning of learning and education, do we want to get educated and why?; what do we want to learn about, and why?

The purpose of this discussion was to understand children’s perception of education and their educational needs. The following table explains the discussion structure.
Group discussion structure

- Going through all the participants where they hold their photo and tell the others why this photo represents education and learning for them
- Allowing other participants to discuss and comment on each other’s photos in a constructive, fun, and friendly manner
- Discussing what is learning, do we want to learn?; why do we learn?; What do we want to learn?; how do we want to learn and why?

The figure below shows a collage of different photos taken in different stages of the activities with different children.

![Example photos from the activities with children](image)

The vast majority of the photos taken by children were for objects that remind them of a previous learning experience. The figure below shows examples of the photos taken by children. The photos include:

![Figure 5-12 Example photos from the activities with children](image)
- The camp playground area reminded them of the school playground
- The library caravan
- A caravan with planets drawings which many children expressed it
- The caravans where adults take English lessons
- A photo of text written on a caravan wall, the children wanted to understand the text but were unable to.

Some children participants got too excited to use a camera, so they took random photos that they were unable to link later to education.

Figure 5-13 Example photos taken by the children

Post-it notes

After the discussion on education, children would participate in a post-it note activity. I would create two sections on a whiteboard or a piece of carton. Each section will have either a smiley face or a sad
face. The children participants were asked to list topics, reasons, or examples of what makes education and learning an engaging and pleasant experience and what would make it a disengaging and unpleasant experience. To encourage participation, I would write the child suggestion on a post-it note then the child who made the suggestion would take stick the note on the whiteboard. The following table lists the activity structure.

<table>
<thead>
<tr>
<th>Post-it notes activity structure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>This activity is a continuation of the previous activity with more focus on:</td>
</tr>
<tr>
<td>- How should learning happen, and why?</td>
</tr>
<tr>
<td>- What makes learning engaging, fun, pleasant, and helpful?</td>
</tr>
<tr>
<td>- What are the examples of something that makes learning a pleasant or unpleasant experience?</td>
</tr>
</tbody>
</table>

The result would be similar to the figure below.

Figure 5-14 Post-it notes activity

The engaging and disengaging factors that were mentioned by the children in the post-it notes activity will be discussed in the stage outcome.
**Drawing**

The drawing activity was planned to be used in addition to the post-it notes. However, after piloting the activity, drawing was more useful as a free activity which added fun and engagement to the other activities. It helped to keep some of the challenging children calm during the discussion where they drew while they were talking and answering questions. Drawing also helped children who were not happy with their photos taken with the instant camera to draw an alternative scene that represents education for them. The following table presents the drawing activity structure:

<table>
<thead>
<tr>
<th>Drawing activity structure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- A child is given an empty A3 sized paper, colouring pencils, and an eraser</td>
</tr>
<tr>
<td>- The child is asked to draw whatever comes to their mind regarding the topic</td>
</tr>
<tr>
<td>- If a child is drawing something that is out of topic, the child will not be asked to draw something else as drawing can be a fun, engaging, and calming activity. Instead, the PI will engage in discussion with the child about the stage questions on education while the child continues drawing whatever they wish.</td>
</tr>
<tr>
<td>- Once the child is done drawing, the result of the drawing can be discussed if relevant, if not, the points made during the discussion would be added to the post-it notes</td>
</tr>
</tbody>
</table>

**Activity evaluation**

At the end of each co-design workshop, an evaluation was conducted with the children to get their feedback on the activity and whether they would like to participate in the following activities. The evaluation was conducted based on the following structure:

<table>
<thead>
<tr>
<th>Activity evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- What do you think of today's activity?</td>
</tr>
<tr>
<td>2- Did you enjoy the task?</td>
</tr>
<tr>
<td>3- How hard was the task for you, and was there any part that you felt you did not understand clearly?</td>
</tr>
<tr>
<td>Would you participate in a similar activity in the future?</td>
</tr>
</tbody>
</table>

**Reflection**

This activity was refined and adapted from one implementation to the other. For example, at first, some children were taking a picture of the first thing they would see just because they were very happy with the camera. This was resolved in later activities by using a smartphone camera to allow children to take as many digital pictures as they wish while keeping the instant camera for one picture per child (due to limitations on paper pictures). Many printed pictures did not reflect education-related photos; however, the photography activity was very successful in engaging the children while
having discussions about education and other topics. Another example is the drawing activity which was first planned differently to draw happy and sad classes while explaining why each class is happy or sad. However, children did not seem to be engaged in such an activity. Thus, drawing turned to be a very helpful activity for children with communication or behavioural difficulties.

5.3.5.4 Stage outcome

This section will present a summary of the outcome of this stage.

Understanding the educational situation at the location

There were no ongoing educational activities at the camp. The displaced children at the camp are supposed to be joining the Greek formal schooling system. However, the displaced was notified that formal schooling would be delayed for two months due to the lack of availability of teachers and schools in the nearby cities.

There were only educational activities (Greek lessons and English lessons) for adults in addition to a pre-school set up on-site at the camp by the Greek Ministry of Education. NGOs workshops reported that adults language lessons were suffering from meagre attendance, although the displaced community members had always requested such lessons but still rarely attended them. The displaced community members that I met stated that the adult language lessons were not designed in a suitable way for them, such as the lessons time and structure and that the lessons were not exciting. Thus, they did not feel the motivation to attend them; this was partly because NGOs operation times at the camp did not match with the displaced population daily schedule. This was because the NGOs staff operated on working hours schedule from 9:00 am to 5:00 pm, whereas the vast majority of the youth camp residents used to stay late at night and wake up late in the afternoon, making them unable to attend Adult classes. Furthermore, most of the displaced families used to spend the time in the morning preparing their food and collecting the food aids. The attendance for the English lessons improved tremendously when a new Arabic speaking volunteer teacher from Syria started teaching. This area will be discussed further in the data analysis finding chapter.

The participants reported several previous attempts to create on-site children schooling projects, some were successful, and others were not. The reasons for success and failure will be analysed further in the data analysis findings chapter.

Conceptualising education, needs, and challenges

The motivation for learning and education was apparent among different adults and children stakeholder groups. NGOs staff and displaced parents suggested that the motivation for learning is acquiring essential educational skills discussed earlier that would improve the quality of life for
children. Furthermore, such skills are essential to prepare children for attending formal schools and prepare them for life in the country to which they will be relocated.

Almost all participants from adults and children’s activities agreed that the most urgent need is basic literacy and numeracy. The reason for this is that most children at the camp have either never attended school or missed out on school for a long time resulting in them being either illiterate or having a literacy level that is way below their average age level. Adult participants suggested teaching English to all children, in addition to allowing each child to learn the language of the country to which the child’s family is expected to be relocated, such as (French, German, Dutch, Swedish, Belgian, and others). Furthermore, it was also suggested to include digital literacy and social skills such as group work and following rules.

Children emphasised that literacy, especially in English, is essential for them to communicate with the volunteers at the camp.

**Contextualising engagement**

Several NGOs staff and parents workshops highlighted that children are very engaged with activities that involve multimedia and standard technology equipment such as a TV screen, sounds, music or when using their parents’ smartphones. On the other hand, children were reported to have little interest in books even though there was a library at the camp; this is because children have severe literacy difficulties; they find books hard to use without adult support. The outcome from these activities will be discussed further at the end of this section after discussing the activities with children participants.

Examples of the engaging and disengaging factors reported by children are as follows:

**Engaging factors:** friendly teacher personality, a teacher who cares, a teacher who speaks their language, photos that help them understand the teachers who do not speak the same language, a classroom with computers where a child can sit and learn on his/her own pace, a classroom with a television, drawing and sports activities.

**Disengaging factors examples:** teachers who hit the children, language barrier, topics that are not useful or unrelated to children learning goals, children who misbehave and fight in educational activities, a teacher who does not respect children’s culture, learning topics that are either too hard or too easy and being with children that are of a different age group in the same class.

**Feedback on the next stages of the design process**

The feedback received from all different stakeholder groups during the activities was very positive and encouraging. NGOs staff emphasised the importance of being inclusive with all the different groups of
the displaced community, being honest about what can or cannot be achieved to avoid losing the community’s trust, involving children and their parents in all stages of the design process, and communicating with the representatives of the Greek Ministry of Education. The displaced parents were very supportive, as discussed earlier, and they approved the process plan and volunteered to communicate it to the rest of the community.

The previous examples of this stage’s outcome were provided to explain the progress of the design process in this case study and the conducted data collection activities. Further data analysis will be discussed and reported in the data analysis findings chapter 5, where more examples will be added, especially regarding the design process evaluation. The next section will discuss the design stage of the design process.

5.3.6 Process Stage 4, co-design

Aim

The previous stages targeted the understanding of the stakeholders, the conflict, the location, and the problem and requirement analysis. This process stage aims to involve the stakeholders in co-design workshops to create sketches, wireframes, mockups, and prototypes of educational systems that tackle the needs, challenges, and requirements that were identified in the previous stages. It should be noted that the co-design workshops contributed to further understanding of the problem analysis.

Unlike the previous stage, this stage started by conducting the activities with children (4.1) and then moved to conduct the activities with the adult stakeholders (4.2). Children were first to ensure that they have the lead in specifying what the designs should tackle and how they want the learning experience to happen since they are the main end-users of the systems. It was appraised to mix children with adults in the co-design workshops, but this was not possible. The reason for this is that children do not speak the same language as the volunteers, and the presence of children’s parents in such activities may cause the children to feel under pressure and restrict their freedom of expression and creativity.

5.3.6.1 Substage 4.1 Data collection activities with children participants

Children’s co-design activities

This activity consisted of a set of tasks that led to creating a design of a magical machine that could help children learn. The participant sampling for this activity was done by combining children who had expressed the same educational needs in the previous stages and were friends already. Each design group would consist of one to three children working on one project, with a maximum of two groups
working simultaneously at the same time. The number of activities that were held with children was eight workshops with 27 child participants in total. The workshops were held at the library caravan similarly to the children’s activities in the previous stage. The collected data was in the form of drawing scans and voice recordings of the design workshops.

My role was as a facilitator and a design partner with all children’s groups. In case there was more than one group, I would regularly move from one group to another. It was emphasised that my role in the co-design workshop is only to facilitate and support and not to influence or act as an expert. Any suggestions that were made from me used the question tone rather than telling children what to do. An example for this would be “PI: do you think this can be done this way instead or do you want to keep it like this?” rather than “PI: this should better be changed to be like this”.

Furthermore, to empower the children and give them the feeling that they are full design partners. At the beginning of each activity, each child would get a sticker where they write their name on with the title “inventor + child’s name”, and each child would place this sticker on their chest during the workshop. I did the same thing as well, which made sure that the design team members all had similar stickers with the same title to foster equality.

The co-design workshop followed the structure provided in the table below:

| Introduction | - Who is the PI  
- what is he doing at the camp  
- what is the project about  
- what are the activities to be conducted  
- what is the role of the children in the project |
| Ethical consideration | - Explaining the communication with parents for consent  
- Explaining how the data will be captured  
- Explaining about any form of recording and who will have access to the recordings, and why  
- Asking the children for their consent to participate by signing under their parent’s name if they had not provided consent in an earlier stage  
- Explaining that at any moment, any child can withdraw from any activity without needing to provide any explanation.  
- Explaining that any child, at any time, can request a break to go to the toilet or to go home to eat  
- Children should feel free to ask for any assistance at any time in any of the activities and have the right to refuse to participate. |
| Introduction on the probes | - Explaining what the activity is about  
- Providing each child with a sticker and assisting them in writing their names on it  
- Going through the different probes such as the drawing crayons and papers  
- Explaining the concept of LEGO and how it can be used  
- Explaining the printed technology peripherals, what they are used for, and how the printed logos can be used alongside the other probes |
| The design activity | - Explaining to children what the workshop tasks are and then giving children the freedom to start working  
- Task questions: |
What do you want your machine to teach you?
- What would your machine look like?
- Where would you place your machine?
- How would you use your machine?
- What is the machine name?
- Draw your machine on a large piece of paper using colourful marker pens. Or model it using the available LEGO pieces. Feel free to mix and match your ideas.

- Continuous support and monitoring from the PI during the workshop, without influencing or overpowering the children participants.

<table>
<thead>
<tr>
<th>Dissemination</th>
<th>Each group would present their design to the others allowing different groups to comment and give feedback on each others’ work</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Activity evaluation</th>
<th>The PI would have a quick group interview with the children to ask for their feedback on the activity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- What do you think of todays’ activity?</td>
<td></td>
</tr>
<tr>
<td>2- Did you enjoy the task?</td>
<td></td>
</tr>
<tr>
<td>3- How hard was the task for you, and was there any part that you felt you did not understand clearly?</td>
<td></td>
</tr>
<tr>
<td>4- Would you participate in a similar activity in the future?</td>
<td></td>
</tr>
</tbody>
</table>

*Reflection from the co-design workshop pilot*

The co-design workshop approach was piloted with four children for evaluation, which resulted in the revised structure provided in the table above. For example, the evaluation, along with the outcome from previous stages, concluded that children have poor digital literacy skills due to the lack of previous exposure to technology. Additionally, it was noted that many children are facing difficulties in drawing technical equipment such as a screen, a keyboard or a laptop. Thus, to support the children with technical knowledge that they may require and with their drawing skills. Several copies of the following stickers (figure number 4.14) of different digital peripherals were printed and placed with the other probes like the colouring crayons and LEGO pieces. At the beginning of each workshop, the use of each of the peripherals would be explained to the children. The children were advised that such equipment are only optional to use in their designs and that it is totally up to them to design whatever they want even if they decide not to use any of the printed equipment.
During the workshops, many children decided to draw and use multiple artefacts to illustrate the context of the machine being designed and the screen content such as buttons, text, and photos. Some children had difficulties working with other partners and preferred to work alone, especially if they decided to work on different designs. In such cases, the group would be divided then by the end of the workshop. If it is possible, the outcome of the different designs would be accumulated and mixed into one design.

At the end of each activity, I would lead a group interview to request feedback from the participants on the design workshop.

*Example of the resulted designs*

the vast majority of the children participant groups designed sketches of self-learning applications to run on a laptop or a smartphone to teach languages, basic maths, science, and games. There were only two designs that involved the presence of a teacher. Children stated that the reason for designing self-learning systems is because of their previous negative experiences at schools. The reasons reported for choosing self-learning systems is that the learning material was not suitable for their knowledge level, other children are misbehaving in the classroom, and because they want to have more control over the pace of their learning.
Figure 5-16 System teaching the meaning of names and words in English via photos

Figure 5-17 Sketch of a system that teaches the vocabulary of the human body
Figure 5-18 Sketch/wireframe of a program teaching languages to both literate and illiterate children
5.3.6.2 Substage 4.2 Data collection activities with adult participants

After finishing the activities with the children participants, rapid analysis (due to the limited time) of the resulting design was performed. Then the design activities with the adult participants were conducted. Adults co-design workshops involved the NGOs staff in three groups, whereas the adult parents preferred to be involved in interviews.

NGOs staff co-design workshop 1

The adult participants co-design workshops started with a presentation by me about the conducted activities so far, listing the identified educational needs and challenges and the children’s designs, followed by a discussion of the presented information. The discussion led to setting up the list of system requirements.

Brainstorming activity structure:

After discussing the system requirements, a group brainstorming activity was conducted. The participants were split into smaller groups of 3-4 participants per group. Each participant group of four were given 30 minutes to suggest several design ideas using drawing, writing, or any other form they preferred. I was moving from one group to another to answer questions and participate as a design partner as most of the participants lacked the technical experience and had questions to ask. The
participants were reassured that the brainstorming does not aim to result in specific technical specifications but rather a general image of the solutions.

Reflection

After the end of the co-design activity, the whole participant group discussed the ideas from the brainstorming session, evaluated, and prioritised the resulting ideas. Some participants lost focus on the design activity goal. Some ideas were considered unrealistic in the context of the refugee camp as they required resources and equipment that were not available nor possible to purchase. Some other ideas that were discussed showed a lack of understanding of the design activity, which was resolved by adding more structure to the activity during the workshop itself by providing more instructions and examples until achieving a better focus on the design goals. The design ideas that were favoured by the group were based on the children’s design ideas of self-learning applications. However, the additions provided by the participants were to suggest how the children’s designs can be implemented in the camp environment within the available resources. Two participant groups suggested the use of some technical resources that already existed at the camp, such as ten tablets and a few laptops. These resources had been donated to the NGO but were not in use. At this point, the first adult co-design workshop ended.

Thus, the second part of the group discussion moved to discuss the final system requirements and the available resources. Moreover, learned lessons from this workshop informed the similar activities in case study two. For example, identifying the resources was added as a prerequisite to the co-design workshops in case study two. Also, more structure and explanations were added to the design activity plan to be used in the next study.

The identified system requirements were as follows:

- The system is to be used in the camp environment, and the end-users are the children with facilitators from the NGOs staff.
- Focus on language learning as it is the most urgent educational that was reported from all the stakeholders. Especially the English language, in addition to any other languages that the displaced community are interested in learning due to their travel plans.
- Using digital content that is fun, and that supports autonomy since the children want to learn at their own pace with more control over what and how they learn.
- The possibility to use learning content from the available smart-phones applications, which can be used to match the children’s designed content
- There is a need to have adult facilitators to support children learning. Furthermore, adult facilitators would ensure that the safety of the children and the equipment is maintained.
- The adult facilitators can be from the NGOs staff, but they better be volunteers from the displaced community as they speak the children language and can control children better
- The system would provide the children with both language learning, general topics learning (such as space and similar subjects), and it will teach the children to use digital equipment, which increases their digital literacy.
- The learning content should be checked for any problematic content that may cause troubles with the displaced community or any violent content that encourages fighting and violence since these are already existing problems.
- The system should include documentation that explains how it can be used and organized; this is important so in case new NGOs staff join in the future, then they can read these documents and understand how the system was created and how it should be used.

In addition to setting up the system requirements, the group discussed the available resources that may assist in the implementation of the system.

<table>
<thead>
<tr>
<th>Category</th>
<th>Resources</th>
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</thead>
<tbody>
<tr>
<td><strong>Human resources</strong></td>
<td>- NGOs staff</td>
</tr>
<tr>
<td></td>
<td>- Volunteers from the displaced community who speak Arabic and Kurdish</td>
</tr>
<tr>
<td><strong>Equipment resources</strong></td>
<td>- Seven tablets that were donated and currently being unused</td>
</tr>
<tr>
<td></td>
<td>- Nine laptops were donated, some of which are being used by some of the volunteers sometimes during the day.</td>
</tr>
<tr>
<td></td>
<td>- One donated projector that requires maintenance work to work properly</td>
</tr>
<tr>
<td></td>
<td>- Applications from Google and Apple stores that could be downloaded on the tablets</td>
</tr>
<tr>
<td><strong>Physical spaces</strong></td>
<td>- A large ISO box (Caravan) that is shaped as a classroom and can accommodate up to 20 people, this caravan is currently used only for a few hours during the week and can be used to host the new children learning program</td>
</tr>
<tr>
<td><strong>Funding</strong></td>
<td>- A small amount of funding from the Leverhulme Trust that funded this PhD study. This can be used to purchase minor equipment such as headphones and some paid educational applications if needed</td>
</tr>
<tr>
<td></td>
<td>- The possibility to communicate with funding bodies and other NGOs to get funding to appoint facilitators for the new children program and to purchase additional equipment</td>
</tr>
</tbody>
</table>

After identifying the system requirements and the available resources, this workshop was ended with a general summary discussion on the activity. Feedback was taken from the participants regarding the activity planning and what could have been improved. Some participants suggested that if the resources were identified ahead of the brainstorming activity, they would have come up with more practical ideas.

The data from the first workshop was summarised and rapidly analysed, and I had researched some of the ideas suggested by the different groups. Furthermore, I checked the tablets and laptops that
were reported in the workshop to make sure that they were in working order and to check their specifications.

**NGOs staff co-design workshop 2**

Afterwards, another co-design workshop was organised a few days after the first workshop with the same participants to continue the work on the designs. The second workshop consisted of a co-design activity where the participants were split into three groups of 3-4 participants per group. Each discussed the system requirements and the available resources identified from the previous stage and suggested different designs. All the designs from the participants were focused on how to implement the ideas from the children’s designs using the available resources. The participants did not discuss the educational content or the screen content but focused on the logistical aspects of the system design. This co-design activity took an average of 35 minutes and was followed by a discussion of the different ideas from the different groups. All the designs ideas were very similar in the general context of creating a self-learning space for the children with the support of adults facilitators. The logistical and smaller details from the different designs were discussed and combined into one design in a similar way to the mixing-ideas technique.

The designs from the adult participants covered all the required logistical needs from spaces, equipment, time, in addition to organising children attendance to the learning space, the entry and exit from the space, and for the outreach to the displaced community about the new project. They suggested involving the community in the management of the learning space and the equipment. Regarding the learning content, the participants suggested that the learning content should tackle literacy and numeracy and other skills such as astronomy which were the skills reported by the children and their parents in previous activities. However, the NGOs participants could not suggest which learning content should be used or how to implement it, nor the details of the learning process, as they had little to no technical and educational experience. At this point, the second workshop finished with the usual summary and the participants’ feedback on the activity planning.

**Communication with the displaced parents**

The results from the NGOs staff co-design workshops were later discussed with the displaced parents, where the parents expressed their support and agreement to the project. However, the parents could not provide substantial input in this stage as they lacked the technical and educational skills and knowledge. They were happy with the system design as long as it matched the educational goals set by them and their children. The input from different groups and how it informs the design process will be analysed and discussed in the findings and discussion chapters.
It was necessary to research the technical aspects of the suggested project. I conducted a mix of literature reviews on tablet learning and on the available possibilities to create learning materials that suit the needs and designs of the children in the previous stage. It should be noted that due to the nature of displacement and refugee camps, many participants were relocating during the case study implementation. This meant that I could not keep track of the resulted system evaluation with all the same children who participated in the design workshops.

Since the project timeline was extremely limited, and since I was the only person who had the technical expertise to use tablets, it was not feasible to design and implement new programs. So we decided to use pre-existing learning applications that are the closest possible match to the children educational needs and to the designs that they provided. I used the tablets to download and evaluate 48 applications from google play store, of which only 21 applications were chosen (see Appendix L for application evaluation example). The applications were to teach English, French, German, Swedish, Greek, Arabic, math, astronomy, world atlas, animal atlas, in addition to other skills and topics. In order to use Google store applications on laptops as well as tablets, an emulator for Android OS was downloaded on the laptops. The experienced teachers from the nearby camp suggested that literacy applications for children are better to use the phonetics approach. Thus, this was one of the evaluation criteria to choose the apps.
Piloting and testing learning content

The applications were evaluated both by me and by the children in piloting sessions where we would sit and evaluate the applications and discuss why they are or are not engaging and helpful. Some applications were disregarded because they had problems with usability or learning quality. Other applications were disregarded just because there were better applications for the same skills, so they were omitted to avoid confusing the children with too many applications.

Final workshop with NGOs staff

After piloting the learning content with the children and setting up the technical aspects of the system, a final co-design workshop was organised with the NGOs staff to agree on the final touches on the digital self-learning space.

<table>
<thead>
<tr>
<th>Activity structure</th>
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</thead>
<tbody>
<tr>
<td>- Revision of the outcome from the previous data collection activity</td>
</tr>
<tr>
<td>- Exploring the digital learning materials and apps</td>
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</table>

The participants were divided into two groups to answer the following questions:

- How would the previous ideas be implemented at the refugee camp?
- Which resources should be used and how (physical spaces, human, equipment, time, and funding resources)?
- How can the community be involved in the planning and implementation of the digital self-learning space?
- What are the challenges expected to be faced and how can we overcome them?
- How will the space be maintained?
- Where would the equipment be stored and how can we ensure the safety of children, equipment, and if there are any risks to be considered?

In this meeting, a problem was raised. It’s that the Greek Ministry of Education bans any children’s activities at the camp during the daytime because this time slot is blocked to attend the Greek formal schools. It was surprising to know that there were no schools for the children to attend at that time. Despite all of this, the NGOs refused to implement the digital self-learning space until the problem mentioned earlier is resolved with the MoE as it could cost the NGOs their operating license at the camp. To resolve this problem, I had a meeting with the representatives of the Ministry of Education whom I had interviewed earlier in stage 3 of the process. I explained the project to them and how it is essential for the children as it will support their learning skills until they can join the formal schools. So they agreed to provide a written document to exclude Ritsona refugee camp from the daytime children activity ban until the Greek formal schools can host the displaced children, which is when the digital self-learning space would operate after school time.

Stage outcome
The outcome of this stage was the design of a digital self-learning environment, designed in a participatory approach with the participation of all stakeholders. Furthermore, the co-design activities resulted in identifying and evaluating suitable learning content that matches the children’s designs and the identified educational needs. The overall design was relevant to children needs and context. This was because of the input from the adult participants. The next section will discuss the implementation and evaluation of the design process.

5.3.7 Process Stage 5, implementation and evaluation
This is the last stage of the design process, which describes the implementation and evaluation of the digital-self-learning space at Ritsona refugee camp. The implementation is turning the prototypes, sketches, and wireframes from the previous design stages into a practical outcome, followed by evaluating the implementation against the system requirements and goals to ensure that they are met and to implement any improvements.
5.3.7.1 Data collection activities

The data collection activities in this stage consisted of observation, usability testing, and group interviews.

Observation

Non-technical incidents related to the digital self-learning space were observed, such as the reactions and opinions of the different stakeholders during the implementation. For example, capturing the children’s reactions and discussions while queuing to enter or after they leave the space, and capturing the children discussions with their parents regarding the space, the discussions between the parents, and other stakeholders’ groups that describe their opinions towards the project. The data from this activity was captured in the form of notes then were transcribed into digital form for data analysis.

Usability testing

Usability testing was conducted to test the technical and logistical aspects of the digital self-learning space. It included capturing incidents of children facing any difficulties in using any of the applications or hardware such as headphones. For example, at the beginning of the implementation, we used in-ear headphones which were pre donated with the tablets to the camp; however, for hygiene reasons and for usability reasons reported by the children having difficulties using the in-ear headphones. They were replaced with over-ear headphones. Furthermore, some children faced difficulties using some of the applications due to the application showing advertisement, so we decided to purchase the full
version of the applications. Some children were using applications that they were not supposed to
use, such as changing the settings of the tablets. Other children faced problems navigating to the
applications that they wanted to use. These issues were resolved by creating children profiles on the
tables that allowed restricting some functionalities they are not allowed to use and by grouping the
applications in folders based on the type of application, such as all English applications in one folder
and another folder for German applications.

There were some limitations to the usability testing as we could not alter the design and content of
the applications themselves. Nevertheless, this was resolved by having multiple applications for the
same educational goals so children could choose the applications that suit their capabilities.

The data from this activity was captured in the form of notes then were transcribed into digital form
for data analysis.

Group interviews

Group interviews were conducted with the children at the end of each learning session at the digital
self-learning space. These interviews structure aimed to capture children's feedback regarding the
session, what can be changed or improved, and whether they would come again in the future. These
group interviews were recorded and transcribed for data analysis.

Additionally, informal interviews were conducted with displaced parents and NGOs staff to capture
their feedback on the implementation of the digital self-learning space. The data from the informal
interviews were recorded in the form of notes and transcribed for data analysis.

5.3.7.2 Digital-self-learning space launch

The previous stages resulted in a full understanding of the digital self-learning space regarding its
logistics, resources, and the learning contents that were piloted with the children and confirmed to
be similar to the original designs. The implementation of the digital-self learning space started with
an outreach phase where the displaced community were invited to a meeting to announce the new
children learning program that is going to be established at the camp. Furthermore, logistics were
explained to residents and children such as, the time at which the space will start operating, the times
per week a child can attend the space, and what is required by the parents.

The following pictures will illustrate the operation of the space from the children entry to the space
and the learning activities. I was operating as the facilitator for the space with volunteers from the
NGOs staff and the community. The volunteers’ presence was necessary as they were the ones who
were going to be running and facilitating the space afterwards.
As can be seen from the figure above, children would register for a time slot during the day or come and queue at the door of the caravan.
Figure 5-23 Children sitting inside the digital self-learning space

The figure above shows the sitting plan inside the space. In order to ensure that each child focuses on the applications that serve the chosen language/skill they want to learn, the facilitator would ask the child first about what he/she wants to learn. Then the child is asked whether they want to learn the alphabet, vocabulary, or sentences of that language. Finally, the facilitator assists the child with running a suitable application.

The learning session was for 45 minutes, where the first 30 minutes were to focus on language learning and then 15 minutes to use other applications such as astronomy, World Atlas, animals’ atlas, or other critical thinking and educational games.
The running plan discussed ahead was a result of discussion with the children, the parents, and the NGOs staff, in addition to the observation and usability notes from the pilot sessions from the previous stages.

**Expanding the project**

The usability testing, observation, and interviews with different stakeholders suggested that we expand the project as it was a great success, and the attendance was very high. The suggestion was to call for funding to increase the number of tablets and to appoint permanent facilitators. A call for funding was placed on the IAY website and social media figure below.

![Figure 5-24 A call for funding for the digital self-learning space](image)

The call for funding was then answered by an international NGO called Armando Aid based in the UK that decided to adopt the project. Armando Aid offered to donate 20 tablets with their accessories, in addition to continued funding and support to the space to ensure the presence of facilitators to support the children. Armando Aid contacted me to revisit Ritsona refugee camp to implement the new tablets and to train the appointed facilitators. An addition was added to the program is that the facilitator would also teach children English for 30 minutes, followed by 15 minutes of individual activity on the tablets using English applications. The following pictures are from the second visit to the camp, which happened ten months after this case study. It should be noted that this expansion of the project happened eight months after the end of the case study. It was not considered a data collection stage in this PhD study; however, it showed the success of this project from the perspective...
of the local community, IAY NGO, and the other NGOs who were not part of the original project but they were convinced of its future.

Figure 5-25 Pictures from the second visit and implementation of the Digital self-learning space

5.3.7.3 Stage outcome

The outcome from this stage was achieving a sustainable educational intervention at Ritsona refugee camp by implementing the digital self-learning space. The digital self-learning space was still operating at the time of writing this PhD thesis.

This chapter explained the implementation of the design process at the first case study, which was implemented at Ritsona refugee camp and led to the development of the Digital self-learning space following a participatory approach involving the NGOs staff, the displaced communities and the MoE representatives. The next section will explain the instantiation of the same design process but in the context of the formal schooling of primary schools hosting displaced children from Ritsona refugee camp alongside their ordinary Greek students.
5.4 Case study two: Chalkida Primary Schools

5.4.1 Introduction

This case study took place at four formal schools in the city of Chalkida in Greece, hosting refugee pupils from Ritsona refugee camp alongside their ordinary Greek pupils. As it was discussed earlier in the (link to the added context chapter in the methodology), the displaced children are supposed to attend the formal schooling system in the host country according to the international refugee laws.

In this case study, the formal schools and the Greek Ministry of Education (MoE) were facing various challenges regarding the logistics, the communication and language barrier, the lack of teaching experience, and the lack of primary resources. The displaced pupils faced many challenges because most of them had not been to school before or had missed school for many years due to their displacement journey. The MoE required support and training from someone who has been working with the displaced community and speak their language. Thus, I was contacted by the Greek MoE representative whom I had met worked with during cases study one to work in collaboration with the schools to set up a plan that would support their work and the displaced pupils’ integration in the Greek educational system. The MoE representative also suggested that using simple technology tools would be an excellent addition to supporting the teachers and students.

My suggestion to the MoE representatives was that we implement the same design process with the four schools hoping to design solutions that would support the learning experience and the integration of the new displaced pupils. This suggestion was because the design process involves ethnography activities such as servicing in addition to problem analysis which would be beneficial to the schools as the teachers needed support from someone who speaks Arabis and understands the context of the displaced children. Therefore, even if the technology solutions were not found to be suitable, there would be a significant benefit from the design process stages in understanding the educational challenges and suggestions for non-technical solutions, such as training, translation, integration and support. The MoE agreed to the plan, and the case study was to be completed by following the same design process structure with involvement from the MoE representatives, school teachers and principals, the displaced pupils, and the displaced parents.

It was agreed that the MoE would facilitate the case study and provide the necessary documentation for me to enter the formal schools as a researcher. Such approval to a foreigner to enter the primary schools is usually a complicated procedure. However, due to the support from the MoE representatives and the trust built during case study one, permission for me to enter the schools was granted within one week. It should be noted that the displaced community in this case study is the
same community from case study one. Therefore, the data and outcomes from case study one, such as educational needs, trust and relationship building, and contextual understanding, were also used in this case study.

This case study lasted for just over a month and was conducted with an overlap with some stages of case study one. During this case study period, I would spend the morning with the children at the schools, then head to the camp after school to finalise the design and implementation of the digital self-learning space in the afternoon and evening time.

5.4.2 Participants

The participants in this case study were as follow:

**School teachers:** 7 participants, four primary teachers and three special subject teachers (all of whom are female participants from Greece)

**Displaced Children:** 43 (19 boys, and 24 girls), 15 children had also participated in case study one.

<table>
<thead>
<tr>
<th>Age y/o</th>
<th>Count</th>
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<tbody>
<tr>
<td>6</td>
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<tr>
<th>Background</th>
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<tbody>
<tr>
<td>Syrian Arab</td>
<td>13</td>
</tr>
<tr>
<td>Syrian Kurdish</td>
<td>16</td>
</tr>
<tr>
<td>Syrian Traveller</td>
<td>10</td>
</tr>
<tr>
<td>Other backgrounds</td>
<td>4</td>
</tr>
</tbody>
</table>

- The Greek Ministry of Education (MoE): two female participants from Greece, both of whom had participated in case study one
- School principals: two schools principals (both are males from Greece)

The next sections will discuss the different process stages and how they were implemented in this case study.

5.4.3 Stage 1: Contextual understanding of the conflict, the displacement, the location, and the stakeholders

5.4.3.1 Aim

This stage aims to understand the general context of the conflict, the dynamics of the resulted displacement, the location in which the process will be implemented, the people and possible stakeholders involved, and to prepare for the following stages of the design process. However, in this PhD study, the understanding of the conflict and displacement was provided separately earlier in (5.2)
as it covers both case studies that were implemented with the same Syrian displaced community in Greece. Thus, this section will only cover the contextual understanding of the specific topics of this case study, such as the location (the schools) and the stakeholders.

The figure below illustrates the aims and the methods and activities linked to the data source and participants involved with the order of participants’ involvement.

![Figure 5-26 Design process stage one structure](image)

Please see Appendix B for a list of the guiding questions that should be considered to achieve the needed understanding in this process stage.

The next sections will discuss each of the substages of this process stage, explaining how the data collection activities were implemented. It should be noted that this stage extended throughout the whole case study as further understanding of the context continued expanding in the later stages of the process.

### 5.4.3.2 Data collection activities

Reviewing the literature, online articles and reports, and social media

The understanding of the conflict and displacement was achieved and described in previous sections. In this case study, literature on the refugee influx to Greece was reviewed to cover reports on the previous attempts of integrating the displaced pupils into the Greek formal schooling systems, the structure of the Greek schools, and different news articles regarding the response of the host Greek population and the displaced population to this integration.
Semi-structured interviews

The interviews were conducted with the following groups of participants:

- MoE representatives, two female participants, both are from Greece.
- Four primary teachers, all of whom are females from Greece, were exclusively responsible for the displaced pupils (30-minute interview per participant)
- The school principals, two male principals, both of whom are from Greece (15 minute interview per participant)

The interviews started with an introduction of myself the research project and then followed the structure of the questions that are provided in the table below, aiming to understand the location and the stakeholders.

<table>
<thead>
<tr>
<th>Informal interview structure, case study two, stage one</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Self-introduction, the background of the PI, and overview of the research plan</td>
</tr>
<tr>
<td>2- The name of the interviewee</td>
</tr>
<tr>
<td>3- The position, the institution, and area of work and expertise of the interviewee</td>
</tr>
<tr>
<td>4- Discussing the location of the case study (the school)</td>
</tr>
<tr>
<td>5- Discussing the people, demography and challenges and the nature of the social division within the school (e.g. local Greek community vs displaced community, school policy vs MoE policies etc..)</td>
</tr>
<tr>
<td>6- The possibility for the case study to be implemented and how could this be achieved?</td>
</tr>
<tr>
<td>7- Who should be involved, and how?</td>
</tr>
<tr>
<td>8- Any feedback from previous experience on the best methods to involve the participants in the design activities</td>
</tr>
<tr>
<td>9- Do you have any suggestions for other contacts that I should interview and get involved?</td>
</tr>
</tbody>
</table>

Ethnography

Ethnographic activities were conducted to understand the context and stakeholders further by experiencing the lifestyle and daily activities of the different stakeholders. Furthermore, these ethnographic activities were essential to getting access to the location and the case study in general as they were part of the agreement with the MoE.

Active participation and servicing

Active participation consisted of the following activities:

Before the beginning of the schooling integration program:

- I assisted in the registration and preparation of the program, which involved facilitation and translation during meetings between the displaced community and the MoE representatives
- Consultation to the MoE representatives regarding the planning of the schooling program

After the beginning of the schooling integration program:
Going daily to Ritsona refugee camp at 6:00 am to meet the MoE reps and plan the day’s activities, followed by escorting the displaced pupils to the schools on the school bus
- Spending the school day with the teachers and the pupils at one of the schools or splitting the day between two schools when needed
- Assisting the teachers and pupils by providing translation, support, and consultation whenever needed
- Supporting the teachers and the MoE representatives in the evaluation and planning of the schooling program
- Going back to the camp with the children where they rest with their family then continue the day with the standard activities at the camp

Observation
The observation was carried out, covering the discussions and events concerning the interaction between the different stakeholders in order to understand the different stakeholders and the context of the schools and the schooling program. The data from the observation was collected in the form of notes that were later transcribed into digital notes for data analysis.

It should be noted that observation in this stage is different from the classroom observation that was carried out in the later stages of the design process, understanding the educational needs and challenges, and the problem analysis.

Interviews
Ethnographic interviews took place at the refugee camp, on the buses, and at the schools. The interviews involved casual chats and discussions with different stakeholders to capture their perspectives on the different events that are ongoing in addition to the planning and implementation of the schooling program. The interviews were casual and informal, the interview’s structure was based on the topics raised in the spontaneous ethnographic conversations. The main aim was to achieve the objectives of this stage and to introduce myself and the research project to different stakeholders. The data from the ethnographic interviews were captured in the form of notes that were later transcribed into digital notes for data analysis.

5.4.3.3 Stage outcome
The data captured from this stage was extensive due to the ethnographic nature, and the full analysis will be discussed in the data analysis findings chapter. However, it is essential to include a summary of the outcome at this stage to understand the context in which this case study was implemented.

Understanding the location and the community
This section will provide a general contextualisation of the schools, the Greek community and the displaced community to help to understand the environment in which this case study was conducted.
The later stages, such as the problem and requirement analysis, will focus more on the educational context, educational needs, and educational challenges.

The four different schools were in the city of Chalkida, which is 30-40 minutes by bus from Ritsona refugee camp. The schools had already started the teaching term four weeks before the integration of the displaced children. This delay in including the displaced children was because the MoE were struggling to find additional teachers. In the initial plan for the schooling program, the MoE plan was to use the same teachers from the schools for the displaced children. However, the Greek community at the city of Chalkida organised a demonstration to object to this and requested that the MoE should appoint dedicated teachers for the displaced children to avoid overwhelming the available teachers. Thus, the MoE delayed including the displaced children until they appointed an additional four teachers, one teacher per school to be responsible for the displaced pupils. The newly appointed teachers were brought from other cities on late notice, and all of them had little to no previous independent teaching experience.

Furthermore, there were continuous clashes between the MoE and the Greek community in the city of Chalkida. Some Greek families objected to the whole schooling integration program and requested that displaced pupils should not attend the formal schools and should only attend educational activities at the camps. For instance, on the first day of the schooling program, I was escorting the children on the school bus alongside the MoE representatives. At one of the schools, the Greek families had demonstrated and closed the street leading to the school. This required the intervention of the police and school teachers, who calmed the Greek community and convinced them to open the road for us to get in. This fear from the Greek community was due to reports from far-right movements and conservative parties that were spreading fear that the refugee pupils are violent and have medical diseases that make them a risk for the Greek children. However, the schools organised group discussions with the Greek parents to explain that the displaced children had had all the necessary vaccines and caused no threat to the Greek children. This helped in stopping the Greek community from intervening and objecting to the schooling program.

Similarly, the MoE representatives wanted to educate the Greek pupils about the case of the displaced children. So I assisted with the MoE representatives to create presentations that educate the Greek community and the Greek pupils about the displaced children to explain the reason for them to come to Greece and the challenges they are facing to foster empathy and inclusion. This encouraged the Greek children to be hospitable with the displaced children once they joined the school.

All the schools followed the same structure for the classes and the same curricula. However, the displaced children were attending special classes with regular mixed classes with the Greek children,
such as in the topics of foreign languages, arts, and sport. The Greek law forces the public schools to place the children from the same family in the same school. However, since the displaced pupils were all placed in one classroom per school, this meant that the displaced pupils’ classroom might have pupils of very different ages (5-11 years old) in the same classroom. All the different schools faced a severe lack of resources and support for the teachers, and some did not even have dedicated classrooms. Finally, there was an apparent cultural difference between the Greek pupils and the displaced pupils. Starting from the early morning where the Greek pupils started their day with a Christian prayer and singing the Greek national anthem, whereas the displaced pupils were mostly non-Christians and had little to no knowledge of Greece and the Greek national symbols.

This section provided a general understanding of the context of the location and the community; the educational context will be discussed further in detail in the later stage of problem and requirement analysis. The next section will discuss the identified stakeholders.

Figure 5-27 A Picture from a classroom environment in the Greek formal schools

The stakeholders and their area of expertise

This section is to list the identified stakeholders from this stage who were included as system stakeholders in the design process. The following table will list the identified groups and whether they will be involved as stakeholders or not, and why.
### Table 5-12 Identified stakeholders in case study two

<table>
<thead>
<tr>
<th>Group</th>
<th>Expertise and rationale for inclusion or exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Teachers</strong></td>
<td>Primary teachers are vital stakeholders for this case study and main system end-users. They can assist in setting and evaluating educational goals and challenges. Moreover, they can provide the needed input on the possible ways to achieve these educational goals. Additionally, the teachers spend extensive time with the displaced pupils daily, which means that they can also provide input on the pupils’ needs and the methods that work best with them. These teachers will be involved in all the coming data collection activities and are considered design partners in all the design process stages.</td>
</tr>
<tr>
<td><strong>Displaced Pupils</strong></td>
<td>The displaced pupils are also key stakeholders and end-users for this case study because children can tell us precisely what engages them and can voice their needs and challenges. They could also provide their input in the system design by telling us how they would interact with the system, which would support the usability of the system. Furthermore, displaced children will be direct beneficiaries of any system that would support and improve their educational experience. Thus, they will be included as design partners.</td>
</tr>
<tr>
<td><strong>MoE representatives</strong></td>
<td>The MoE representatives are key stakeholders in the system design but are not system end-users. Their input is important in the problem and requirement analysis, and their experience is needed to tell us what is applicable and what is not regarding the logistics and school resources. Including the MoE representatives provide support for the teachers as all the different parties will be communicating together and learning from each other’s experiences and challenges. In summary, their input and engagement are essential regarding system goals and requirements. However, there is no need to involve them in the activities that focus on designing the interaction with the system.</td>
</tr>
<tr>
<td><strong>Greek pupils</strong></td>
<td>Greek pupils were not included in the data collection activities in this study because of the time limitations and the sensitivities that were discussed earlier, which made it hard to have enough time to build relationships with the Greek</td>
</tr>
</tbody>
</table>
pupils and their parents to gain their consent. Moreover, the teachers and the MoE representatives agreed that the design for any systems should better target the classrooms of the displaced pupils only.

<table>
<thead>
<tr>
<th><strong>Special subjects teachers</strong></th>
<th>The special topics teachers are the ones who teach subjects such as arts and foreign languages who spend only one or two classes with the displaced children weekly. These teachers will be included in the ethnography communications (informal interviews and observation) to capture their input regarding the displaced pupils’ performance in the special subjects. However, they will not be considered system end-users as they stated that they would not be available to participate in the system design or the implementation as they work in different schools. Furthermore, it is not possible to perform any data collection activities in their classes as it includes Greek pupils who are not part of this research.</th>
</tr>
</thead>
</table>

| **Displaced parents** | The displaced parents will be involved in this case study, as their opinion is valuable and can influence the children. Their input is most valuable in identifying the educational needs of their children and communicating these needs with the schools. However, they will not be considered system end-users as they will not be the direct users of the system, which would be implemented at the schools. |

5.4.4 Process stage two: Trust and relationship building

5.4.4.1 **Aim**
This stage aims to establish trust relationships with different stakeholders in order to get access, consent, and data reliability. It should be highlighted that the trust relationships with the displaced community (parents and children) and the MoE representatives had already been developed during case study one. Thus, trust relationships in this stage were focused on teachers and school principals, in addition to improving the relationships with the displaced community and MoE representatives.

5.4.4.2 **Activities:**
This stage used the same ethnography methods, such as servicing and active participation for different stakeholders. These activities involved translation, interpretation, cultural consultation, and training. Additionally, this stage involved informal discussions with different stakeholders’ groups which
contributed to establishing personal relationships. These activities are the same as the activities in the previous stage of the design process. However, the aim here is not towards understanding the context and stakeholders but to establish trust-based personal relationships. Moreover, this stage would not be possible to complete without the prior contextual understanding of the conflict, the displacement, the stakeholders, and the location.

**5.4.4.3 Stage outcome:**
The outcome from this stage was successfully establishing trust-based relationships with the different stakeholders. This section will describe the indicators of the success of establishing such relationships.

The teachers and principals expressed on multiple occasions that my presence and support through servicing activities were highly appreciated and that they consider me as a trusted subject who is there to help and support their work.

Another significant notion is that I was granted the clearance to enter the Greek formal schools as a researcher even though I am neither a Greek nor a European. The clearance was obtained after meeting the four school principals to get their written consent which was later sent to the MoE by the representatives. This type of clearance usually is tough to obtain in Greece and reflect that the MoE representatives and the principals trusted me.

Furthermore, the trust-based relationships with the displaced community -especially the children- and the MoE representatives were also improved during this stage due to the extensive time spent together. At the camp, I became the primary person involved in anything related to the children due to my good relationship with them. For example, if the NGOs at the camp or the principals at the schools require any help in communicating or dealing with challenging children, they request me to help as children would listen to me. This shows that my relationship with the children has also substantially improved.

**5.4.5 Stage 3: Problem and requirement analysis**
This stage involved working with the different stakeholders on investigating and analysing the problem and suggesting the educational system requirements. This stage also built on the previous understanding of the educational needs from case study one since there were many similarities. However, in this case study, the focus was on understanding the problem and educational needs and problems in the context of formal schooling activities.

**5.4.5.1 The stage aims (Objectives)**
The research activities in this process stage discussed the following topics:x.
**Understanding the educational context at the location:** to discuss the ongoing and planned educational activities at the four formal schools.

**Conceptualising education:** to understand the concept of education and motivation for learning from the perspective of the different identified stakeholders and to identify the educational needs and challenges.

**Conceptualising engagement:** to identify the factors that engage the participants in the learning activities (children and teachers) and what factors make the learning experience pleasant or unpleasant for the participants.

**Get feedback on the next stages of the design process:** to consult the participants on how the findings from this stage would inform the planning of the later design process stages.

Following the same approach in case study one, the data collection activities in this stage consist of two substages. The first substage is with adult participants and the second substage is with children participants. The figure below illustrates the aims of this stage, and the data collection activities used to achieve the aims in this case study, and the data sources/participants that were involved in each of the data collection activities.

![Figure 5-28 Case Study two, Stage 3: Problem and requirement analysis](image)

The following two sections will explain how the data collection activities were conducted with each of the participant groups starting with the adult participants (3.1) and then children participants (3.2).
It should be noted that the findings from case study one regarding the educational needs and challenges provided important input to this case study since the displaced community is the same. However, all the findings were recontextualised and reconfirmed in light of the new context of the formal schools.

### 5.4.5.2 Substage 3.1 Data collection activities with adult participants

The data collection activities with adult participants varied from focus groups, semi-structured interviews, and ethnographic interviews. The main structure for these activities can be found in the following table; however, questions were minimally altered for some activities based on participants areas of expertise and the topics they bring to the discussion.

<table>
<thead>
<tr>
<th>Table 5.13 Case study two, stage 3, questions structure for data collection activities with adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction of the research project and PI</td>
</tr>
<tr>
<td>Introduction of the interviewee/focus group participants</td>
</tr>
<tr>
<td>What is your perception of the importance of educating displaced children, and why?</td>
</tr>
<tr>
<td>What are the available/previous educational activities at this school?</td>
</tr>
<tr>
<td>How do you feel about the current or previous educational interventions?</td>
</tr>
<tr>
<td>What are the factors that make the learning experience pleasant, interesting, and motivating for the displaced children? And what makes it unpleasant, uninteresting, and demotivating?</td>
</tr>
<tr>
<td>What interest the displaced children in general and in education?</td>
</tr>
<tr>
<td>What are the educational needs and goals for displaced children?</td>
</tr>
<tr>
<td>What are the challenges that are preventing or have prevented children from achieving the educational needs and goals</td>
</tr>
<tr>
<td>What do you think about involving children in discussing their learning? What do you advise on this topic and how do you think such a process should be conducted?</td>
</tr>
<tr>
<td>Would you be happy to participate in or support this process in any way?</td>
</tr>
</tbody>
</table>

**Focus groups**

Two focus group meetings were conducted with all teachers, two school principals, and the two MoE representatives. One focus group was conducted ahead of the beginning of the schooling integration program, and the second was conducted two weeks after the beginning of the program. Focus group meetings were recorded and transcribed for data analysis.
Interviews
Simultaneously with the focus groups, interviews were being conducted with different adult stakeholders. The interviews took the form of informal ethnographic interviews and formal semi-structured interviews.

Informal ethnographic interviews:
This type of interview started with the displaced parents in the form of informal group interviews at the camp during my ethnography activities and during my presence to assist in the preparation and registration of the formal schools’ integration program. Parents would come in groups to register their children for the program, ask questions, and discuss all the topics regarding the program goals and planning.

After the beginning of the schooling program, further informal ethnographic interviews were conducted regularly involving all adult stakeholders. These interviews focused on capturing the perspective of the different stakeholders regarding the implementation of the program.

The data from the informal ethnographic interviews were captured in the form of written or recorded notes using my recorder and notebook. The data was transcribed into digital form for the data analysis.

Formal semi-structured interviews:
Semi-structured interviews were conducted with the school teachers. The interviews focused on capturing the detailed personal experience and perspective of individual teachers during the implementation of the schooling program. The topics discussed included the general educational condition at the schools, the educational goals, and the faced challenges. These interviews were recorded and transcribed later for analysis.

Classroom observation
Classroom observation was conducted in all schools to focus on educational activities. Classroom observation was conducted by sitting in the back of the classroom and taking continuous notes. Both the teachers and the pupils were informed and reassured the observation during the classes was only to observe, assist, and support them. It was explained that such observation does not aim to judge or report to any other parties such as parents or the principals. Classroom observation focused on capturing the following incidents:

- Challenges faced in the classroom by the teacher or the pupils
- Indicators of engagement of disengagement
- Capturing any additional observations that may assist in understanding the problem
Samples of observation notes field collection can be found in the figure below:

![Example of written notes during classroom observation](image)

The notes above were later converted into a digital form. Then they were thematically analysed during the implementation of the case study to understand the educational problem for which the system will be designed.

### 5.4.5.3 Substage 3.2 Data collection activities with children participants

**Group interview and post-it notes**

The data collection with children consisted of one activity that involved a group interview with a post-it note activity. The focus of the activity was to get the perspective of the children regarding the schooling integration program. It was conducted in the 3rd week of the program; the activities were held at the camp after school time. Sampling for this activity was done by grouping the pupils from each school separately into one activity. The reason for this method of sampling is that the challenges, context, teacher, and other dynamics were different from one school to another. Therefore, the assessment required that we understand the challenges in each school separately depending on these dynamics. A table of the activity plan can be found in the following table.
Table 5.14 Stage 3.2, activity structure for data collection activities with children

<table>
<thead>
<tr>
<th>Introduction</th>
<th>To explain the reason for the activity to the children participants and what is going to be done.</th>
</tr>
</thead>
<tbody>
<tr>
<td>General discussion</td>
<td>A general discussion on how the school is going on and the general feeling towards the integration program</td>
</tr>
<tr>
<td>Post-it notes</td>
<td>The whiteboard is split in half to represent negative experiences or factors (sad face), and positive experiences and factors (happy face). Children are asked to name and discuss the factors that would make their schooling experience satisfying or dissatisfying. The PI would write the reported factor and the child would go to the whiteboard to place it in the negative or positive section.</td>
</tr>
<tr>
<td>Summary</td>
<td>The reported factors are relisted and summarised, an explanation is provided on the next stage in the design process.</td>
</tr>
<tr>
<td>Evaluation</td>
<td>Children participants are asked about their opinions regarding the activity:</td>
</tr>
<tr>
<td></td>
<td>- Was the activity fun?</td>
</tr>
<tr>
<td></td>
<td>- Do you feel you have expressed your feelings towards the subjects discussed?</td>
</tr>
<tr>
<td></td>
<td>- Could we have done anything differently to improve the activity?</td>
</tr>
<tr>
<td></td>
<td>- Would you participate in similar activities in the future?</td>
</tr>
</tbody>
</table>

The activity starts with an introduction of the activity, what is going to be done, and a check that all participants have signed the consent form with their parents, followed by a general discussion on the schooling integration program. Afterwards, it was followed by the post-it note activity, which is very similar to the one from case study one. The post-it note activity involved a whiteboard that was split in half to represent negative experiences or factors (sad face), and positive experiences and factors (happy face). Children were asked to name and discuss the factors that would make their schooling experience satisfying or dissatisfying. The children participants then placed each reported factor on the whiteboard in the negative or positive section. Afterwards, a summary of all the discussed factors was done, followed by an activity evaluation discussion. In the evaluation, children participants were asked to report their feedback towards the activity, what could have been improved, and if they would be happy to participate in similar activities in the later design stages.

5.4.5.4 Stage outcome

This section will provide a summary of the stage outcomes just to explain the decision making in the later design stages. A full analysis of the data and outcome will be provided in the data analysis findings chapter. The outcome from this stage formed the requirements for the design stage afterwards, and this is why it is essential to report it in this section.
Understanding the educational situation at the location

The educational situation that was studied in this case study was the schooling intervention program where the displaced children were attending the different Greek formal schools. This program was managed by the Greek Ministry of Education and was funded by different international bodies and NGOs. However, the program faced multiple challenges that will be discussed in the coming sections.

Children would go every day to the school on the buses from the camp. The program was supposed to start with a half-day schedule from 8:00 to 11:30 for three weeks then become a full-day schedule 8:00 to 13:30. However, a decision was later made to maintain the half-day schedule for the whole term for reasons related to the lack of resources.

Children would have two classes daily to learn Greek, where the class would only consist of displaced children. Additionally, the displaced pupils would attend two more mixed classes alongside the Greek pupils of sport, arts, or foreign language classes that were added later, such as English, French, or German, depending on the school. Afterwards, displaced pupils would go back to the camp at the end of the day.

The next few sections will further explain the educational situation.

Conceptualising education, educational needs, and challenges

The perspective of education:

Teachers, principals, and the MoE representatives emphasised that education aims to prepare the displaced children to get integrated into the Greek educational system and life in Greece as soon as possible because the Greek government believed that all displaced people in Greece would remain in Greece. Therefore, they believed that the focus should be on teaching the Greek language and schooling behavioural skills.

On the other hand, the displaced parents believed that education is supposed to provide the children with the opportunity to leave the camp and have a sense of ordinary life. Furthermore, displaced parents suggested that education should provide the skills required for children’s life wherever they end up going, and not necessarily in Greece. Therefore, they had requested more focus on teaching English and other languages such as German and French, in addition to life skills.

The children from the four different schools expressed that they were delighted that they now have the chance of leaving the camp and going to the schools to meet other pupils. Additionally, pupils from all schools expressed that they were happy with their teachers and that the teachers make their educational experience very good. Regarding education, the displaced pupils expressed that for them,
education starts from the moment they leave the camp on the buses. Even though the displaced children had not expressed interest in learning Greek in the early stages of the case study, this was changed as they expressed that they wanted to learn Greek as they would use it to communicate with their teacher and with their new Greek friends at the school.

**Educational goals:**

As it was discussed in the previous section, there was a bit of a clash between how different stakeholders groups imagined the educational needs should be. Further communications between the different groups resolved this contrast, the MoE agreed on enrolling the displaced pupils in the foreign language classes, and the parents became less stressed about their children learning Greek when they saw that their children were happy to do so. In summary, the agreed educational goals were basic literacy and numeracy in Greek, English, and possibly more languages depending on each school, in addition to schooling and social behavioural skills.

**The educational challenges:**

The schooling integration program faced various limitations and challenges that affected the success of the educational goals. This paragraph will report the main challenges that were later used in the design stage. Additional challenges will be discussed in the data analysis finding chapter.

The MoE had very little funding and support for the program. The schools had little to no dedicated classroom spaces or resources (books and materials) to accommodate the displaced pupils. There were no books for the displaced pupils to use, and the teachers had no printing budget. Thus, the teachers relied on using their personal laptops to show the children educational materials that would lead the lesson. However, all four teachers reported having low digital literacy knowledge, which is preventing them from using the full capacity of any technology equipment they have.

The teachers were chosen on an emergency basis and from other cities with little to no experience in teaching in general and particularly no experience in special education, which in addition to moving to a new school and a new city, overwhelmed the teachers dramatically.

The displaced children classrooms consisted of an age group of children between 5 to 11 years old, which was considered as a massive difference in age.

Displaced pupils had severe performance challenges when they were placed with the Greek pupils in the foreign languages classes such as English. The reason for this is that Greek pupils had been studying these topics for several years. In contrast, the displaced pupils were total beginners, which made it hard for the teachers to work with both student groups as they had to split the classroom giving
different tasks for different students. Teachers interviews and classroom observation showed that children perform better in subjects such as drawing, computers, and sport as it does not rely on previous knowledge such as foreign languages classes.

There was an apparent language barrier affecting the whole schooling experience, especially between the teachers and the displaced pupils. Three out of four teachers spoke moderate English, which helped them to communicate with the few children who spoke little English or Greek and acted as a bridge with the rest of the pupils. The other ways of communication consisted of using the google translate application on the teachers’ smartphones to translate to Arabic and Kurdish, which was also limited as Arabic and Kurdish have several dialects.

Displaced pupils had little to no experience in being in a school and adhering to school rules. There were many incidents of behavioural difficulties in and outside the classroom, especially with children who suffer from psycho-social difficulties. That situation was worsened with the teachers’ lack of experience in controlling the classroom, the language barrier, and the age difference.

The teachers and students expressed that another main challenge is that learning during school time is not sufficient to improve the pupils’ knowledge quickly enough as they were attending only half of the school day with little to no education at home. The reason for this is that the parents do not speak any Greek and thus they cannot help their children with any homework, and there were no books for the children in the first place to use at home.

**Contextualising engagement**

The facilitators for the engagement and disengagement of both displaced pupils and the teachers’ were discussed and observed in the different data collection activities.

Teachers and children reported that the reported educational challenges such as the behavioural difficulties, language barrier, and lack of resources were the most significant disengaging factors.

On the other hand, children reported that teachers personality and care is very engaging and motivating for them to learn. Pupils also suggested that the most engaging time for them as school is lessons such as arts and sport, and when the teachers used the projectors and laptops to show digital educational content. The classroom observation showed a significant improvement in engagement in some teaching methods and the use of specific tools compared to others. Displaced pupils showed an increased engagement when the teacher used a laptop/projector to show them Youtube videos of Greek letters with music. These devices were used because the teachers did not have any books and because children showed little interest when teachers used the ordinary physical letters probes made of cartons. Projectors and laptops were available used in all four schools. Additionally, pupils
engagement was further increased when some teachers involved further interactivity by regularly stopping the videos and asking children to go on the whiteboard to answer questions related to the content of the video. This observation was later discussed and confirmed with the teachers and the pupils.

![Teacher using a laptop and a projector in the classroom](image)

*Figure 5-30 Teacher using a laptop and a projector in the classroom*

**Feedback and preparation for the next stages of the design process**

All the different groups of stakeholders reported positive feedback on the data collection activities conducted in this design process stage. Moreover, all the stakeholders agreed on participating in the next stages of the design process. It was agreed with the teachers, MoE representatives, displaced parents and the children that the next stage will consist of co-design workshops with children participants followed by co-design workshops with the teachers and MoE representatives.

### 5.4.6 Process Stage 4, Co-design

#### 5.4.6.1 Aim

This stage aimed to work with the different stakeholders, especially the teachers and children, on co-designing the educational technology system that will be used to tackle the identified challenges from the previous stage. It was agreed from the previous stage to work first with the children and later with the teachers and MoE representatives. The role of the displaced parents was agreed to be more of consulting rather than co-design as the displaced parents are not direct users of the system.
5.4.6.2 Substage 4.1 Data collection activities with children participants

Children co-design workshops

This activity is similar to the children co-design activity from case study one. It consisted of a set of tasks that led to creating a design of a magical machine that could help children learn more efficiently by tackling the identified challenges from the previous stage.

The participant sampling for this workshop was done in a similar way to the previous stage, where children were grouped by the school they attended. The workshops were agreed to be held at the schools, where teachers were present as observers and facilitators only. One workshop was held at the camp after school time. Each activity lasted for 45-60 minutes. Children worked initially in small groups of 2-3 children per group. Afterwards, ideas from the different small groups were discussed with the whole group following the mixing ideas technique. My role was as a facilitator and a design partner with all children groups where I was moving between the different children groups to assist them neutrally to avoid influencing them towards any specific type of designs. At the beginning of each activity, each child would get a sticker where they write their name on with the title “inventor + child’s name”, and each child would place this sticker on their chest during the workshop. This practice empowered the children and gave them the feeling that they were full design partners. I did the same thing as well, which made sure that the design team members all had similar stickers with the same title to foster equality.

The design task structure consisted of answering the following questions:

- What do you want your machine to teach you?
- What would your machine look like?
- Where would you place your machine?
- How would you use your machine?
- What is the machine name?
- Draw your machine on a large paper using colourful marker pens, or model it using the available LEGO pieces. Feel free to mix and match your ideas.
- Illustrate and explain what will appear on screen and how will you interact with it?

There was no need to pilot the activities as the same structure had been used in case study one. We used the same stickers of the computing peripherals that were used in case study one to support the children with technical knowledge that they may require and with their drawing skills.

Example of the resulted designs

The majority of the designs from this case study aimed to improve the classroom experience. Many of the designs involved the use of the laptops and projectors that were used by the teachers. Some
designs involved added interactivity and gamification to the learning process. Other designs focused on the language barrier between the students and the teachers. Finally, some designs focused on the behavioural problems of children misbehaving in the classroom. The following figures will explore examples of the resulting designs from the children’s workshops. The caption of each figure explains its functionality.

Figure 5-31 System showing educational materials on classroom TV then prints it for the pupils to take home
**Figure 5-32** System using projector to show pictures of the vocabulary to overcome the language barrier with teacher

**Figure 5-33** System uses projectors to provide quizzes on language vocabulary with scores
Figure 5-34 Digital educational materials on a projector, equipped with a camera to records misbehaving pupils

Figure 5-35 System to teach and quiz vocabulary of Greek and Arabic via sound
5.4.6.3 Substage 4.2 Data collection activities with adult participants

Teachers agreed that we could make use of the digital self-learning space at the camp, so they were trained on the applications that teach Greek, and they were installed on the teachers’ laptops. In this case, teachers were showing the letters for the children at school on the app, which the children can later use at the Digital learning space in the camp to revise and study at home.

After finishing the activities with the children participants, a rapid analysis of the resulting design was performed. Then the design activities with the teachers were conducted. Adults co-design workshops involved the NGOs staff in three groups, whereas the adult parents preferred to be involved in interviews.

Reflection from the design process activities with adults in case study one:

The reflection from co-design activities with adults in case study (stage 4.2) one identified some challenges that were faced then and thus, the workshop plan was improved to tackle these challenges. For example, he co-design workshops with NGO participants in the first case study involved some cases of participants losing focus on what the task is due to lack of structure and also involved some unrealistic designs due to not identifying the available and possible resources ahead of the design activities. Thus, the co-design activity with adults in this case study was more structured and emphasised identifying the resources ahead of the design activities.

Teachers co-design workshops

Two co-design workshops were held with the teachers; the first workshop aimed to co-design solutions for the schools based on the identified challenges. Afterwards, the second co-design workshop involved taking the designs further to create a practical solution based on the available resources.
Teachers co-design workshop 1

The workshop with the teachers consisted of two parts. The first part was to discuss the results regarding the problem analysis from the previous stage and identify the challenges that should be tackled in the system. Furthermore, the second part of the workshop involved exploring the designs from the children’s workshops and then engaging in co-design activity to design systems that the teachers believe are suitable and helpful for their case. The workshops structure was as illustrated in the following table:

Table 5-15 Co-design activity structure, case study two, stage 4.2 with adult participants

<table>
<thead>
<tr>
<th>Question</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Which identified educational needs and challenges are we going to tackle in the system design?</td>
<td></td>
</tr>
<tr>
<td>What will your designed system teach?</td>
<td></td>
</tr>
<tr>
<td>What are the available resources that could be used in designing the system?</td>
<td></td>
</tr>
<tr>
<td>What would it look like?</td>
<td></td>
</tr>
<tr>
<td>How did you consider and involve children’s designs?</td>
<td></td>
</tr>
<tr>
<td>Which equipment/learning content/resources would be involved and how?</td>
<td></td>
</tr>
<tr>
<td>How would the educational content be edited and expanded in the future?</td>
<td></td>
</tr>
<tr>
<td>How did you consider the following requirements?</td>
<td></td>
</tr>
<tr>
<td>- The system should be suitable for children’s knowledge and expertise</td>
<td></td>
</tr>
<tr>
<td>- Should use as many visuals and less text</td>
<td></td>
</tr>
<tr>
<td>- Should be usable by various age groups</td>
<td></td>
</tr>
<tr>
<td>- Should be fun and interactive</td>
<td></td>
</tr>
</tbody>
</table>

The workshop was held at one of the schools in the presence of the MoE representatives as observers only, to which the teachers agreed. We started with the discussion of the identified challenges and available identified available and missing resources that could be used in the system. A smart whiteboard was used to write the challenges and resources by one of the teachers (Figure below).
The list from the figure above was changed and re-written multiple times after brainstorming different possibilities. The teachers were first focusing on the behavioural challenges as they were the most urgent causes for disengagement and stress for both the pupils and the teachers. That changed after a discussion about the reasons for these behavioural challenges, in light of the results from the previous stage. Teachers decided to build on the incidents where the pupils were engaged in learning and showed fewer behavioural challenges. The discussion led to acknowledging that pupils behave better when the lesson is well structured, involves pupils participation, and includes multimedia and digital materials. So the group decided to work on designing systems that foster these factors to increase engagement which in return would improve the behavioural difficulties. The first part of the teachers’ workshop ended here by identifying the system requirements and the available resources that could support the design and implementation of the system.

The identified system requirements were as follow:

- The system is to be used in a classroom environment, and the end-users are the teacher and pupils
- Focus on language learning as it is the most urgent educational need from all the designs from children and teachers workshops
- Support and improve student engagement by adding the concepts of interactivity, participation, fun, and gamification. The improved engagement would indirectly result in improving the student behavioural challenges in the classroom.
- If possible, the system should support learning both in and outside the school to support children’s learning at home after school time
- The system should be simple to use and adapt and to use the minimum resources due to the extreme lack of funding and resources
- The system should focus on the visuals and involve as many visuals as possible to overcome the language barrier challenge

The resources that were identified to be usable in the system were as follows in the table below

<table>
<thead>
<tr>
<th>Category</th>
<th>Resources</th>
</tr>
</thead>
</table>
| Human resources        | - Teachers  
                         - Volunteers at the camp (NGOs and residents) who might be able to support after-school learning and/or content translation to Arabic and Kurdish |
| Equipment resources    | - The laptops and projectors in all the four schools  
                         - Open digital educational media from public websites such as Google, Youtube, and websites of the Greek Ministry of Education  
                         - Translation websites for content translation  
                         - Installed content creation software such as Microsoft PowerPoint on teachers laptops  
                         - The Tablets from the Digital self-learning space at the refugee camp for after school use  
                         - Open educational applications installed on the tablets at the refugee camp for after school |
| Physical spaces        | - Classrooms at school which are equipped with the projectors  
                         - The Digital self-learning space at Ritsona refugee camp for after school learning |

The next stage of the workshop was a co-design activity. The four teachers were split into two groups to work on designing a concept of a system that fulfilled the identified requirements. The smart whiteboard was used to list the main tasks of the activity, in addition to the requirements identified in the first stage of the workshop (figure below). The teachers were then given up to 45 minutes to complete the task.
My role during the task was as a facilitator and as a consultant. The design activity was held in two iterations. In the first iteration, I had very little intervention in the design activity to give the teachers full autonomy and freedom to design anything they believe is essential. In the second iteration, I supported the groups as a design partner with technology experience. I took personal notes and recordings during the workshop, where this data was later used to evaluate the design process and activities.

The outcome from the co-design workshops was a set of sketches and wireframes made by the teachers and influenced by the children's designs and the requirements agreed on during the workshop. Examples of the resulting sketches can be found in the following figures.
Figure 5.39 A sketch of a system that teaches vocabulary to children with translation and gamified quizzes

Figure 5.40 A sketch of a system that teaches sentences in Greek using multimedia with translation to Arabic and Kurdish
After finishing the co-design activity, a discussion was held to discuss the different resulted designs and how they can be implemented using the available resources.

After achieving the designs and finalising the system requirements and available resources, the workshop was ended to allow a few days for the rapid data analysis and further brainstorming and research for technical solutions, followed by another co-design workshop to finalise the system design.

*Teachers co-design workshop 2*

The first co-design workshop with the teachers could not address all the points in the workshop structure. Thus, a second workshop was added using the same structure to continue addressing all the points and achieve practical, applicable implementation of a design. In the second co-design workshop, the teachers discussed how to turn the designs from the children and adults into a practical solution using the available resources. I participated in this discussion as a design partner. The main challenge was that the cases study timeframe does not allow for time for developing and programming new solutions. Thus, it was agreed that we could use simple content creation software such as PowerPoint to create interactive clickable content with the help of many open educational media and content online. The teachers did not have the knowledge to use PowerPoint for such a purpose and how to create buttons and multiple-choice quizzes. Thus, it was decided to do a short PowerPoint training and to provide the teachers with video tutorials to assist them. Also, it was suggested that the teachers would be added to a WhatsApp group that the NGOs at the refugee camp created to...
communicate any translation needs, where group members exchange sentences in Greek or English
and request a translation in Arabic or Kurdish or vice versa. The WhatsApp group would allow teachers
to get translated content when they prepare their presentations and quizzes on PowerPoint.

Furthermore, we explored the available applications that were being used at the digital self-learning
space at the refugee camp in addition to Greek language teaching applications. The teachers
expressed that these applications are similar to the designs of the children and teachers. They
suggested that such applications would be beneficial if they were downloaded on the teachers’
laptops and used with the projector. For this purpose, I assisted the teachers by downloading an
Android OS simulator on their personal laptops, and we created a unified Google account that has all
the language applications that are downloaded on the tablets at the digital self-learning space at the
camp. Having done this, the teachers became able to use the same applications on their laptops to
teach children new letters, words, and sentences at the school. Moreover, at the same time, this
allowed the pupils to use the same applications when they got back home to create a complete circle
of learning between the school and the camp. From the perspective of the teachers, making use of
the digital self-learning space at the camp was a supportive aspect as it supported the need to provide
personalised education for the pupils who are of different age groups and have different experiences.

This workshop ended with a timeline for the implementation phase, which would allow me to
complete any technical requirements, such as installing software on teachers laptops and the agreed
PowerPoint training.

Finally, we conducted a summary of the whole design process activities that were conducted so far,
and the participants were asked to provide any feedback on the activities and implementation.

Stage outcome

The outcome of this stage was an agreement on the system requirements that were identified
following a participatory approach. Also, co-design activities were conducted and resulted in multiple
low-fidelity designs from children and teachers and the designs were matched with the available
resources. Finally, all the designs were discussed and converted into a practical intervention that was
compared to the system requirements and participants’ designs. The final system design was then
shared with the different stakeholders who expressed their satisfaction.
5.4.7 Process Stage 5, implementation and evaluation

5.4.7.1 Stage aim
This stage is where the final design from the previous stage was implemented. It started with one training session on Microsoft PowerPoint, followed by technical work such as installing the required software on teachers’ laptops. The software included Android OS simulator to run the Android applications on a personal computer, in addition to the language teaching applications. Teachers were also trained on how to test and add more applications in the future.

5.4.7.2 Data collection activities

Remote communication
The timeframe for this case study was too tight as I had to leave Greece due to travel limitations as I was visiting on my refugee passport, which allows me to stay for a maximum of three months. Thus, I was unable to conduct any further classroom observation when the teachers started using new solutions. However, I managed to keep communication with the teachers using WhatsApp and emails until the end of the teaching term. The teachers told expressed that the new solutions did help them a lot in their work, mostly in structuring their lessons and increasing student engagement. They said the behaviour of the children improved, even though it can be related to other factors such as the relationship with the teachers and getting used to the school environment. However, the teachers also expressed that this was not enough to get rid of the challenges completely as the schooling intervention was not getting the required attention from the MoE, and the challenges were too hard to resolve completely.
6 DATA ANALYSIS FINDINGS

6.1 Introduction

This chapter will discuss the findings from the data analysis of the data collected from both case studies.

6.1.1 Data analysis process

Due to a large amount of the gathered data from both case studies, the thematic analysis process had to be done over several iterations, as explained in section 4.6.3. The analysis process started with the transcription and translation of the collected data. This included analysing the content of ethnography field notes, interviews recordings, focus groups recordings, classroom observation notes, design workshops recordings, the designs resulting from the design workshops, and any other form of collected data from both case studies. All visual data such as pictures or videos were transcribed into digital text to be later analysed. All non-English data transcription (such as Arabic data) were translated by me as I am a native Arabic speaker, especially since I was the one who conducted the data collection activities.

The first result of the data analysis was a very large number of codes that were generated over a long period of time. Many codes were similar or duplicate; such codes were merged. Afterwards, themes and sub-themes were generated in an iterative process that included merging and unpacking the themes and sub-themes until reaching a stage in which themes were clear and well-identified.

The themes resulting from the data analysis were turned into a design method diagram (section 6.2) that illustrates the relationship between the different themes. The reporting of this chapter will be different from the way the data analysis was conducted. The themes diagram will be presented first to provide a general understanding of the relationship between the identified themes. Then sub-themes will be unpacked with exploring the codes. This way of presenting the findings is suggested to give a broad overview and understanding of the data analysis findings before discussing the codes and their examples. This explanation is presented here to acknowledge that the data analysis report does not represent the data analysis process and approach, which was explained in detail in section 4.6 of the methodology chapter. You can find a sample of the thematic analysis codebook in Appendix K.

6.1.1.2 Chapter structure

This chapter will start by introducing the link between the different main themes by introducing the design method in section 6.2. This will be followed by the keys for the thematic maps in section 6.3.
Then each of the main themes will be unpacked with their sub-themes, their codes, and how they link together to constitute the design method. Section 6.4 will discuss the contextual complexity theme, the trust theme will be discussed in section 6.5, and the involvement theme will be explained in section 6.5. Section 6.7 will discuss the data examples that contributed to the evaluation of the design process from the perspective of the stakeholders, the resulted, systems, and the field notes. Finally, section 6.8 will provide the chapter conclusion.

6.2 The main themes and the overarching link (The CRIT design method)

The thematic analysis resulted in identifying three main themes, which are *contextual complexity*, *trust*, and *involvement*. These themes, when linked together, constitute the foundation of a design method that will be discussed and presented in the discussion chapter. As discussed in the literature review (section 2.5.9.2), a design method is a set of attitudes and concepts that the designers should consider and conduct while implementing a design process. Therefore, the themes discussed in this chapter will introduce different attitudes and concepts that require consideration and focus when implementing the design process. These themes will be discussed in the discussion chapter to present the design method attached to the design process developed in this PhD research.

The main overarching finding that connects all the main themes is the CRIT design method (figure 6-1), which stands for (Contextual complexity, Relevance, Involvement, and Trust). Relevance is not a separate theme on its own, but it is the core connecting concept that links the main themes together. The name CRIT was also chosen as it is a short word for the word “Critical”, as these themes will cover a range of attitudes and concepts that are critical to consider, understand, and implement in a design process for educational technology systems of displaced war-affected children. The CRIT method will be discussed and presented in full detail in the discussion chapter.
The logic behind the CRIT design method is that the displacement context has an array of contextual complexities, such as stakeholders diversity, resources complexity, and continuous change. If these complexities are not adequately understood and addressed, they will affect the relevance of any intervention in this context, whether the intervention is the design process activities or the implementation of the resulting systems. The affected relevance in return will affect the trust and involvement of the participants and end-users in the design process activities and the resulting systems.

On the other hand, figure 6-2 below illustrates the unpacked CRIT method themes with their sub-themes. It shows that the solution is by applying involvement through involving the stakeholders, designers’ involvement in the stakeholders’ context, and implementing a list of identified facilitators of successful involvement, in addition to emphasising trust. This would result in a better understanding of the contextual complexities, which would, in return, result in an increased relevance of the design process activities and the resulting systems. This increased relevance will result in a successful involvement of the stakeholders in the design process and the resulting systems, in addition to increased trust.
This section introduced the main themes and sub-themes, the core connecting the concept of relevance, and the CRIT method with an introduction on how it connects the different themes and sub-themes. The next section will provide the keys for the thematic maps. It will be followed by different sections that will unpack and explain each of the themes, sub-themes, and their codes.
6.3 The key for thematic maps

The coming sections will involve several maps for different themes; the two following tables explain the meanings of the shapes and relationships. Table 6-1 below explains the shapes, and table 6-2 explains the relationships.

Table 6-1 Thematic maps shapes key table

<table>
<thead>
<tr>
<th>Shape</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theme</td>
<td>Theme</td>
</tr>
<tr>
<td>Sub-theme</td>
<td>Sub-theme</td>
</tr>
<tr>
<td>Node</td>
<td>Node/Code</td>
</tr>
<tr>
<td>Core connecting concept</td>
<td>Core connecting concept</td>
</tr>
</tbody>
</table>

Table 6-2 Thematic map relationships key table

<table>
<thead>
<tr>
<th>Relationship line shape</th>
<th>Relationship type</th>
</tr>
</thead>
<tbody>
<tr>
<td>——</td>
<td>Leads to</td>
</tr>
<tr>
<td>——</td>
<td>Association</td>
</tr>
<tr>
<td>——</td>
<td>Symmetrical</td>
</tr>
</tbody>
</table>

6.4 Contextual complexity

This section will discuss the theme of contextual complexity and will explore all its sub-themes and codes that eventually lead to various design challenges that affect the implementation of the design process. Contextual complexity consists of three sub-themes that categorise different forms of complexities that affect designing in the context of displacement. The first sub-theme is “stakeholders’ diversity”, which discusses the differences and transformations in multiple aspects – such as age, culture, needs, power etc.- amongst the different groups of stakeholders and how they result in design
difficulties such as sampling, design, and requirement analysis difficulties. The second sub-theme is “resources complexity” which discusses the complexities that are related to the resources’ availability and use, how resources are affected by stakeholders’ complexities, and how resource complexity affects the design in the displacement context. The final sub-theme is “continuous change”, this sub-theme discusses the complexities caused by the in the displacement environment, which affects the stakeholders’ involvement in the design activities and the logistical aspects of the design process. Figure 6-3 below shows the theme of contextual complexity with its main sub-themes.

The codes from each of the sub-themes will be unpacked in the coming sections with examples from the data and links to the overarching finding. The next figure, 6.4 will illustrate all the codes from the contextual complexity theme and its sub-themes, the link between them, and how they are linked to the relevance of the design activities and the resulted designs.
The figure above shows the expanded sub-themes and codes of the contextual complexity theme. The next sections will explain and give examples of each sub-theme and its codes.

### 6.4.1 Stakeholders diversity

This sub-theme discusses the complexities caused by the diversity amongst the stakeholders in a displacement environment. In the context of this analysis, “diversity” can be defined as the “variety” within the different groups of stakeholders who are likely to exist in the context of displacement. Examples of this diversity can be a variety of needs, ages, cultural and language differences, and experiences. The following sections will explore examples of these codes from the data collected in the case studies. Moreover, this section will explain how this variety results in design challenges such as unrealistic expectations, group work difficulties, sampling difficulties, and requirement identification difficulties. These design challenges – if not considered in the design process- will affect the relevance and success of the design activities of the design process, in addition to the resulted designs and systems.
Say that there will be x paragraphs with their names and that you will give examples and how they lead to design challenges (relevance)

6.4.1.1 Diversities of age and needs

The first node in figure 6-4 is the diversity of stakeholders ages. The age of the displaced children was highlighted in both case studies as a significant added complexity in designing an educational intervention for the children in such a context. This section will list examples of how children’s age was perceived as an added complexity and how such topics affect the systems and the design process.

In case study two, the displaced children were grouped in 4 different classes, each class in one of four different schools as each school had only space for only one additional class for the displaced students. One major challenge faced was that Greek law forces the schools to place siblings in the same school. In ordinary cases, this would not be a problem as siblings would join different classes depending on their age. However, in this case, siblings who may have very different ages had to go to the same class as there is only one available class for refugee children in the school. The result was classes of up to 15 pupils per class where the age range was between five years and eleven years in the same classroom. The representative of the Greek Ministry of Education explained that the challenge of large age difference exists in the vast majority of the Greek formal schools hosting displaced pupils.

The age diversity resulted in a diversity of needs from different children as the children needs differ based on age. For example, teaching materials, learning methods, and design and communication methods with children of different ages differ by the age group. The interviews and observation data from case study two showed that the age gap affected the teaching methods and the methods of interaction with the children. Such as, the teacher need to use one-to-one time with the younger children. It also added the challenge that some older children overpowered the younger children in group activities.

Similar challenges related to age diversity required a need for personalisation of data collection activities and sampling in the design process with the children to suit the different age groups. It also affected the resulting systems that required inbuilt adaptability to support a variety of ages and needs. This challenge was easier to accommodate in case study one, where the resulted system was a self-learning educational system. However, in case study two, this was harder as the children end-users were of different age groups between six and eleven years old, which added additional pressure on the system design and the teachers.

Furthermore, in both case studies one and two, children had diverse academic skills and knowledge that were not related to their age, unlike the context of education in an ordinary context where age is
an indicator of a child’s academic skills and knowledge. For example, a displaced child could be ten years old but have missed school for four years or even never attended school; this means that this child’s academic knowledge level is much lower than the child’s age. On the other hand, another child could be seven years old but has been to school in a previous year and thus acquired more academic knowledge and skills than other children who are much older. This added to the challenge of diverse ages and diverse needs, but in this context, it was the educational needs that were affected. As a result, in case study one, even though the educational applications installed on the tablets did have a suggested age group for each application, but the applications were chosen categorised based on the skills and needs of the different children, and not the age of the child.

In summary, in the context of displacement, children’s age is a complexity that does affect the relevance of the design process’s data collection activities for different ages, which could affect children’s involvement in such activities. The age gap could also affect the resulted system (the educational intervention) as it would need to accommodate the different needs and knowledge levels of the different children at the same time. It also should be noted that when designing in this context, all the data from both case studies suggested that age should not be an indicator for academic skills. In other words, unlike ordinary education, in displacement, age is not necessarily an indication for the children education level. It can add complexity that affects the ability of the system design process and the resulting systems to engage the stakeholders and attract their involvement.

The diversity in stakeholder’s needs was also highlighted in the data as a complexity due to having multiple actors in the displacement context who had conflicting views on the system goals. For example, in case study two (stage 3 outcome), there was the Greek Ministry of Education representatives, school principals, and policymakers who prioritised teaching the Greek language as a primary educational goal. This prioritisation was because they expected the displaced community to remain in Greece, and thus they should learn the language. On the other hand, there was the displaced community who wanted to focus on learning English and the languages of the countries to which they are awaiting relocation, such as Germany, Sweden, the UK, France, or Ireland. The displaced community even suggested that they may refuse to send their children to schools if their needs are not respected.

Furthermore, part of the Greek population in the city in which the case study two was conducted held demonstrations against the reception of the displaced children in the Greek schools at the beginning of the schooling integration program, which added additional stress to the whole context. Therefore, various groups wanted different goals, which resulted in challenges in the requirement identification stage in the design process.
These challenges were later resolved by emphasising communication and activities to mediate the needs and challenges faced by the different groups to the other groups of stakeholders. These activities included communications with the different stakeholders' groups to explain the needs, challenges, and perspectives regarding the educational program. The activities were conducted with the support of the MoE representatives by preparing presentations and meetings to bring the different stakeholders closer and reach an agreement regarding the educational goals.

If the complexity of diversity in needs and goals is not well understood and accommodated in the design process, the resulting solutions may not be relevant and would not attract the involvement and trust of the participants.

The diversity of needs could also take the form of unexpressed needs. For example, in case study one, the NGOs at the camp organised English, and Greek language learning activities for youth and adult displaced populations involving camp residents from 16 years old onwards. According to the NGOs, these programs were designed in a participatory manner where the NGOs asked the residents about what kind of educational activities they would like to learn at the camp and designed the programs accordingly. However, these activities suffered from an extreme lack of attendance. As a part of my ethnography activities in case study one, I investigated this issue with the camp residents to enquire about the reasons for the lack of attendance. The displaced residents told me that the reason for the low attendance was that the residents did not express all their needs to the NGO staff. For example, the residents were having difficulties learning from teachers who were regularly changing and did not speak the language of the residents. The residents wanted teachers who speak their language to make learning more comfortable and to be able to form friendships with them. My observation field notes also suggested the same needs of the stakeholders. But this type of need would have only been expressed by the residents to someone whom they had already known and had formed a trust relationship with. Thus, they did not express these needs to the volunteers who came to ask them about what they wanted.

An example was encapsulated in the field notes when a new volunteer English teacher who was originally from Syria joined the camp. This teacher was from the same country as the residents and therefore understood their language and their culture. She was, therefore, able to form a friendship with them very quickly. Her English classes were at their fullest capacity, so the NGO had to increase the number of classes to accommodate the amount of students who wanted to attend.
This example shows that in the context of displacement, stakeholders’ needs are not always expressed without the presence of trust, involvement, and relationship building. Designers cannot just approach the displaced population and ask them questions without active involvement in their lives to gain rich understanding and a separate process stage of relationship building. The lack of understanding the needs of different stakeholders would lead to solutions that lack the required relevance and thus would not engage the stakeholders. This challenge may be known in contexts other than displacement; however, in displacement context, the context is more challenging with the presence of psychosocial difficulties and cultural and language differences. Thus forming trust-based relationships and mutual involvement is essential to understand the needs of the stakeholders.

6.4.1.2 Diversities of culture and language

In addition to the diversities of age and needs that were discussed earlier, the thematic analysis highlighted the diversities of culture and language. These types of stakeholder’s diversity can also be challenging and would lead to challenges in the design process and affect the relevance of the solutions. The data highlighted how refugee camps and displacement situations involved people from multiple countries with vast differences in language, religion, political opinion, and culture. For example, in case study one, the displaced community (camp residents) consisted of 4 different cultures and backgrounds who sometimes spoke different languages even though they came from the same country. At the time of writing this thesis, the same camp now hosts ten times the number of residents from eight different nationalities.

In case study one, the language and culture differences informed the relationships and interactions amongst the residents. The displaced community suffered from social division based on ethnicity, culture, language, and the diverse political opinions which were related to the conflict back in Syria. This social division was also illustrated in regular incidents of violence and discrimination, especially with children. Therefore, there were cases of children from specific ethnic groups who would not want to work or play with children from other ethnic groups who do not share the same language and culture with them. The social division, the associated violence and discrimination had a direct effect
on the participant sampling for both adults and children in the design process activities, but it was more evident with children. In the first stage of the participant sampling, children were grouped by age with ensuring to cover both genders. However, several challenges were faced in the group work in these activities due to clashes between the children from different backgrounds. Thus, the children participant sampling changed to consider the culture and ethnicity of the children and the social division in the camp. This was done by inviting children who are either friends or from the same background to the design process activities.

The political and ethnic social division can also affect the resulting learning content. For example, parents and children suggested adding some educational materials on the country from which they had to flee to keep the link to their homeland. However, the first stage in case study one, where the literature review of the Syrian conflict, showed examples that when international actors such as the UNESCO and War-Child organisations tried introducing such educational content, they faced multiple difficulties—starting from the country flag where each group participating the Syrian war had their own flag that replaces the older Syrian flag, in addition to the naming of the different characters in the digital storytelling apps where the names sometimes reflected controversies regarding specific ethnic or religious groups. This shows how the political and social division may affect the relevance of the resulting systems.

Having multiple cultures and languages had a link -in both case studies - to the diversity of the stakeholders’ needs which was discussed earlier and linked to requirement gathering difficulties. For example, when the camp displaced parents attended the problem analysis and requirement gathering focus groups, one of their suggestions was to teach the mother tong of the families. Which was different from one culture to another as some spoke Arabic and others spoke Kurdish. It was easy to find suitable applications to teach Arabic for the digital self-learning space. However, Kurdish applications were tough to find since the Kurdish language itself has many dialects and is mostly an informal language for teaching. This was not a critical problem as according to the interviewed parents, teaching mother tongue languages was considered not an essential goal, such as teaching English and the other foreign languages of the countries to which they will relocate in their displacement journey.

The diversity of language was one of the most severe challenges reported by all teachers, NGO volunteers, children, and MoE representatives. In both case studies, almost every different group of stakeholders spoke a different language than the other. The displaced population spoke Arabic and Kurdish, NGOs staff spoke mainly English, and the teachers and MoE representatives spoke mainly Greek. Most of these different stakeholders were unable to communicate with the children, even
though their main tasks involved direct interaction with the children. The staff from the NGOs struggled when organising the children for any activities, which was exacerbated because many children suffered from psychosocial symptoms from the displacement lifestyle. The staff reported that communicating and controlling children is one of the most challenging missions. The same was reported by the teachers in the formal schools in case study two. NGO staff suggested that they often ask volunteers from the camp to join them as translators, but this is also challenging as not anyone can interact with the children appropriately. The field notes identified repeated accounts in both case studies that children’s behaviour and interaction would massively improve if the adult interacting with them spoke the same language as them. This was also evident from the field observation notes from multiple incidents where camp volunteers faced challenging behaviour from the children that they had to call for a volunteer who speaks Arabic or a camp resident to support them.

<table>
<thead>
<tr>
<th>Case study one, stage 1, field notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>“(volunteer name) has been shouting at a kid who was throwing large stones at younger kids. She called a nearby resident who speaks Kurdish, asking him to talk to the kid as he was laughing at her shouting. Once the guy shouted at the kid, the kid suddenly stopped throwing stones and went back down from the caravan roof”. 03.October.2017</td>
</tr>
<tr>
<td>“The NGO was looking for someone who speaks Arabic to assist in managing kids going on the school bus as they would not adhere to the instructions given by the non-native speaker volunteers. Without the presence of a native speaker, most kids would go to buses with their friends even if the bus is going to another school”. 07.December.2017</td>
</tr>
</tbody>
</table>

This language barrier and diversity had a direct effect on almost every aspect of the design process activities. It affected the participant sampling for the design process activities as it was not possible to mix staff from the NGOs or formal school teachers with the displaced parents or with children in the same activities. Of course, there were some other reasons, such as trust difficulties which also contributed to this separation, but language was also a significant complexity. Using translators for such cases may work for some activities but adds additional challenges. For example, in case study one, one group of children spoke only Kurdish as they were mostly young and did not interact with Arabs or go to formal schools back home to learn Arabic. For this group work, a Kurdish researcher who was at the camp at the same time was asked to assist as she spoke Kurdish and English natively.
She was also visiting from the UK as a translator with a Canadian research group to operate a development project in the camp area. We spent a long time preparing for the activities where all activities’ details and aims were thoroughly explained. The problem analysis activities (photography, post-it notes, and discussion) were very successful. However, the co-design workshops were challenging, and the designs from the children were not as structured and meaningful as the ones from the Arabic speaking children in other children groups. When children were asked about their designs, they replied that they did not understand the aim of the activity well and thus, they were trying multiple things.

Similarly, in case study two at the formal schools, children were mixed of Arabic and Kurdish speaking children. Most children spoke Arabic, with a minority of young children who only spoke Kurdish. Study logistics difficulties made it impossible to take a Kurdish translator into the formal school. Thus, children who speak both Arabic and Kurdish were asked to assist in the activities by interpreting to their colleagues who only speak Kurdish. In a nutshell, the two previous examples showed that language diversity -which is a common theme of displacement- has a substantial impact on the design process activities and the resulting systems.

The lack of understanding of the diversities of the displaced population’s culture, social division, and variety of social dynamics -such as the language- could affect the design process activities or could lead to missing out some groups who may not be represented in the design activities. Furthermore, these complexities may also affect the stakeholders’ needs and expectations from the resulting systems. All of the above would either lead to design process activities that are not relevant to the stakeholders, or to resulted systems that do not accommodate the diversity of the displaced community as a result of leaving groups unheard and isolated. All of this would later affect the involvement and trust of the participants in the resulted educational systems and design activities.

6.4.1.3 Diversity of power

The previous sections discussed several diversities, including the diversity of needs with highlighting examples of how different stakeholders may want different things. Another aspect of diversity is that these different stakeholders may have various powers. The diversity of power was evident from both case studies and is an essential aspect of the displacement context. The data from both case studies showed how the displaced community is a vulnerable community governed by complicated laws and various actors and organisations that constitute what the displaced community should do and when to the smallest details. This is because the displaced community relies on the aid distributed by the government and must obey the strict laws to avoid any problems in their asylum application. In other words, the vulnerable displaced community is used to follow the orders of others.
Similarly, the NGOs also are governed by strict rules provided by the Greek governments, which gave them little autonomy in planning their projects. NGOs staff in case study one explained how their projects plan must align with the policy provided by the government.

In summary, when such groups have different needs, power diversity may affect the discussion between the different groups and push the goals of a specific group of stakeholders. Such an aspect would result in difficulties in the required identification. It would also result in sampling difficulties as the more powerful stakeholders could be perceived as the decision-makers rather than co-designers.

6.4.1.4 Diversity of experience

Diversity of experiences was consistent in the data amongst both case studies and participant groups and is another finding with a direct effect on the designs and design process stages and the relevance of the resulted systems. Conflict-related displacement situations emerge as emergencies that overwhelm the country in which the cause of displacement has occurred and the countries hosting the influx of displaced people fleeing the conflict. Displacement contexts often lack resources, and thus, the group of actors involved in such environments tend to be appointed on an urgent basis regardless of their experience in the tasks they are assigned. This was evident in the data from both case studies, such as the lack of teaching and volunteering experience, lack of children schooling experience, and the lack of technical experience.

Most camp teachers and NGOs staff in case study one expressed that their experience is low in the tasks to which they were assigned. Furthermore, all of the school teachers in case study two expressed severe experience difficulties; three of the four teachers were teaching for the first time.

**Case study one, Educational Coordinator:** “in previous years, when we had schooling activities, teachers were struggling, especially with behavioural problems, so keeping the class focused, keeping them learning. Very few teachers were experienced, most of the others were not experienced at all.”

**Case study two, Ministry of Education representative interview:** “The teachers are very young and not experienced, some of them have just been appointed for the first time, so they don’t know what to do.”

This lack of experience, along with the previously identified complexities -such as the diversities of language, culture, age, needs, in addition to the general lack of resources and the psychosocial difficulties in children- affected their ability to perform their tasks. Teachers from all four schools
stated that they had massive difficulties controlling their classrooms and planning their lessons to fit the complex context in which they were working. Furthermore, children at the four schools were also lacking the experience of being in a classroom and following the rules, which also added more challenge. The children photographs from the photography activity in case study one and the data from the follow-up discussions showed that many children lacked the experience of understanding what education is unless they had been to a school before.

**Case study two, School teacher1:** “Children in my class do not understand what a school is or what it means and how to behave in a school.”

Furthermore, the data showed that there is a possibility of not only stakeholders having low experience in some aspects but also the absence of some aspects of experiences altogether. For example, in case study one, there were no participants with experience in children’s education as there were no educational activities for children at the camp. Moreover, since most children and even their parents had little schooling and educational experience, it was hard to identify the educational needs, requirements, and design suggestions from an educational perspective. This was because there were no educational activities for children at the camp in the first place as the language classes were only for adults and provided by teachers with little experience in childhood education. To overcome this difficulty, I visited another refugee camp nearby that has similar challenges and where there was an established field school with a group of specialist teachers. A focus group was conducted with them as a part of the problem and requirement analysis, and they were also consulted with the resulted system and its implementation.

In addition to teaching and schooling experiences, the data showed a lack of experiences with technology in stakeholders from both case studies. Teachers in case study two expressed that their digital literacy is low; they were having trouble with basic technical tasks.

The quote below presents an example of connecting the laptop to a projector, running the internet browser with the sounds from the speakers, or downloading digital content from the internet. The teachers feared such experience difficulty might affect their ability to help design or even use the resulting designs.

**Case study one, stage 3, School Teacher 3 interview**

*Teacher to PI: “look, I have to be honest, I am very bad with computers. It’s not that I don’t like them, but I always need help. As you saw today, it wasn’t able to play the sound through the external loud speakers and not the laptop speakers*
without your help. Also, I normally ask (name of another teacher) for help when I
download YouTube videos to play them without internet. So I am not sure how much
I could help you in this project”.

The same applied to the adult participants in case study one where many of them lacked technical experience. Displaced parents clearly expressed that their technical experience is very low. However, they were able to give practical suggestions such as the focus on using sounds and visuals in the content design as it helps children learn since most children cannot read application menus and text.

Case study one, stage 3, Male parents focus group

Male Parent 3 to PI: “my smartphone is always in Arabic because I easily get lost in
the many apps and stuff that appear on the screen. I use it sometimes to translate
English words to my children, but they can’t read anything on the screen. I he
(another parent’s name) showed me how to make the app say the word rather than
typing it and this is much easier to the kids....they like pictures and sounds because
they can’t read, not even in Arabic”.

Many children in design workshops showed a low understanding of the possibilities of technology, which is why technical peripheral stickers were used in children co-design workshops. Nevertheless, children showed much competence in understanding mobile applications as they had experience in using their parents’ smartphones to play games or learn. They were very able to suggest what engages them and how they want the learning process to happen in a way that suits them. In summary, all the different groups showed technical experience that is limited to their previous exposure to the technologies that they have previously used, which was little to no experience.

The previous examples of experience diversity also led to difficulties in the design process activities and sometimes resulted in unrealistic outcomes. For example, in the co-design workshops for case study two, teachers were asked to list the educational problems that they wanted to design technology systems to tackle. The teachers chose behavioural problems as the main problem that they wanted to design a system to tackle. However, after a discussion on the behavioural difficulties faced and when linking it to the input from the children’s activities. It was discussed that the behaviour difficulties were a result of the other complexities such as the language barrier, the lack of educational materials, the variety of ages and needs, lack of schooling and teaching experience, and many other
difficulties. Also, the classroom observation data collection suggested that some learning activities were more engaging and resulted in better behaviour than others.

This concluded that behavioural difficulties were a result of a lack of engagement and can be improved by improving student engagement by building on the observed learning methods that yielded better student engagement. Such as interactive and participatory learning methods, including visuals and multimedia on projectors, allowing children to participate individually on the screen, and involving educational materials that link to the language of the displaced pupils. Also, during the workshops, the notes from the teachers co-design workshops stated that teachers had misinformation about some aspects of how basic technology equipment works. Finally, teachers required technical support and training to be able to operate the resulting systems; the required understanding was fairly basic, for example, how to use PowerPoint.

After finishing the design workshop with the teachers, we held an evaluation discussion on how the workshop went and how it could have been improved. The teachers stated that if they had more teaching and technical experience, they would have analysed the problem better and possibly suggested more suitable solutions. In summary, the diversity of experience in different stakeholders is a complexity that adds challenges to the context of education in displacement in general. Furthermore, this complexity has a direct effect on the stakeholders’ capabilities in the problem and requirement analysis, solution design, and systems usability.

This section discussed the stakeholders’ diversity sub-theme and its codes alongside examples from the collected data. The previous examples showed how the lack of understanding and considering the different forms of diversity would lead to requirement identification difficulties, sampling difficulties, and design difficulties. The next section will discuss the resources complexity sub-theme.

### 6.4.2 Psychosocial difficulties

This code was regular amongst all the different data items in both case studies. This is because psychosocial difficulties are strongly related to almost every aspect of the displacement context, and they get worse by the lack of resources, continuous change and uncertainty, and severe lifestyle. Examples of the identified psychosocial challenges were behavioural difficulties, extreme lack of motivation, depression, violence, and communication difficulties in both children and adults. The field notes logged numerous cases of violence between the children and even adults, which were based on stress, social division, and other psychosocial difficulties.
Case study one, stage 1, field notes

“a fight broke today between the displaced adult. (displaced person name) who is normally a very gentle and polite young man, was threatening a person while holding a knife. We had to implement the emergency plan as the fight broke near the NGOs caravans. They later calmed down, and the guy apologised while he cried, saying that he has been under extreme stress lately”. 12. November 2017

“For the fourth time in a week, I was called to intervene in a fight between children throwing stones at each other”. 23. October 2017

The psychosocial difficulties amongst the different stakeholder groups, especially stress and lack of motivation, affected the participants sampling, participants engagement, and the general communication with different stakeholders groups. The field notes highlighted that the psychosocial difficulties were manifested in children in the form of stress, depression, lack of focus, lack of expression, violence, discrimination against children of different races and social groups, swearing and bad language, destroying public properties in the camp, fighting with rocks.

In case study one, the field notes from the design activities stated that many children suffered from particular psychological, behavioural, or social difficulties. They had to be identified and placed in smaller groups with their close friends, as suggested by the child-protection officer at the camp.

Case study one, stage 1, field notes of stage 3.2, activities with children

“One kid was very shy during the whole activity and barely looking at me or anyone else. He seemed to be enjoying the activity but barely spoke. When I asked the child protection officer about him, I was told that he has some psychological difficulties and is always afraid of talking to strangers and requires more attention and friendship building. The child protection officer gave me more induction on the children who require special attention for various reasons to be put in smaller groups and smaller activity size”.

“One kid on the school bus was jumping in a very risky way as he did not want to sit all the way. He was about to hit the lady responsible for the children on the bus. He had severe ADHD in addition to other psychological difficulties due to the death of his father in the war”.

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The field notes also included that the psychotherapists who were assigned to attend the camp once a week were overwhelmed with the number of community members who needed professional psychological support.

**Case study one, stage 1, field notes**

“one psychologist at the camp asked me if I am available to assist him in translating a psychotherapy session. He told me that he is unable to find enough qualified translators due to the large number of sessions that he needs to work on. He said that the number was more than 400% than what he was prepared for”.

27 October 2017

Similarly, NGOs staff were also affected by the severe environment and the lack of resources which affected their motivation and ability to work in this environment. NGOs emphasised that their staff should take regular holidays to maintain their wellbeing. Thus, it was challenging at some points to involve adult stakeholders in some data collection activities because some of them were tired, overwhelmed, or taking a break. The psychosocial difficulties also affected the PhD researcher witnessing several incidents of people struggling and listening to many tragedies expressed by the children and adults throughout the PhD study.

**Case study one, stage 1, NGO staff participant 3:**

NGO staff 5: “I really do not care to go for the English lessons outreach anymore. I do it every day, and no one cares to come. Whatever we do is not enough sometimes I feel it is a mission impossible. But also sometimes small things make my day.” (field notes from case study one)

The challenge of lack of motivation was evident in all forms of collected data and was reported by the different stakeholder groups. Several NGOs staff highlighted the challenge of motivation when they were consulted regarding the design process activities. They stated that the lack of motivation could be a severe challenge, as many of the displaced community members are overwhelmed and demotivated and rarely participate in any activities. Such a challenge would directly affect the participants’ involvement and, therefore, the design process activities.

*Displaced community member 8:* “look around you, it is ridiculous. No one cares; our asylum court date is in 14 months. What shall I do until then? Continue begging for
food and walk around the camp? I am not even allowed to work as an electrician as I used to do back home. There is nothing here. If it were not for my children, I would go back to Syria and die there. I do not care.” (field notes from case study one)

In case study two, several teachers repeatedly expressed their lack of motivation, explaining that it is very hard to believe that they can achieve the required educational outcome within the extraordinarily challenging and under-resourced nature they work in. The teachers were also from other cities, and they had travelled to a new city to teach in a severe context that they knew very little about. All of these aspects made them lose the motivation to work in many instances.

<table>
<thead>
<tr>
<th>Case study two, stage 2, School Teacher 1 interview</th>
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<tbody>
<tr>
<td><strong>Teacher to PI:</strong> “I really have no idea how can this be done. You may not know, but I am not from Chalkida. You have been here longer than me, haha… I travelled here just last week, and I am still adjusting. Yet, we are asked to do so many things that are impossible to do, and I have not done special education before, even if I want to. If I am completely honest, I am not sure if I will stay with this program for a long time if things keep going like this.”</td>
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6.4.3 Resources complexity

The availability of resources was a significant concern in all aspects of both case studies. This lack of resources had a substantial effect on several aspects of the design process. This section will discuss the codes identified in regards to the resources.

Case study one showed an extreme lack of resources in all different aspects affecting all the different stakeholders. There was a lack of necessary food and clothing aids, schooling equipment, medications and vaccinations, physical locations to hold activities, in addition to stationary for the NGO staff. In case study two, teachers did not have any form of printed books to use in their classes, one school did not even have a dedicated class for the refugee children, and they had a limited number of notebooks and stationery for the children. Teachers used their personal laptops to search the internet for suitable educational content to show it on a small screen for the children as they did not even have a printing budget like other teachers who are teaching the non-refugee classrooms who receive their budget from the Ministry of Education. This lack of resources contributed to the psychosocial challenges faced by all the different stakeholders and severely affected their motivation.

This lack of resources affected the design activities, as it is hard to design applicable systems when there is an extreme lack of resources. For example, challenges were faced in finding spaces to conduct
the design process activities or to host the created educational system, human resources to support the design process activities or give suggestions, and equipment to implement the resulted systems. It is said that teaching is challenging when the child is hungry and lacking the necessary clothing; designing is also challenging in the same context. The lack of resources exacerbated many other complexities such as the psychosocial challenges, needs, and lack of experience.

In addition to the general lack of resources, the data showed that many available resources were not being used or not being used properly. This was due to the lack of experience from the stakeholders, which was discussed earlier. For example, in case study one, there was a set of 10 tablets, a projector, a large-scale Wi-Fi system, and 12 laptops that were all donated to the camp. However, since the stakeholders did not have the technological experience or time, they could not make use of these resources for educational activities at the camp. This was not limited to technical equipment; there was also a lack of communication between different NGOs regarding the availability of caravans, such as the library caravan and other classroom-style caravans. This made it challenging to know which caravans are available to host the design activities or the created systems.

The lack of understanding of the available and feasible resources had a direct effect on the design process. In case study one, adult participants in the design workshops were NGO staff. They created multiple designs; some of these designs were unrealistic because they involved resources that did not exist and were not feasible to procure in a displacement context. Similarly, some designs did not incorporate some of the available resources that could have improved the designs as the participants did not know of their existence. To resolve this, we asked the participants to identify the available resources in the camp and then to reconsider their designs in light of the educational needs and the possible or available resources (“NGOs staff co-design workshop 1”). This led to designs that were more applicable in the environment of the refugee camp and tackled the educational needs. The design process was edited in case study two to incorporate these changes, and identifying the resources was done throughout the case study, and it was used in the co-design activities.

The data analysis of the design process activities from both case studies identified the following categories of resources that were discussed by the stakeholders in both case studies. The identified resources categories were:

1- physical resources such as caravans and spaces
2- technical resources such as tablets, laptops, and projectors
3- human resources such as educators and facilitators, NGOs staff, and volunteer camp residents
4- funding resources such as possible contacts and organisations who might support the purchase of additional resources
5- time resource, which could mean the available time to develop and implement the solutions.

Having these categories is very helpful in guiding the exploration and identification of the resources in the design process. The proper identification of the resources would result in more relevant system designs to the context in which they are implemented.

This section discussed the resources complexity sub-theme; it explained how the displacement context suffers from an extreme lack of resources, in addition to a lack of management of the available resources, and provided examples on how this complexity affects the design activities. It also suggested a set of resources that were identified and would guide the identification of the resources for more relevance in the designs and design activities.

6.4.4 Continuous change

The last sub-theme in the contextual complexity theme is the theme of continuous change which discusses the complexities caused by the continuous change in the displacement environment as a result of changes in the logistics and the stakeholders.

In case study one, extensions to the camp and changes in the physical spaces were ongoing for most of the time with little or no warning of these changes, which had a significant effect on the availability of many spaces for the design activities and even for the digital self-learning space. Hence the link in figure 6-4 above links logistical changes with resource complexity. In case study one, the displaced population was regularly changing every week due to relocations to and from other refugee camps, cities, or even other countries. As a result, new groups of people would arrive, and others would not be part of the community or the design process anymore.

The same also applied to the NGOs, within three months, four NGOs were changed in the camp due to projects ending, licenses expired, or relocations. Similar changes happened in case study two, where two of the teachers were replaced two months after the case study finished. This resulted in changes in the participants throughout the implementation of the design process activities. Thus, in the design process stages, the design activities and methods should consider stakeholders to change in the middle of the design process to ensure inclusivity and to maintain the relevance of the design process to the context of the changing stakeholders. This is because the change of the stakeholders and context might reflect changes in the requirement, activities planning, and participants availability and sampling.
6.4.5 Summary of the contextual complexity theme

The previous sections discussed the sub-themes of the contextual complexity theme, and it provided examples from both case studies on the complexities of stakeholders diversity, resources complexities, and continuous change. Furthermore, this section explained the link between the codes identified in these complexities and sampling, design, and requirement identification difficulties. The next sections of the findings will discuss the themes of involvement and trust. These themes will explain how they can contribute to understanding the contextual complexities, which would increase the relevance of the design process activities and the resulting systems, and thus result in better involvement and trust in the resulted solutions.

6.5 Trust

This section will explore the codes of the trust theme (figure 6-5 below). Trust was a central topic in both case studies and was evident to be a primary challenge in the displacement context. There were many examples of different groups of stakeholders having trust difficulties with each other. Furthermore, there was extensive evidence on the importance of trust in the researcher/designer for the success of the design process and the resulted designs. The data showed multiple factors that affect trust amongst stakeholders and between the researchers/designers and the participants; these factors will be explored in this theme. Additionally, since it was explained earlier that the theme of trust has a symmetrical relationship with the theme of involvement, this relationship will also be discussed.
The trust difficulties were evident in case study one from the early stages of understanding the context through the different ethnography activities. There were several incidents where the displaced community expressed that they do not trust some of the NGOs staff. Several informal discussions with the displaced community stated that they believe that some of the NGOs and their staff do not care about them and are only operating to receive funds that will not be fully used for the benefit of the displaced community.

**Case study one, stage 2, field notes from a conversation with an adult male camp resident**

*Camp resident to PI:* “No one cares except for the very few. I saw them (volunteers) last week at an expensive restaurant in the city. How could they afford such a restaurant if they really depend on stipends? It is probably our money that they are using.”

The accusations of corruption were worsened by the lack of resources, the overall stress, and the severe psychosocial challenges. The displaced population also regularly expressed that they often
observe all the new volunteers and workers at the camp. This is because they experienced numerous cases where the visitors or the volunteers had agendas that contradicted their culture and needs.

Case study one, stage 4.2, communication with adult displaced male parent

*Camp resident to PI:* “I will be very honest with you, maybe even rude, I observe everyone who work here. When I notice things that are not normal, I take notes of that person. Some people are here to help, but others have their own agenda”.

On the other hand, several NGOs staff stated that some of the displaced populations provide wrong information regarding their needs and attendance plans to the activities planned for them, which was discussed earlier in the complexity of the unexpressed needs.

Case study one, stage 3.1, a focus group with NGOs staff from multiple NGOs

*NGO staff 7 to PI:* “they say they want English classes, we planned English classes, but where are they? No one shows up.”

Furthermore, several NGO staff, in addition to the MoE representatives, suggested that some parents give the wrong information when registering their children in schools or their asylum cases. NGOs staff, who act as gatekeepers in such context, regularly emphasised that trust is an essential requirement they assess when collaborating with anyone, including accepting their volunteers who must have specific qualities which are all related to trust. Such an environment where trust is both a key to operating and a challenge at the same time affect the design process and the resulting systems.

The first factor to affect trust is “personal relationship”. Numerous sources in the dataset suggested that personal relationship is a crucial element in the interaction with the different groups of participants. Teachers and NGO members expressed the importance of personal relationships, which some have linked with adults/children perception of caring, empathy, and safety.

Case study one, teachers focus group

*Teacher 3:* “Personal relationship is more than essential; they see you, and you symbolise something to them like they’re crying, and they want you to pick them up because you symbolise someone who cares for them”.

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Teacher 4: “They know that they can go to any of the teachers, and we’re safe. We’re their friends. We’re someone you can approach; I’m not going to shout at you”.

As discussed in the complexity theme, many of the displaced children suffered from severe behaviour difficulties because of the psychosocial complications of living in a limited context (the camp), which the child-protection officer described as “like a cage”. These psychosocial difficulties made controlling the children during the design process activities challenging. Furthermore, the field notes from the early stages of children’s activities stated that many of the children with social skills difficulties required more encouragement to enable those children to voice their own opinions. During the case study, several playful activities were organised (by the researcher supported by volunteers), such as football training and other games for different ages and genders. These activities contributed to the trust and relationship building stage in the design process. The progress in building a personal relationship with the children resulted in a significant improvement in children behaviour. Furthermore, the personal relationship also had a substantial positive effect on the communications with children who suffer from social difficulties; they became more involved and started contributing more in the design activities. The design process personal notes highlighted that children tho at the beginning of the case were reluctant to speak but after these activities became highly talkative.

The field notes highlighted the sensitivity of forming a personal relationship with such children who have special needs because of the complex environment they live in and their previous experiences. Moreover, the notes highlighted that forming a personal relationship with the children requires forming a personal relationship with their social circle of parents, teachers, and friends.

**Case study two, stage 3.1, field notes**

“and NGO staff at the camp told me that I should pay attention when communicating with a child who is challenging because he has a lot of psychological difficulties, possibly because his father lives in a different country and they have to wait for too long before they can meet him. He is aggressive, and other kids insult him by mentioning that his father is away, which makes him very aggressive and has trust difficulties. The staff told me that she is one of his very few friends as she plays with him and visits him at his caravan with his mother to say hi and eat together”. 03 November 2017
Children in this context may have behavioural difficulties. However, the field notes and the feedback from the specialised teachers in case study one emphasised that such behavioural difficulties should be resolved by friendship, a positive atmosphere, and positive reinforcement. The feedback from the adult participants in case study one stated that designers and researchers are suggested to be strict in some cases but to avoid harmful communication methods or to involve the parents in resolving behavioural issues unless it is indispensable.

The quote below from an evaluation group interview with children in case study one reflects the critical importance of personal relationships from the perspective of children as well.

<table>
<thead>
<tr>
<th>Case study one, a group interview with children</th>
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<tr>
<td><strong>Pl to children:</strong> “if we were to do this all over again, what are the characteristics of the people researchers or teachers that you would want to work with?”</td>
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<tr>
<td><em>(Child participant 7):</em> “it should be someone who is happy not only here to teach us, but to also play with us like we played football with you when you organised the football training for us”.</td>
</tr>
<tr>
<td><em>(Child participant 2):</em> “Like you and like (school teacher name) at our school. Because you (plural form) really care about us.”</td>
</tr>
</tbody>
</table>

Similar evidence in the data showed the importance of the personal relationship with the adult participants as well. Without the personal relationship with the children and adult participants, the stakeholders’ involvement in the design process activities would have been affected, which would have affected the relevance of the results and the resulted system designs. The data showed that personal relationships also require some other aspects alongside such as respect, empathy, and care.

<table>
<thead>
<tr>
<th>Case study one, interview with a child protection officer</th>
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</thead>
<tbody>
<tr>
<td>“They (the displaced community) trusted you because you respected them. They respected you as well. I can see it in the way they interact with you. Maybe it is easier for you because you speak the same language and from the same culture.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Case study one, informal discussion with a parent regarding children’s activities</th>
</tr>
</thead>
</table>

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“I like how the consent forms ask for child signature in addition to the adult. Even though the child may not know what a signature is, but this makes them feel valued and respected. I also liked the sticker of “inventor” that you gave them to wear.”

The previous examples showed the importance of personal relationships, care, and respect in achieving trust. Moreover, the data showed examples that social and political bias could significantly affect trust in such a sensitive context. The contextual complexity theme showed how the displacement environment involves diverse cultures, religions, and political opinions, which can all be related to the conflict that caused the displacement.

For example, one volunteer arrived at the camp in case study one. This volunteer faced some difficulties with the refugee residents because he discussed political matters with them regarding the war in their country. The camp residents complaint to the NGO that the volunteer belongs to, and they had his volunteering contract terminated immediately. The data highlighted in many cases that the NGOs in case study one stressed the importance of respecting the vulnerability and the sensitivity of the displaced residents. In such an environment that lacks the basic resources, many things tend to be unordinary from people’s clothing to some other lifestyle choices that may look strange to outsiders. Thus, NGOs repeatedly advised the volunteers and visitors to never comment on sensitive topics relating to the culture, politics, religion, refugees’ origin country, clothing, habits, lifestyle, or the reasons and methods the displaced communities used to flee to safety. A log of sensitive socio-cultural and political topics was kept as part of the field notes. This log was essential to planning relevant design process activities and also to assess the suitability of the resulted system to ensure the relevance of the activity and the system to the stakeholders’ context.

Another example of the importance of social bias is in the quote below.

<table>
<thead>
<tr>
<th>Case study one, refugee parent and community leader:</th>
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</thead>
<tbody>
<tr>
<td>“I wouldn’t have participated in the project if I felt that the project is biased or had a hidden agenda for whatever reason. But when you spoke to us in the first meeting and told us everything, I happily signed the consent forms and convinced other families to do the same. Also, me and other parents were always checking with our children that your activities are suitable and similar to what you promised.”</td>
</tr>
</tbody>
</table>

As seen from the examples above, acknowledging social bias is critical to achieving and maintaining trust. Furthermore, it shows the link between trust and involvement as it highlighted that participants
(parents) might not want to be involved or to involve their children in activities or with people with social bias. It also showed the importance of acknowledging social and political bias in the design process activities and the resulted system designs.

Another aspect of trust is support. Several pieces of data showed a link between support and trust. Displaced community members expressed that they have a better trust relationship with NGOs that are working on projects that are supporting them.

<table>
<thead>
<tr>
<th>Case study one, stage 2</th>
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</table>
| **Male resident to PI:** “the organization (name) are the only trusted ones, their projects were really supportive. Other organisations are just useless and they waste their funds on useless stuff”.

Furthermore, NGOs are already overwhelmed in providing essential services in a complex context. Thus they would not trust or want to collaborate with the designers unless the planned intervention supports them. For example, early communications with the NGO engaged in case study one included the following quote:

<table>
<thead>
<tr>
<th>case study one, planning stage, skype meeting with the volunteer coordinator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Volunteer coordinator:</strong> “I will be honest with you, we are extremely busy here, and we have limited resources. We get contacted by many researchers and we do not normally accept researchers. However, I am happy for us to collaborate with you in this project as I believe it will really support both us as an organisation and the children here.”</td>
</tr>
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</table>

Additionally, a discussion with one of the parents’ interviews during the design process evaluation, the next quote was highlighted.

<table>
<thead>
<tr>
<th>Case study 1, focus group with displaced female parents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Parent 1:</strong> “The reason why I trusted your project and allowed my children to participate in your activities is because I felt that what you are doing is helping them.”</td>
</tr>
</tbody>
</table>
Three out of four teachers at the formal Greek schools in case study two stated that they would not have discussed the details of their work with children or participated in the research if they did not feel that it would support them. Furthermore, they stated that the stage of servicing conducted at the schools (translation, workshops, consultation) made them trust me and the project I am working on. This trust was the key to convincing them to participate in the research voluntarily. Their participation entailed discussing sensitive topics regarding their work, attending research meetings and activities outside their regular working hours, and allowing me to attend their classes for observation and assessment and work with the school children.

### Case study two, stage 2, School Teacher 2 interview

*Teacher to PI:* “I feel that I can talk to you without you judging me because you have been with us for the past 2 weeks. You know how hard it is what we are doing, and you were helping us. If someone else comes just from nowhere and asks me questions, I won’t be able to talk freely. I need to know who they are and what they want, especially if they want to work with children. We already face lots of challenges here, and we don’t have time for more complicated stuff”.

The final aspect of the trust theme is fulfilled promises. During the research NGO staff and volunteers specified it was important not to give promises that could not be met, especially when working with the refugee community, as this will affect establishing a trusting relationship with them and with other groups of stakeholders.

### Case study one, interview with the Education Coordinator

*PI: What advice can you provide in regard to the implementation of the research?*

*Education coordinator:* “What are you going to tell parents about the outcome of your project?; Make sure that you don’t promise them something that might not happen as they may easily stop collaborating with you.”

The example above shows that unfulfilled promises which would affect trust do also affect involvement as it shows highlights that participants would stop their involvement in activities that they do not trust.

This section discussed the theme of trust. Several examples from the data showed the critical importance of trust for the design process success with adult and children participants and in the
resulting systems or educational interventions. Trust is essential to gain access and to ensure participants fruitful involvement. Moreover, this section discussed several aspects that are linked to how trust can be achieved. Such aspects may require an understanding of the stakeholders’ culture, needs, and challenges, which is challenging in such a complex and diverse context.

It should be noted that trust is both an input and an output of the CRIT design method. This is because trust is needed for a better understanding of the contextual complexities. Once this understanding is achieved, the design process activities and the resulting systems will be more relevant and would result in better trust and involvement.

The next section will discuss the theme of involvement, which will discuss the importance of involvement, which stakeholders groups to involve and should they be involved, in addition to the facilitators and indicators of successful involvement.

6.6 Involvement

6.6.1 introduction

Involvement was a central theme in the collected data as it is a key theme to understanding and resolving the challenges identified in the contextual complexity theme. Involvement is both an input and output in the CRIT design method. Involvement (Figure 6-1) is implemented in the form of engaging the different stakeholders in the design process activities and decision making, and in the form of designers’ engagement in the context in which they are operating, with implementing the facilitators of successful involvement. This allows for a better understanding and resolution of the different contextual complexities. A better understanding would then result in more relevant design process activities and system designs. Once this relevance is achieved, then involvement -as an output- is increased in the shape of indicators of successful involvement.
Involvement theme has four sub-themes; all of the sub-themes are also linked to trust, which has a symmetrical relationship with involvement. The first sub-theme is “Stakeholders’ involvement” which explains the importance of involving identified stakeholders groups in the context of displacement by explaining the expected contribution each group can provide in the design process. The second sub-theme is “Designers/researchers’ involvement in the stakeholders’ context”. This sub-theme clarifies why researchers and designers should be involved in the stakeholders’ context and how they should be involved. The two previous sub-themes aimed to explain why involvement is significant, and who should be involved and why. The third sub-theme is “Facilitators of successful involvement”, this sub-theme discusses how to involve the different stakeholders. It lists a set of facilitators which enable better involvement in the design process activities and the resulting systems. Finally, the fourth sub-theme is “Indicators of successful involvement”. This sub-theme lists the indicators of successful involvement which were reported by the stakeholders in both case studies. These indicators are the result of implementing the first three sub-themes.

The next sections will unpack the four sub-themes and explain their codes with examples from the data.

6.6.2 Stakeholders’ involvement sub-theme

This theme will explain why it is essential to involve the stakeholders in the design process activities and will provide examples of the contribution that each stakeholder group provided in the case studies. It will also discuss the link between involvement and trust.
The importance of stakeholders’ involvement was present in all design process stages in both case studies. The stakeholders’ groups identified in the case studies were the displaced community, the NGOs staff, teachers and educational volunteers, and the displaced children. The inputs provided by each of these stakeholders groups were analysed to understand the forms of contribution each group provides in such context. Such an understanding would help designers in displacement context to know what contribution to expect from each group of stakeholders.

From the early stages of planning case study one, the NGO staff have stressed that we should involve the displaced community in as much as possible. The educational coordinator stated that the previous successful intervention and projects at the camp all emphasised the involvement of the community. One reason for this is that involving the displaced community helps to understand their needs from their own perspective and would result in projects that are more relevant to these needs.
### Case study one, interview with the education coordinator

“I like that you have a participatory approach in your research. When you come here to the camp, you will see nothing can be done without the participation of the community. It will be easier for you though since you are Syrian.”

“When we implemented previous educational interventions. Having people from the community being involved meant that we could always get their feedback because they were also talking to the people inside the camp, so we did not need to look for them. They would just come to us and say, “Oh. People think that they do not want to learn Arabic; they want just to do English.” This would make our programs more suitable for their needs. Sometimes they would also help us more and volunteer with us as they feel they are part of the project”.

An additional point was stated by the child protection officer and education coordinator in case study one. They stated that one of the challenges they faced regularly was the lack of respect from the displaced community for some of the projects at the camp. For example, they were taking chairs from the field school to use at their caravans, not supporting the NGOs staff and carelessness towards some projects and resources. This was because of the lack of trust, lack of resources, psychosocial difficulties, and relationship difficulties. It was stressed that from their experience, involving the community empowers them and create a sense of shared ownership and trust which makes the community members show respect and care in the resulted interventions.

The relationship between involvement, trust, and motivation was evident also from the data. For example, in the displaced parents focus groups case study one, parents repeatedly expressed their gratitude for involving them and asking for their opinions during the design process. As a result, they volunteered to take the project leaflets and distribute them to other families in the camp and to also explain to other families the importance of the project. This was essential to obtaining consent from the parents to invite their children to the design process activities. This shows that involvement can be linked to motivation as participants motivation was increased when they felt empowered and had a say in their future.
Case study one, stage 3.1, Focus group with male participants

_Displaced parent 5_ “you did well by talking to us first. Some other parents would be very interested, but for some others, it might be easier if it comes from us rather than you. If you want, give me some of these leaflets, and I can distribute them to some other parents tomorrow after the prayer time when they will be in the same place.”

_Displaced parent 1_ “give me some as well, by tomorrow I will have done the same with four families I know, all of whom have lots of children.”

Another critical piece of evidence on the importance of the involvement of displaced parents came from the child protection officer in case study one, who suggested that involving the parents is essential in educational projects as it increases the motivation of the children towards education. Hence the link between the parents’ involvement and children’s involvement in the figure above.

_Please do involve parents in whatever you do. Many people here forget about this. Children’s interest in anything is strongly linked to their parents. If their parents tell them that something is important and interesting, then children will also be interested. If the parents are not convinced, children will not be convinced. Also, this is important for a child’s psychology to see that his parents are involved and caring for what he is doing._

_Child protection officer, case study one_,

In summary, involving parents helped in managing the complexities of needs, psychosocial challenges, and culture. Furthermore, it has a direct link to the trust and motivation of displaced adults and children. The contribution of the displaced parents and community members in both case studies was in setting the educational goals and needs of their children, explaining the challenges faced by their children, and in expressing their opinions around what was working or not for their children.

In addition to involving displaced parents, research participants from all stakeholder groups in both case studies stated that involving children in the research is paramount. In case study one, parents and NGO staff suggested that involving children empowers them and helps to obtain their input on topics that adults may not be able to describe. Children’s contribution to the design process activities was invaluable. They provided thorough input regarding what and why they want to learn, how they
want the learning process to happen, what engages them and what disengages them. Furthermore, they provided constructive details regarding the interaction and usability of the system and the educational content. Children designs were the core of the system design in case study one. Similarly, in case study two, the teachers decided to ground their designs to children’s designs because they saw the value of children’s contribution. All the teachers in case study two stated that they welcomed involving children -and even requested it- because they wanted to know the opinions of their pupils. Children contribution covered the problem and requirement analysis, the system design, the evaluation, in addition to a general understanding of the context. Illiterate children contributed with designs that were based on visuals without text since they could not read the text. Even literate children asked for visuals and multimedia as they assist them in understanding the educational materials, especially with the presence of the language barrier between them and the teachers.

In conclusion, the data suggested that involving children is essential, and the nature of their contribution was essential in understanding the problem definition, the system requirement, and the nature of engagement. This ensured that the designs were relevant to their diverse needs, ages, languages, cultures, diverse experiences. Furthermore, the children’s activities contributed to the relationship building with them, which increased trust and also helped to overcome the psychosocial and behavioural challenges of the displaced children that were affecting some of the design activities.

Involving teachers is essential to set up the educational goals and that the resulted designs are applicable and usable from the perspective of the teachers since they are system end-users. The data from teachers’ interviews and design process activities showed a focus on the educational challenges that they face, which were different from the challenges faced by children. Additionally, teachers had an essential contribution to identifying educational goals and long-term learning plans. Children contributed to understanding their usability of the educational systems; similarly, teachers also had special usability needs that fit their technical knowledge, the available resources, and their classroom setting. All of these aspects are essential in tackling the complexities of experience, needs, age, and resources. Tackling these complexities results in a better understanding of the complexities and increased relevance of the resulted systems and design process activities to suit the needs and capabilities of the teachers, which results in increased involvement.

Previous paragraphs discussed that parents and children would contribute to the educational needs, what engages or disengage them, and how should learning happen to suit the particular needs and capabilities of the children. Involving the NGOs staff was necessary for various reasons. First of all, NGOs staff are the gatekeepers for the camp. Thus, accessing the camp must go through them and would require full transparency in the project goals and plan. Furthermore, NGOs staff have thorough
experience regarding the displaced community, how to interact with them, and what to do or avoid. All of this is essential to maintain understanding and trust-building with the displaced community.

In terms of system design, the data from NGOs staff activities showed that they could contribute immensely in identifying and designing the contextual and logistical aspects of the system. NGOs staff have experience from conducting multiple projects with the displaced community as this is the core of their work. The analysis of their discussions in the different design process activities showed that their primary focus was towards ensuring the applicability and sustainability of the designs in the context of displacement, especially with the complexity of continuous change. The data collected from NGOs staff activities contributed to understanding the resources and how they can be leveraged to create applicable sustainable systems that implement the requirements that were set up by the parents and children.

In summary, involving the NGOs staff helped in understanding the contextual dynamics of the community to prepare for the ethnography activities, was essential to gain access to the camp, and ensured that the designed solutions were applicable and sustainable by matching them to the available resources. All of this links directly to overcoming the contextual complexity challenges of resources diversity, culture, needs, and continuous changes. All of this resulted in a better relevance of the designed systems.

Involving decision-makers was also discussed as an essential factor in both case studies. In case study one, the NGOs staff were reluctant in running the digital self-learning space activities in the afternoon time before 2:00 pm. This is because the MoE had instructed them not to run any children’s activities during formal school time to avoid confusing children and encouraging them to miss school. This issue was peculiar as there was a large group of children at the camp whose schooling integration program had not yet started and was unlikely to start any time soon. However, the NGOs staff were unhappy to run the digital learning space just to avoid any risk of disobeying the strict rules from the MoE. Thus, the MoE representatives were included in one of the design workshops where this problem was presented to them, explaining the whole project aims. As a result of this involvement, the MoE representatives agreed to provide a written exception which allowed us to run the digital self-learning space in the morning time for the students who do not have a schooling program to attend.

Similarly, in case study two, involving the decision-makers from the MoE allowed for communications with them to mediate the needs and challenges of the displaced community, which resulted in resolving the needs conflicts and agreeing on some changes in the educational plans of the formal schools. Thus, the data presented from both case studies suggest that involving policy makers support the requirement analysis, contextual applicability, and sustainability of the systems.
This sub-theme discussed the importance of involving different groups of stakeholders from the context of displacement in the design process activities. Furthermore, it explained the nature of the contribution from each of the stakeholders’ groups and how it assists in overcoming the contextual complexities and result in more relevant design process activities and system designs. Finally, it also explained how stakeholders’ involvement has a direct link to trust-building and motivation.

6.6.3 Designers/researchers’ Involvement in the stakeholders’ context

The previous sub-theme explored the data regarding stakeholders’ involvement in the design process. This sub-theme will explore the data regarding the importance of researchers/designers’ involvement in the context of the stakeholders for whom the system is created.

Active participation means the involvement in the context not as an outsider but as a person observing and experiencing the challenges and lifestyle as the stakeholders. In both case studies, active participation was used as an ethnographic method. In the study, active participation was conducted through servicing in the daily tasks and life of the stakeholders. This allowed the gain of an in-depth understanding of the context, the challenges, the needs, and to plan the future stages of the design process. Involving stakeholders through interviews, focus groups, and workshops is helpful, but it could not cover all the required understanding of the different complexities. An essential portion of the collected data originated from active involvement in the displacement context and could not have
been expressed by the stakeholders. Both case studies showed that not all stakeholders’ needs are expressed during the design process activities.

Active participation in the volunteering work resulted in a greater understanding of the challenges they faced and made me able to suggest better ways to conduct the design process activities with them in a more suitable way for their lifestyle. Similarly, active participation through translation and other ethnography servicing activities gave me a better understanding of the multiple complexities, which made me plan design process activities that are suitable and inclusive for the diverse displaced community. Similarly, in case study two, classroom observation was a key to understanding the behavioural difficulties, the use of technology in classrooms led to better problem and requirement analysis.

Furthermore, active participation had a direct effect on building trust and relationships because it is directly related to helping others. Many instances in the coded data showed that active participation in the lifestyle of the stakeholders resulted in being seen as a helpful subject which allowed the designer to gain trust and further access. Because of this involvement, the different groups of stakeholders saw the designer not as an outsider but as a person who is living their experiences and facing their challenges, which was an essential factor in trust and relationship building.

Three teachers in case study two expressed that they joined the research as participants only because the designer’s previous active participation in their context showed them that the designer is there to help and not to judge.

<table>
<thead>
<tr>
<th>Case study two, School Teacher 2 interview</th>
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</table>
| Teacher to PI: “I feel that I can talk to you without you judging me because you have been with us for the past two weeks. You know how hard it is what we are doing, and you were helping us. If someone else comes just from nowhere and asks me questions, I won’t be able to talk freely. I need to know who they are and what they want, especially if they want to work with children. We already face lots of challenges here, and we don’t have time for more complicated stuff”.

In addition to active participation, the field notes from the different stages in both case studies highlighted and confirmed the importance of having a “prior understanding” of the context, the conflict, the place, and the stakeholders ahead of the face-to-face interactions. The previous themes and sections explained how diverse and complex the context of displacement is. Furthermore, the Trust theme showed how important it is to form personal relationships based on respect and empathy while avoiding any form of social or political bias. These relationships are challenging to achieve with
such diverse and complex stakeholders without a systematic prior understanding of their background, challenges, fears, and needs.

This section showed the importance of the researchers and designers’ involvement in the stakeholders’ context. Such involvement should start with a contextual understanding ahead of the face to face interactions due to the complex and sensitive context of displacement. Furthermore, involvement is enriched by active participation in the stakeholders’ context. This form of involvement will result in a better understanding of the complexity and requirement has a direct link to trust and relationship building. Thus, it would contribute to more relevant designs that would be more applicable to the context and will lead to better involvement.

6.6.4 Facilitators of successful involvement

As it was discussed in the previous themes, the displacement context is very complex, full of uncertainty and severe lifestyle conditions. An overwhelming part of the data showed that such conditions massively affect peoples’ motivation to do almost anything. The previous sub-themes of stakeholders involvement theme discussed the importance of stakeholders involvement, whom to involve and why they should be involved, in addition to explaining the importance of researchers/designers’ involvement in the stakeholders’ context. This theme will discuss how to involve the stakeholders successfully following some aspects that enable better motivation and engagement by the different stakeholders. This will be done by listing examples from the data on the aspects that motivated and engaged the participants in the design process activities. Besides, it contributes to understanding what motivate the stakeholders to attend and use the systems after they are implemented. Most of the data examples reported in this sub-theme came from the post-it notes activities conducted with children in both case studies, in addition to the evaluation questions at the end of each design process activity with all different stakeholders groups.
As shown in the figure above, trust is an essential facilitator of successful involvement. Stakeholders in various communications expressed that they are participating in the design process activity because they trusted me as a researcher and trusted the goals of the research. The aspects of trust were already discussed in the trust theme but were revisited here to explain the link between the trust theme and the facilitators of successful involvement.

**Case study one, stage 5, communications with displaced parents regarding the digital self-learning space**

*Displaced parent to PI*: “no need to thank me for my help. You know that I wouldn’t have spent time with you on this unless I felt it was good for us and, most importantly for the children. (volunteer name) asks me always to help her in the classes outreach, but I don’t do it because who cares to go to a class at 11:00 am”.

*Displaced parent to PI*: “you are from Syria, you know what we have gone through, you are clearly helping, and thus I have no problem with you at all, and I am always happy to help.”.
As discussed earlier in the stakeholders’ involvement sub-theme (section 6.6.2), it was highlighted by NGO staff that it is essential to give the displaced community the chance to share control over the design process activities and the resulted system designs. This control gives the displaced community a sense of ownership which contributes to increased trust and participation. When the parents were involved as co-decision makers, they regularly expressed their gratitude for this involvement in the evaluation activities. Parents were motivated to volunteer and support the project by distributing leaflets and convincing other parents to join and send their children to participate in the design activities (as discussed in the trust theme). Also, children expressed numerous times during the design process activities and evaluation that they appreciated being given control over what they designed.

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<tr>
<th>Case study one, stage 5, evaluation conversations with various adult and child participants</th>
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<tbody>
<tr>
<td><strong>Adult displaced parent to PI:</strong> “thank you guys for making my friend and me here (pointing at another parent) part of this. It was fun and also good to see things in our own eyes. And whenever you or (another NGO volunteer) need help with the naughty kids, give me a shout, and I will help (while smiling)”</td>
</tr>
<tr>
<td><strong>Two displaced sibling children to PI:</strong> “this is my design, haha….I did this, tell him”</td>
</tr>
<tr>
<td><strong>Displaced child to PI:</strong> “so.. if I draw a nice idea that is doable, would you do it?”</td>
</tr>
<tr>
<td><strong>PI:</strong> “sure, I will try my best to do it or find something similar.”</td>
</tr>
<tr>
<td><strong>Displaced child:</strong> “oh my god, great!!”</td>
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</table>

The resulted system designs in case study one emphasised the aspects of autonomy in learning, where most designs illustrated self-learning systems. The reason for this was that children wanted to have control over their learning pace and content in addition to the absence of teachers and the lack of parents educational experience. Which also showed the importance of control and choice in both the design activities and the resulting systems.

In addition to control, interest was discussed in both case studies as a key concept that makes the stakeholders want to get involved in something. When parents, children, teachers, and NGOs staff were asked why they participated in a design process activity, the vast majority reported that the project/activity was “interesting”. This interest can be linked to the different needs of the
stakeholders, and it shows the importance of understanding the different groups of stakeholders and what interests them.

Fun and challenge were also highlighted in almost all children’s activities. Children participants were asked in the activity evaluation phase what they liked in the activities. They often used the word “fun” as one of the aspects they liked in the activity. Systems designed by the children all had aspects of fun and challenge. The fun was expressed in the form of gamified learning experiences, and the challenge was expressed in the form of designing tasks to test children’s knowledge and give them feedback. In addition to “challenge”, children gave examples of rewards to the correct answers to the challenges in the designed systems.

**Child participant, Co-design workshop case study one:** “I want to have multiple answers on the letters, the machine makes the sound of a letter, and I have to choose which letter is the one I heard. If I win, maybe you can make the system give me a prize”.

In the pilot sessions for the digital self-learning space in case study one, multiple applications were tested with children participants. It was evident that the children interacted positively with the applications that involved digital rewards such as a sticker or a star, a car, a rocket and others. According to children, digital rewards make learning a fun and positive experience.

Technology was used in the design activities with children (photography) both as a design activity tool. Children specifically expressed that they enjoyed the photography activity where they were telling their friends how amazing the activity was and showing their parents the pictures they took. Even though the photography activity was not substantially helpful in setting the requirements, but it was a fun and helpful activity to establish relationships and engage children into participating in later activities. Also, technology in the resulting systems supported the other aspects discussed earlier, such as control, challenge, and digital rewards.

In case study one, in the focus group with the volunteer teachers in the nearby refugee camp, the participants stated that from their experience, the most crucial aspect of education in displacement is a positive and loving atmosphere. The reason for this is that in this context, children are often stressed and suffering from multiple psychosocial difficulties. Thus, the key to involving them in the learning activity is through making them fun and positive. Two NGO volunteers gave similar input in case study one. The two volunteers were conducting art therapy activities with the children at the camp. They empathised that a positive and fun environment is essential in planning any activities with the
displaced children for ethical and psychological reasons and in order to gain their involvement. Positivity was also emphasised by the NGO staff, who organised art therapy sessions for the children. They stressed that children exhibit violence due to the displacement trauma and the severe conditions. The participants highlighted the need for the educational message and activities to have a positive message and not anything that can encourage violent behaviour. The participants stated that this is essential for supporting children’s mental wellbeing and resilience.

In addition to the previous points, children in case study one and two emphasised the importance of activities being suitable to their level of knowledge and experience. When children were asked in the post-it notes activities on what engages or disengages them the most in learning. They highlighted the area of learning activities where the content is either too hard or too easy for their knowledge level. This is particularly challenging in the context of displacement, where children of various ages are placed together and where children age is not an indicator of academic knowledge. This point is essential when designing the educational technology system and educational content to be engaging. In case study one, children who were 9 or 11 years old who had missed school for a long period enjoyed and were engaged with educational applications that were initially designed for five-year-old children. This was because these children felt that the applications were giving them new knowledge.

Moreover, in case study one, during the contextual understanding stage, it became evident that the experiences of the available stakeholders were more diverse than the planned questions for the interviews. Thus, the questions had to be changed to be more relevant to the different expertise of the discovered stakeholder groups.

Interactivity was brought up in different data instances; children specifically stated that they enjoyed the design activities that had interactivity aspects. For example, in the post-it notes activities, children were encouraged to participate as they were given a chance to take a post-it note and go to the board to place stick it. This increased participation encouraged further topics to be discussed and more participation. Moreover, teachers interviews and classroom observation in case study two revealed that children’s behaviour and participation is significantly higher in the activities that involve continuous participation and interactivity. These observations were used later to inform the problem and requirement analysis and the design of the system in case study two.

Finally, a significant aspect of successful involvement was essential in almost all the different activities in both case studies. This aspect is “exchanging experiences”. The concept of exchanging experiences means fostering knowledge exchange amongst the different stakeholders’ groups and between the researchers/designers and the stakeholders. This PhD study included fostering the exchange of needs,
technical experience, fears, and challenges faced by the different groups. This exchange helped in tackling the challenges of needs diversity and conflicting needs, and the experience diversity.

For example, In both case studies, children and teachers had little experience in technology equipment, their possibilities, and how they operate due to the lack of previous exposure to technology. One of the teachers in case study two expressed disinterest in the research project in the beginning because she said that from her experience, technology is not helpful because she does not have the experience to use it.

**Case study two, stage 3, School Teacher 3 interview**

*Teacher to PI: “I really appreciate what you are doing and don’t be upset, but I do not believe that technology could help here. If pen and paper cannot help, technology would do much here”.*

*PI to teacher: “I totally get you, but have you tried something similar before?”.*

*Teacher to PI: “tried what... technology? Not really. Where and how can I try it? We can barely find a working printer. We never had much technological stuff to use. Some other schools have fancy smart boards, and I only have a laptop that I use for my personal stuff only”.*

In case study one, in the focus group with the teachers from the nearby camp, there was a discussion regarding technology where the opinions were split between people who were for the use of technology in refugee camps and others who opposed it. The opposing participants explained that their opposition is based on their lack of knowledge in ways where technology can support their work which is strongly linked to the lack of experience complexity which was discussed earlier. Without resolving this complexity, children and teachers may not be able to provide useful design ideas. In order to resolve this issue, a stage of exchanging experiences was added to the design activities. We explored different technology equipment and discussed how they could be used and for what purpose. For the children participants, stickers of the equipment were also made available to support children who could not draw. This allowed the designs to be effective, applicable, based on knowledge, and relevant to the context. With the teachers, exchanging experience was done in the form of training and technical support, which resolved many of their technical experience problems, including the teacher who had concerns regarding technology in the beginning.

When children and teachers were asked for their feedback at the end of the design activities, both stakeholders groups emphasised that the stage of the exchanging experience provided them with the
knowledge that would help them on a personal level regardless of the design process itself. Thus, exchanging experiences managed to assist the participant in designing better systems and also was relevant to their need for technical knowledge. As a result, both groups happily participated in the design activities, which is considered better involvement in the design process activities.

Another reason why exchanging experiences is essential is its ability to contribute to resolving the complexity of diverse needs. In case study two, it was discussed that there was a conflict between the educational needs provided by the refugee community and the ones provided by the Ministry of Education. The Greek entities wanted to teach Greek, and the refugee community wanted to learn in English and other foreign languages primarily. Furthermore, some of the Greek children parents objected to the schooling integration program to the Greek schools. Exchanging experiences activities were used to overcome both of these conflicts.

This was by designing a presentation that explains the background of the emergency that caused the children and their families to flee their country and why they are joining the Greek schools. The presentation was presented by the MoE representatives and school principals to the Greek families and children to foster empathy towards the displaced refugee children. The result of these activities was that the Greek students decided to start an initiation for friendship towards the refugee children at school. When the displaced children started making friendships with the Greek children, they started expressing willingness to learn Greek as they wanted to communicate with their new Greek friends. Similar methods of exchanging experiences were used to make the school principals and Ministry of Education representatives understand the needs of the displaced community in learning foreign languages of English, French, and German as many of the families were waiting to be relocated to one of these countries and will not remain in Greece. As a result, the schools accepted, including the displaced children in foreign language classes. Several instances in the data highlighted that different stakeholders developed an understanding of the needs and challenges of the other stakeholders and resulted in agreeing on educational goals that are suitable for all groups. The above example from the data shows how exchanging experiences was used and suggested by different participants to foster empathy and overcome the complexities of stakeholders needs diversity. Without reaching a consensus on the needs between the different stakeholders, the educational intervention would not have been successful as it would have been irrelevant to the needs and would not result in successful involvement.

This sub-theme explored multiple aspects that facilitate the successful involvement of the different stakeholders that lead to better involvement in the design process activities, which would lead to
better relevance of the designed systems and result in a successful involvement. The next sub-theme will discuss the indicators of successful involvement as expressed by the different stakeholder groups.

6.6.5 Indicators of successful involvement

This sub-theme will discuss the aspects that the stakeholders expressed that would constitute a successful involvement from their perspective. The codes in this sub-theme resulted from asking the different stakeholders about what would make the activities and the resulted systems successful from their point of view.

![Diagram of Involvement, Trust, and Indicators of successful involvement]

Figure 6-10 The sub-theme of indicators of successful involvement

In various design process activities in both case studies, the participants were asked about what makes an activity or an intervention successful. The question focused on both the design activities and the resulting systems. Similarly, when designing the systems in both case studies, The stakeholders were asked to name the aspects by which we can assess the resulted system when it is implemented.

All stakeholders agreed that successful involvement could be measured and judged first by the participation and attendance of the stakeholders. In other words, if the stakeholders participate in an activity, this makes it successful. Furthermore, progress and improvement were mentioned as additional aspects that would indicate a successful involvement. This aspect was specifically stressed by displaced parents, displaced children, and teachers. Progress means that the resulting system is
supporting children’s learning progress, and improvement means that other stakeholders -such as the teachers- are experiencing improvements in the identified challenges that they were facing. All the participant groups reported that fun is important in learning and the designed systems but that it must not be the only focus. However, progress and sustainability should be the main focus. This is why fun was discussed as a facilitator of successful involvement but not as an indicator. Finally, sustainability was stressed as another measure to evaluate successful involvement. Sustainability was reported mainly by the NGOs staff and the parents; it was defined as the continuity of progress and attendance and.

6.7 Design process activities evaluation

The previous sections covered all the different themes and sub-themes that constitute the CRIT design method. Many of the examples from the previous section will be reviewed in the discussion chapter to discuss the evaluation of the design process. This section will cover additional findings that contribute to the evaluation of the design process. The data discussed in this section originates from the interviews that were conducted at the end of different process stages in addition to the field notes, which evaluated the design process activities.

6.7.1 Design process stages

The analysis of the field notes and the nature of the data and input captured in the different process stages showed that process stages often provide input that supports other design process stages. For example, the co-design workshops, which are in the co-design process stage, and the usability testing, which was in the implementation and evaluation stage, involved data that assisted in a better understanding of the problem and requirement analysis, which is another process stage that was implemented ahead of these two stages.

Similarly, the contextual understanding and trust-building stages which are the first two stages in the design process, were extended to all the other stages that were implemented afterwards. This was because other stages activities such as co-design workshops or problem and requirement analysis activities also contributed to the contextual understanding and trust relationships. This was particularly relevant to the displacement context, which involves a continuous change in the stakeholders and resources in addition to the other complexities. This shows the intersection and overlap between the different design process stages when implemented in the case of displacement and will be discussed further in the discussion chapter.
6.7.2 Stakeholders feedback

This section introduces evidence of the general satisfaction of the different stakeholder groups from both case studies.

At the end of case study one, and an interview was conducted with the general manager of the camp (also child protection officer) to discuss and evaluate the design process and how it was conducted. Her reply was very positive as she explained that she believes that the project implementation was very successful and should be replicated in other similar contexts. The reason why this particular feedback is important is that this participant is a senior manager at one of the biggest organisations to handle emergencies and displacements and has 17 years of experience in working in refugee camps with different stakeholders, including children.

**Case study one, child protection officer:**

“I am very happy with how everything went here. The relationship and attitude between you and the residents, the respect, even the children who are very challenging...and this (the digital learning space), I can see how children are super happy and chasing each other to get in... We needed this long time ago.”

“I think it is an excellent project. You started from the basics, you took the right angle, and step by step.”

“I believe we should report and present this project to other organisations dealing with emergencies, it is the same context, it and then go and present it to my colleagues at IOM (International organisation for Migration) so they can replicate it in every intervention in all the other camps.”

Similarly, the manager of the IAY NGO with whom the collaboration in both case studies was initiated provided similar positive feedback from the context of completing a circle of providing back to the community.

**Case study one, IAY NGO manager:**

“I am very thankful for all the work that has been done here over the past months. The work was done in a careful and considerate manner that aligned with our strict code of conduct. You started from the bottom with the community, and everything was very inclusive to the smallest detail. And the bonus was that you completed the
In addition to the above, there were multiple similar quotes from the different parents, children, and community leaders who gave positive feedback at the end of the different activities. Many of these examples were already discussed in the trust theme earlier. The communication with several families remained for months after the end of the case study. Many families kept in contact with the researcher sending their updates to when they left the camp to another country.

Finally, in case study two, the teachers voluntarily sent supportive emails expressing their appreciation at the end of the case study. They also organised activities with the children where each classroom designed a joint “thank you card” with the names of the children and teachers on the cards. The cards were delivered to the researcher by the children after the end of the school day on the last day at the camp for the researcher.

6.7.3 The designed systems

Another aspect of the process evaluation is the resulting systems from both case studies. Both case studies ended with systems that were useful, usable, and relevant to the needs of the stakeholders. This was according to the interviews with children, parents, NGOs staff, and teachers in both case studies.

The system from case study one (digital self-learning space) is still ongoing at Ritsona refugee camp with the funding of a British NGO that is funding the equipment, content, and human resources, which is another sign of the success of the process in case study one. Children’s feedback was captured from regular group interviews at the end of each digital self-learning space session. And the input from the NGOs staff and parents was captured through several interviews, examples from which were provided in different sections of this chapter. During the case study, children’s participation was high where out of 54 sessions at the digital self-learning space, 51 sessions had full attendance where the other three sessions had a maximum of two free spaces each. Even when the space was run by the NGO later, they reported regular high attendance to the lessons at the space.

For case study two, the system implementation was limited due to the research time limits and other logistical limitations. However, feedback was captured from teachers in a group interview at the end of the second case study in addition to the emails communications after I had to leave Greece due to
the travel length limitations on my refugee travel documents. They expressed that the designed system was indeed relevant to their needs and improved their abilities to engage and teach the children with significant behavioural improvements.

This section provided examples from the collected data that are essential to highlight as a part of the process evaluation. The full process evaluation will be discussed further in the discussion chapter, where the data analysis for the evaluation will be discussed in light of the literature review resulting in identifying the process stages, approach, and method.

6.8 Chapter conclusion

This chapter discussed the result of the data analysis of the collected data from both case studies. It started by introducing the different themes and how they are connected to constitute the CRIT design method. Afterwards, the contextual complexity theme was unpacked, explaining the different complexity in the displacement context, such as stakeholders diversity, resources, and continuous change complexities and how they affect the relevance of the design activities and resulted systems. Subsequently, the trust theme was explained and how trust is strongly linked to a better understanding of the different complexity and also a result of the increased understanding and relevance. Then, the involvement theme was discussed, showing the importance of stakeholders’ involvement with identifying whom to involve and why they should be involved, in addition to the importance of designers’ involvement in stakeholders context, and the implementation of the facilitators of successful involvement. Then it explained how all of the above leads to a better understanding of the complex context, and to an increased relevance that is illustrated in a list of signs of successful involvement. Finally, a section on the data examples regarding the design process evaluation presented evaluation feedback based on the participants’ input, field notes, and evaluation of the resulted systems.

The next chapter is the discussion chapter. It will discuss the data analysis findings in the light of the literature review, providing the revised design process, and summarising the answers for the research questions with highlighting the research originality.
7 DISCUSSION

7.1 Introduction

This chapter will discuss the data analysis findings in light of the literature review. It will start with a section introducing an overarching relationship between the findings and motivation represented in the self-determination theory (see section 7.2). This relationship with motivation will inform the later sections that will link back to these concepts regularly. The following three sections each aims to discuss the findings to answer one of the research questions with the links to the CRIT method, motivation, literature review, and the design process. Section (7.3) will discuss the first research question regarding the challenges that affect the design process of educational systems for war-affected displaced children. Section (7.4) will discuss the second research question regarding the processes and methods. Section (7.5) will discuss the third research question by exploring the possibilities for technology systems to be harnessed for the context of education in displacement.

This will be followed by section (7.6) that will summarise the discussion chapter and answer the main research question.

*Table 7-1 Research questions mapped with the discussion chapter sections*

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Section number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main research question: What is an effective design process for the design of educational technology systems for displaced war-affected children?</td>
<td>7.6</td>
</tr>
<tr>
<td>RQ1: “What challenges may affect the design process of educational technology systems in a displaced war-affected children context?”</td>
<td>7.3</td>
</tr>
<tr>
<td>RQ2: “What design process stages, approach, and method should be followed to overcome the identified challenges?”</td>
<td>7.4</td>
</tr>
<tr>
<td>RQ3: “What are the lessons learned from implementing the proposed design process regarding the requirements of educational technology systems to support the learning of displaced children?”</td>
<td>7.5</td>
</tr>
</tbody>
</table>
7.2 The findings and the overarching link to motivation through self-determination theory

The findings in (section 6.4.2 Psychosocial difficulties) and the case studies chapter (4.1) highlighted that both case studies involved examples of how all the different participant groups suffered from severe motivational difficulties due to the complex nature of displacement context. Various contextual complexities were identified, which all have a direct link to affecting people’s motivation. The findings from this PhD study suggest that motivation is a central aspect that is linked to all the different themes and the CRIT method.

As discussed in the literature review (section 2.3.4), self-determination theory (SDT) suggests that motivation can be increased and internalised by supporting the three psychological needs of autonomy, competence, and relatedness (Ryan & Deci, 2000; Ryan, 2020).

![Intrinsic & Extrinsic Motivation Continuum](image)

Figure 7-1 The self-determination continuum showing types of motivation with their regulatory styles, loci of causality, and corresponding processes (Ryan & Deci, 2000)

Figure 7-1 above illustrates the different types of motivation based on the self-determination theory. The table was introduced in the literature review in (2.2.3), but it is repeated here for easier access as some of the following sections will refer back to it. The SDT suggests that the movement from the state of no motivation to the state of internalised motivation can be achieved by supporting the needs for autonomy, competence, and relatedness (Ryan & Deci, 2000).
This section presented the link between the displacement context and motivation with a reminder of the SDT concepts and components. The following sections will answer the research questions linked to the findings and to motivation through self-determination theory (SDT). This will result in positioning motivation and SDT in the CRIT method.

All the mentions of the innate psychological needs of SDT in the coming sections will be based on Ryan & Deci (2000) and the online course on SDT by (R. Ryan, 2020), where the founders of the theory discuss its details with examples from various contexts.

7.3 RQ1: The challenges in designing in displacement

This section will answer the first research question, which is: “What challenges may affect the design process of educational technology systems in a displaced war-affected children context?”

To answer this research question, each of the following sections will discuss the findings regarding the identified challenges. The discussion for each challenge will include how it links to motivation and self-determination theory, the CRIT method, and the design process developed in this research.

The challenges will be discussed and linked to SDT, the component of the CRIT method (involvement, trust, contextual complexity, and relevance), and to the literature review. The CRTI method components will be later discussed in detail in section (7.4).

7.3.1 Lack of motivation for participation

The findings in section (6.4.2) highlighted how the psychological challenges were evident from both case studies resulting in outcomes such as the lack of motivation, behavioural difficulties, and violence. The findings from section (6.4.3) discussed the extreme lack of resources and how the displaced community were overwhelmed in managing their life and their essential needs. Both sections explained that lack of motivation was a significant challenge that was discussed by various participants.

The lack of motivation was linked to a lack of hope in the quotes from the different participant groups. The quotes expressed feelings that the complex context is too challenging and overwhelming, making projects and life goals very hard to achieve, resulting in decreased motivation. This can be linked to the need for competence in SDT which states that when people feel that they are unable to complete a task or an activity, their motivation towards it decreases. It can also be seen in Figure 7-1 above as lack of competence is placed on the far left column representing a state of demotivation.
The challenge of lack of motivation resulted in the community being reluctant to participate or show little interest, respect, and care in previous projects identified by the NGO staff interviews (section 6.6.2). The NGO staff emphasised the need to involve the displaced community in the decision making and planning of any activities or projects designed for them as an essential factor of intervention success. They stated that involvement adds an aspect of partnership with the community and gives them a sense of ownership. This aligns with Parnell et al. (2008) that highlighted that students developed a sense of ownership when they were involved as co-designers in the design process. However, Parnell et al. (2008) discussed this concept very broadly and in the context or architecture of a school in an ordinary context, not displacement nor in PD for educational technology systems. At the same time, this study discusses the aspect of ownership as a concept in the CRIT design method by linking it to theories of motivation because motivation is a core challenge in a displacement context. The aspect of ownership is linked to motivation through the need for autonomy in SDT, which states that one form of implementing autonomy is by fostering ownership with the people that we need to motivate (Deci, 1975; Deci & Ryan, 2017; Decl & Ryan, 2001; R. Ryan, 2020; R. M. Ryan & Deci, 2000).

Furthermore, section (6.6.2) also discussed how the participatory approach resulted in the parents increasing their motivation. They subsequently volunteered to distribute the research fliers and to convince other parents to participate with their children in the project. This confirms the link between involvement and autonomy, leading to increased and internalised motivation. The findings in section 6.6.4 discussed that interest is an essential facilitator of successful involvement. Different participant groups stated that they participated because they were interested in the activities and project goals as it aligns with their goals and needs. This relates to Figure 7-1 above, which links interest to intrinsic motivation. Thus, interest is included in the CRIT method as a component of the facilitators of successful involvement. This also links to the concept of relevance in the CRIT method, as the participants empathised the importance of project goals being relevant to their needs. Moreover, it confirms the importance of the contextual understanding stage in the design process and the need to understand peoples needs and challenges from the earliest stages of the process. This would ensure that the activities and research goals are relevant to the identified needs, which would result in increased interest, which would result in increased intrinsic motivation.

Furthermore, the findings showed multiple examples (section 6.5.2 and section 6.5) where participants expressed their appreciation for the respectful and equal involvement, which the participants described that made them feel valued respected in the research. The trust theme in the findings (section 6.5) also highlighted the importance of trust and personal relationships with the participants and its link to participation and involvement. The concepts of feeling valued, personal
relationship, trust, and the feeling of being significant are also mentioned by Ryan & Deci (2000) as characteristics of the need for relatedness in SDT (section 2.3.4).

This section presented evidence from the data to highlight the significance of the lack of motivation challenge and how it can affect participation in the design process activities. It discussed the findings showing the links between this challenge, the SDT needs of competence, autonomy, and relatedness, and the CRIT method and design process developed in this research. This section concludes that participants should feel that the project is relevant to their needs and challenges, which are identified in the contextual understanding stage of the design process, as this relates to concepts of interest and relevance in the CRIT method. Moreover, the participants should feel that the project goals are achievable as it links to the need for competence in SDT. The participants should be involved in the decision making and planning of both the design process activities and the system design. This would support the need for autonomy in SDT. Finally, the participants should have a trust-based and personal relationship with the designers and researchers. This relationship should be based on making participants feel valued and respected. The coming sections will discuss the other challenges faced in the design process implementation but will also discuss further aspects that are related to motivation.

7.3.2 Children’s behavioural difficulties

The findings illustrated that due to the displacement severe lifestyle and conditions, children developed challenging behavioural difficulties, which were reported by the NGOs, parents, teachers, and all the field experts that engaged with this PhD study (sections 6.4.1 and 6.4.2). Children were very hard to manage and showed many characteristics of behaviour difficulties such as violence, lack of focus and communication, discrimination, and anti-social behaviour (section 6.4.2). These difficulties affected organising the children design activities in case study one (section 6.4.2) and their educational activities at the formal schools in case study two (section 6.4.1.4).

The findings in section 6.5 discussed how organising different non-research playful activities for children ahead of the design activities helped in establishing personal relationships with the children, which substantially improved their behaviour in design activities. The findings in section 6.5 discussed the importance of personal relationships and included quotes from the children explaining that they want the researchers and designers in such projects to be more than just outsiders who are there to work on a specific task in a project. They expressed that they wanted someone who cares, empathises, and plays football and other activities in a friendship based relationship. The behaviour improvements and the children’s emphasis on personal relationships and friendship relates directly to the need for relatedness in SDT that states that people tend to get motivated and internalise the principles of the people to whom they are connected (section 2.3.4). Thus, the CRIT method emphasises trust and
personal relationships (section 6.5), and the design process developed in this PhD study highlights the importance of developing trust and personal relationships in a separate process ahead of the design activities.

The fun and positive atmosphere of the design activities were reported by children in the findings to encourage their participation section (6.6.4). An example of the positive and supportive atmosphere is when children participants were given stickers that give them the title of an “inventor” in the co-design workshops (section 6.3.6), involving technology as a tool for engagement such as the photography activities, and implementing interactive and fun methods in the data collection such as drawing and post-it notes (section case study one stage 3.2). Such aspects link to the need for competence in SDT which states that competence requires a positive atmosphere, support, and flexibility (section 2.3.4). The use of the “inventor” stickers can relate to the SDT needs of relatedness and competence, as it increases the feeling of self-value and adds a fun and supportive aspect to the design activities. The aspect of interactivity is linked to the facilitators of student engagement in the literature review (section 2.3.2).

The aspects mentioned above are discussed in the CRIT method as facilitators of successful involvement, such as fun, positivity, interactivity, and exchanging experiences. It also shows the importance of understanding what interests the different participants in a design process, especially children, as such understanding will assist in planning activities that are interesting and fun from their perspective. This is why the design process should focus on conceptualising what engages and disengages the different participants from the early stages of activities planning. Fun, flexibility, support, mutual learning, and positivity have been known as supportive components of co-design activities in the literature on participatory design PD with children (Druin, 2002; Fails et al., 2012; Scaife & Rogers, 1999; Walsh et al., 2013). However, this study linked these aspects to motivation through self-determination theory and showed that this link could result in increased participation and child behaviour.

Furthermore, involving children as design partners in the case studies was linked to the improvement of children behaviour and motivation. This is because the design partner role gave the children a high amount of control and choice in the design process. These aspects link to the need for autonomy for increased motivation, and also link to the literature from Jones et al. (2003) that reported that increased control could help in children’s behaviour, which this PhD study suggests is linked to internalised motivation and values through supporting autonomy in SDT. This discussion suggests that the child as a co-designer role from Druin (2002) is more suitable to use in a design process in a displacement context but what this literature misses is the importance of emphasising and developing
trust-based personal relationships between the designers and children ahead of the design activities. This aspect will be discussed in section 7.4.4 with more details.

### 7.3.3 Conflicting needs and diversity of power

Conflicting needs is one of the clear examples of how supporting autonomy, relatedness, and competence results in internalising the motivation from the external level to the intrinsic level. In regards to education in the displacement context, the findings in section 6.4.1.1 showed that educational interventions in displacement are more complex than ordinary cases. One reason for this is that there are multiple policymakers, decision-makers, and stakeholders whom all have to agree on the intervention goals and requirements. However, these different stakeholders may have diverse decision-making power.

For example, the findings in sections 6.4.1.1 (diversity of needs) and 6.6.4 (the discussion on experience exchange) discussed the story from case study two where the Greek Ministry of Education and the traditional schools had different educational goals than the ones requested by the displaced communities which resulted in many families threatening not to send their children to school. In this case, one group was a governmental body which is the Ministry of Education, with their governmental decision making power. The other group, on the other hand, was the displaced, vulnerable community with limited power. Furthermore, some Greek parents demonstrated at school doors against the inclusion of the displaced refugee children in their public schools.

The MoE and the Greek government tried telling the displaced parents that they must send their children to schools according to the Greek laws or face legal problems, and the police intervened to prevent the Greek families from demonstrating at the school doors. This sort of action of using laws and force can be linked to the external motivation from the SDT continuum in Figure 7-1 above that is linked to compliance and external punishments, which all result in the form of non-internalised non-intrinsic motivation, which is not sustainable. Ryan & Connell (1989) and Ryan & Deci (2000) linked these motivation types to students showing less interest, value, and effort towards the achievement.

Therefore, for successful educational interventions in displacement, different stakeholders, especially the displaced parents and children, have to be convinced that the intervention is relevant to their needs and goals. In the CRIT method, this problem was resolved by implementing experience exchange activities with different groups to foster mutual understanding of different groups’ needs and challenges section 6.6.4 (the discussion on experience exchange). This understanding is linked to the need for autonomy in SDT, which Ryan & Deci (2000) stated requires an “empathic stance” that is achieved by understanding the needs, challenges, and perceptions of others (2.2.3.1).
Wake & Eames (2013) provided a design model highlighting the aspect of “empathetic community practitioners” as an essential need for a successful co-design process. This is because the presence of an empathetic community would support the project even where the participant’s needs do not make sense to that community. Though, Wake & Eames (2013) discussed this aspect in a totally different context which is architecture within a school sustainability co-design project with children in New Zealand. This PhD study discussed the need for fostering empathy in a displacement context, where needs conflict is very likely to occur, suggested empathy as a component in a design method, and linked it to motivation through autonomy and SDT.

Weibert et al. (2019) explained how their project of designing a language class wizard for refugees in Germany involved different perceptions on some topics between the students and the volunteers helping them. The differences were linked to the structural understanding of procedures and trust. The authors stated that these differences were resolved through a facilitated exchange of opinions about such differences. Weibert et al. (2019) worked in a closer context to this research which is displacement, but they only discussed the problem of different perceptions as a topic in a case study for other designers to learn from without links to motivation. This research linked the same aspect to motivation and presented it as a design method through empathy and facilitated experience exchange.

Parnell et al. (2008) also discussed a similar challenge giving examples of how in their project, students had different needs that conflicted with teachers and school facilities in some cases, which resulted in students leaving school. The authors highlighted the need for the teachers, students, principals, and architects to understand each other’s challenges and not to expect the solution to fit their needs fully, so the solutions fit all the different groups and stem from the people within rather than being imposed on any group. Parnell et al. (2008) called this process “Ongoing Partnership”, whereas the CRIT method called it experience exchange. This experience exchange resulted in fostering personal importance and conscious valuing of the needs of other groups, which can be linked to the identification of motivation in the SDT continuum in Figure 7-1 above (the yellow section) which is described as a more internal and sustainable form of motivation.

A result of this improvement was the friendly environment at the Greek schools where the displaced children became able to make friends with the local Greek children. The positive environment is linked to competence, whereas the friendly relationships amongst the different children are linked to fostering relatedness. Achieving autonomy, relatedness and competence in the previous examples led to the displaced children developing an interest in learning Greek to communicate with their new Greek friends and teachers.
This interest was based on conscious valuing, personal importance, and awareness which all come from the self rather than forced externally through laws and legal actions. The figure above shows that these aspects are related to internal motivation, based on internal regulators, and lead to the interest, which is related to intrinsic motivation in Figure 7-1. Finally, experience exchange and interest are also discussed in the data as facilitators of successful involvement according to the CRIT method, and this discussion section showed how they link to SDT and to resolving the challenge of the conflicting need.

The challenge of conflicting educational needs was also discussed in many instances in the preliminary study discussed in section 3.1. Several communications stated similar difficulties in Lebanon, Turkey, and Jordan, where the governments and schooling systems tried to force teaching the curriculum in a specific language that was not understood or not wanted by the displaced community.

The challenges of conflicts and power are addressed in the literature on emergency education by Salmi (2004). The author suggested that imposing specific learning goals on the displaced community is a breach of human rights and freedom of choice. This is because the International Covenant on Civil and Political Rights states that countries should respect the parents’ liberty to choose several aspects regarding their children’s education. Similarly, Kukulska-Hulme et al. (2017) highlighted the same concern from the literature on educational technology for migrants. The authors stated that the integration policies in displacement could be violating human rights and the dignity of migrants by imposing language requirements without due regard the human motivation and the relationship between language and identity. Charitonos and Kukulska-Hulme (2017) suggested that achieving learning opportunities for the displaced communities strengthen their inclusion in host countries. But for this to happen, the displaced community has to be convinced of the goals and methods of such learning opportunities, which may prove to be problematic in many cases due to needs conflict and power diversity.

Addressing power diversity in a design process has been discussed in participatory design by Simonsen and Robertson (2013), who emphasised the importance of participants empowerment as a core concept of PD. The authors also added that equal participation does not mean equal representation, which directly links to the aspect of power in the context of displacement. Muller and Druin (1993) suggested that levelling power diversity can be achieved by choosing meeting and activity locations that empower a specific group. This was implemented in this research by planning the children meeting to evaluate the schooling program at the camp rather than at the school to make them feel in their safe space so they can provide their criticism freely (case study two process stage 3.2).
This study expanded on (Simonsen & Robertson, 2013) and Muller and Druin (1993) by exploring the challenge of power in a design process for educational technology with a focus on the possible conflicting needs in educational interventions. Furthermore, this study linked the challenges of conflicting needs to power diversity and explored their effect on motivation through self-determination theory. This aligns with the link made by Kukulska-Hulme et al. (2017) between the conflict of needs and motivation, but this study contributed further by discussing it in regards to SDT. This expansion of discussing the concept of power in relation to SDT supports the ability to solve the power and needs diversities by supporting the needs for autonomy, competence, and relatedness, which align perfectly with the core values of PD, such as mutual learning. These aspects will be discussed further in section 7.4, which will discuss the CRIT method.

In summary, this PhD study suggests that the needs of the displaced population and children, in particular, should be the priority. This is to avoid any alienation, which Salmi (2004) and Kukulska-Hulme et al. (2017) considered as a form of indirect violence towards the displaced communities and breach of human rights. The conflicts of needs with the more powerful entities such as the NGOs and the governments should only be resolved by facilitating equal and ethical discussion based on experience exchange and mutual learning.

Therefore, in the case of goals conflicts in the educational technology system design, the CRIT design method and the design process should emphasise that the displaced population and children, in particular, should always be at the heart of designing educational interventions for them. Their needs should be the priority as they are the beneficiaries of such a system. Moreover, they should be empowered to ensure that their voice is heard equally. The design process should also include guiding questions to support the designers in planning and understanding the possible challenges related to the aspects of conflicting needs and diverse power. These aspects will be discussed further in section 7.4.

7.3.4 Stakeholders diversities of age, culture, and language

Stakeholders demographic diversities of age, culture, ethnicity, political opinion, and language was evident to be a significant challenge in designing in displacement. The diversity of age was most evident with children. Section 6.4.1.1 in the findings discussed how in displacement, children or various ages are often put in one classroom. This means that the design activities and the designed systems should consider such difficulty as different age groups may require different methods and activities. In case study one, the age diversity was not a significant difficulty as we had control over the sampling for design activities, and the designed system was a self-learning system. In contrast, in
case study two, the design activities had to be done with the children of the same classrooms, which required extra personalisation of the design activities to make sure that all children age groups were represented equally. Furthermore, the designed system in case study two had two components, interactive tools for group learning in the classroom and a self-learning component by using the digital self-learning space from case study one to allow for a personalised learning experience which partly resolved the age diversity difficulty (case study two, design stage 4.2).

Age diversity was linked to experience diversity in the findings (section 6.4.1.1) as the children age did not reflect their educational knowledge due to them missing school for many years during their displacement journey. This is why this study suggests that future designers should focus on the previous educational knowledge rather than children’s age when designing educational technology systems for them. This was done similarly by Weibert et al. (2019), where the authors designed a wizard for adults to find language learning classes. The wizard did, in fact, ask for the user’s age, but this was only for legal purposes as some classes were for adults only. The classes results were based on another question in the wizard that tackled current language skills and not age.

The diversities of language and culture exist within the displaced context and the other stakeholders, such as the NGOs staff, as the two groups are often from different demographics and backgrounds. The findings provided examples of how such diversities resulted in cases of participants - especially children- from diverse backgrounds refusing to work with each other (section 6.4.1.2), which affected participant’ sampling for the design process activities. This can be linked to the lack of relatedness that is associated with relationships. This aligns with other research such as Pipek et al. (2019) and Weibert et al. (2019) that highlighted that the language barrier was one of the most affecting challenges to their design processes.

The diversity of cultures was present in this study through the social division, which was discussed in section 6.4.1.2 of the findings. There were various ethnic groups in the camp, even though they were from the same country, which is Syria. Moreover, there were signs of social division which linked to the conflict back home. Such division created sensitivities that had to be identified and addressed during the study. Avoiding such sensitivities may affect the designers’ ability to form trust-based relationships if they do not understand the social construct of the location. Therefore, the CRIT method and the design process emphasise the importance of the contextual understanding of the social division as an essential part of a design process in displacement.

Moreover, these diversities affect the participants’ ability to work together due to the differences in language. For example, it was impossible to mix children from different ethnicities, mixing displaced parents with NGOs staff due to the language diversities. Working with children group that only spoke
Kurdish through a translator was also difficult and resulted in children not understanding parts of the task even though the translator was a professional researcher and a native speaker in English and Kurdish (section 6.4.1.2). Such difficulties caused participants’ inability to correctly complete some of their tasks due to the language diversities. This is associated with the SDT need for competence which is linked to the people’s ability to master a task and be able to complete it successfully to be motivated.

Other cases of displacement may have other types of diversities. Weibert et al. (2019) highlighted the challenge of diversity amongst the displaced community, such as in culture, language, and previous experiences. The authors stated that awareness of such diversities and their impact on refugee education is essential as it forms a basis upon which individual progress and opportunities are constantly being estimated. This PhD study suggests that such difficulties are only able to be solved by an early understanding of the different diversities and personalisation of the activities to suit the diverse groups. This is included in the CRIT method by emphasising the need for stakeholders’ involvement in the activities planning as it enables identifying such diversities and how to deal with them in addition to the thorough contextual understanding ahead of the design activities planning. The CRIT method covers this aspect by suggesting the implementation of the facilitators of successful involvement sub-theme that includes personalisation in addition to other aspects that will contribute to supporting the need for competence and assist in resolving this challenge.

Furthermore, PD techniques such as mixing ideas (discussed in section 2.5.9.1) can be used to overcome the challenge of needing to work with the participants in separate groups (due to language diversity). Mixing ideas describes how PD can be done with different groups and then combine the ideas of the different groups into one solution. Another PD technique that can be relevant to this challenge is the proxy design technique (Metatla et al., 2020) which was discussed in the literature review (section 2.5.5.1). This method involves using objects such as toys and stuffed animals as proxies where children design for the toy rather than for themselves, minimising the load on the child designer. Such a method can be beneficial when dealing with children with special needs, language difficulties, or who have difficulties expressing themselves, which links to this challenge and possibly to the challenge of children behaviour. Such a method can also be linked to both SDT needs for competence as it supports the child’s ability to complete a task and relatedness as it emphasises creating a relationship between the child and a mediator object to motivate the child for more participation.

7.3.5 Experience diversity

The data analysis of both case studies showed examples of the participants expressing a lack of experience in the positions they are holding (section 6.4.1.4). This was due to the nature of working
in emergencies and the lack of resources which results in appointing people based on urgent needs rather than previous experience. Such lack of experience affects the stakeholders’ ability to complete the design activities tasks appropriately, which affects the need for competence in SDT. Moreover, this affects the participants’ feeling of self-value and significance in the design process, which link to the need for relatedness in SDT.

Lack of experience can also be in the form of absence of experience, such as in case study one where there were no possible stakeholders who have educational experience. The findings showed examples where the lack of experience also caused examples where participants design unreliable designs (section 6.4.1.4). The lack of experience can be linked to the literature from Chambers (1994) and Robertson and Wagner (2012). They emphasised the need to find solutions to obtain the input from any excluded or absent participants. Weibert et al. (2019) stated that some refugees in their project did not know how to use a tablet or a laptop as opposed to having good levels of experience with using a smartphone which affected how their language wizard was designed to target mobile users essentially.

Moreover, this can also be linked to Parnell et al. (2008), where the authors stated that many participants in their project had little to no experience of anything similar, leading to participants feeling disempowered and frustrated. Parnell et al. (2008) suggested a design model for school architecture that has a “support and capacity building” stage where the participants are taught and supported to gain the required experience for more successful co-design activities. But the work of Parnell was in the context of co-design in architecture rather than HCI or educational technology. Similarly, but in a more technological context, Pipek et al. (2019) suggested that even some stakeholders such as tutors require tutoring themselves in some topics such as technology and care of the available technical hardware. In this PhD study, case study two (section 6.4.7) involved cases of supporting the knowledge of the educators where the researcher supported them in digital skills for them to be able to use and enhance the resulted systems. This aspect is part of the CRIT method under the name of “experience exchange” that is linked to mutual learning in PD. In experience exchange, Not only do the designers learn from the participants, but also participants learn from the designers where each group support the other groups’ knowledge. This exchange of experiences is linked to the aspect of enhancing competence in both the participants and designers and is linked to motivation.

The literature on PD suggests that one value of participatory design is trusting the experience of the participants (Robertson and Wagner, 2012; Simonsen and Robertson, 2013). This PhD study suggests that even though trusting participants’ experience is essential. However, it can be challenging in the context of displacement when we know that lack of experiences is a theme in such a context. Such a
challenge does not mean that participants do not have any experience and should be ignored or excluded from the activities. It means that we need to acknowledge that lack of experience from the initial design process stages and find solutions to overcome any identified lack of experience depending on the context without silencing or alienating any of the participant groups.

Addressing these aspects would be established in the problem and requirement analysis stage; however, the contextual understanding stage would contribute to understanding these aspects as well. Furthermore, participants should be involved in the discussion of their experiences and design activities planning; this would ensure that the activities are suitable for their area of expertise and would reveal any experience difficulties ahead of the activities. The activities would then be personalised to match the experiences of the different participant groups accordingly. This is covered in the CRIT method as it emphasises participants’ involvement as a key aspect to understanding the complexities, and to result in activities and systems that are relevant to the context. The findings in section 6.6.4 discussed the aspect of personalisation that was implemented in both case studies where interviews questions and other activities with adults and children had to be changed for different groups with different experiences and levels of knowledge. Also, in case study one, process stage 4.2 (co-design with adult participants), discussed how the participants faced difficulties designing systems that are applicable to the context available resources. This was resolved by adding more structure to the activities by identifying the available and possible resources and then asking the participants to consider them in their design activities. The need for the activities to be structured is important in general, but it becomes even more essential when the participants are likely to lack experience.

Participants can be supported, in the design process, by exchanging experiences, such as the case of case study two (teachers co-design workshops), where the teachers were provided with basic training on some technical experiences that they lacked. Another example is providing stickers and technical explanations to children who had trouble drawing technical equipment (children co-design activities). In the case of the absence of experience, this was resolved in this study by recruiting participants from similar contexts, such as recruiting the field school teachers from a nearby refugee camp in case study one. Alternatively, by the designer consulting the literature to assist in the problem analysis, which was done in case study two (process stage 3.1), where consulting the literature on students engagement and behaviour helped to understand the behavioural problems of the children and to suggest adequate solutions in the system problem and requirement analysis stage.

It should be noted that implementing exchanging experiences in order to support the participants may result in an additional design challenge which is design bias. For example, when it is known that the users lack experience in technology, exchanging experience could be done by informing them about
different possibilities of technology. However, communication of experience from the designers may influence the decision of the other participants, causing bias towards the suggestions of the designers who might be seen as the source of knowledge. This is discussed in the literature in Frauenberger, Good and Keay-Bright (2011), who stated that there is a delicate balance to strike between inducing a vision that opens up creative design space and imposing ideas or assumptions. Particularly with children with special needs who may live in an unbalanced power relationship with parents and teachers or carers. This PhD study aligns with the view from Frauenberger, Good and Keay-Bright (2011). Moreover, Wake & Eames (2013) also discussed this point by stating that with children’s lack of experience, it could be very tempting to direct them. But once this is done, the children are very quick to realise it is not their project anymore. This links directly to the aspect of autonomy that is an essential part of the CRIT method and motivation. This PhD study suggests that experience exchange should be done in an empowering manner and not by imposing design bias, especially in a context where the participants are vulnerable to accept the bias imposed on them due to their lack of experience and the nature of displacement.

An example of how this was implemented in this study is giving children participants the “inventor” stickers to wear during the design activities to empower their view of themselves during the co-design activities and support equal co-design. Furthermore, children were also supported and educated on devices that they did not have experience with before the co-design workshops. Moreover, experience exchange was implemented by using suggestive language and asking participants frequently for their opinion on the design activity structure to ensure that no bias is being enforced and that the participants, especially children, are still in control of their share of co-design. This topic also links to the discussion on child-adult relationships in PD in section 7.4.4.

Empowering the participants by supporting them with the experience they lack and personalising the activities to match their abilities support the SDT need for competence which is linked to the peoples’ ability to master a skill and its link to their motivation to complete the activity. Empowerment and suggestive language can also be linked to the SDT need for relatedness as it boosts the participants feeling of being valued. Finally, involving the participants in the planning of not only the designed systems but in the planning of the design activities themselves support the SDT need for autonomy.

The CRIT method emphasises the previous aspects of involvement, personalisation, and experience exchange. And the design process developed in this PhD study will include guiding questions that support the designers understanding and planning for any challenges related to the participant’s lack of experience (Appendix B, plan for later stages).
7.3.6 Unexpressed needs

The findings from the sub-theme of stakeholders diversity of needs (section 6.4.1.1) discussed a type of needs complexity that was called unexpressed needs. In the context of displacement, due to the language and cultural differences, stakeholders significantly displaced populations may not express all of their needs when they are involved in the planning of an educational intervention. The unexpressed needs result in a lack of requirement identification of an educational intervention and would affect the relevance of the resulting intervention.

An example was when the adult displaced community members did not discuss their needs for teachers who speak their language, so they can form a personal relationship with, and the needs for the lessons to be late in the afternoon due to them waking up late. The displaced community members did not feel that they could share such details with the NGOs staff. Especially since the NGOs staff were continuously changing, making it harder to form personal relationships with them. In case study one, these unexpressed challenges were discovered through a long term relationship building with the displaced community that allowed them to express and explain themselves in more detail to the researcher. Moreover, the contextual understanding process stage with the observation and active participation activities also helped in revealing these needs.

Similarly, the findings (6.4.2) stated that many displaced children suffered from severe psychosocial difficulties, which in some cases resulted in them being reluctant to speak and voice their opinions. This was resolved in this PhD study by establishing a personal relationship with these children. Moreover, the sampling and structure for the children activities were personalised to ensure that such children are placed in smaller groups with their friends, ensuring a positive atmosphere with maximum error tolerance. These measures improved the abilities of such children to voice their opinions and participate in design activities.

Krüger et al. (2019) discussed two research cases on participatory design with refugees. One of the cases highlighted that the displaced communities could be marginalised in their own countries and societies, making them at a higher risk of feeling unable to make their ideas heard. This PhD study agrees with the point made by the author and suggests that personal relationships, contextual understanding, personalised activities, and a positive atmosphere can assist in resolving such difficulties. However, this research, whilst invaluable, does not present a detailed model of how to apply these concepts in an educational, participatory design process.

Relationship building and active involvement are linked directly to the need for relatedness in SDT, which discusses that people are more motivated to communicate and work with people that they are related to (Ryan & Deci, 2000; Ryan, 2020). The contextual understanding was described in SDT as a
method to support autonomy by forming an “empathetic stance” of the participants through understanding their needs and challenges. Moreover, personalisation and a positive atmosphere can be linked to the SDT need for competence which states that people are more internally motivated to complete activities that are flexible and suitable for their abilities. These aspects are discussed in the CRIT design method as the relationship building is discussed in the theme of trust, personalisation is discussed in the facilitators of successful involvement.

The discussion on this challenge confirms the suggestion in the proposed design process in this PhD study that the stages of trust and relationship building, and contextual understanding are to be done before determining the system requirement as they would contribute to a better problem and requirement analysis. However, the design process should include guiding questions that support the designers in planning their observation of the displaced community to form the “empathetic stance”, how to form trust-based relationships with the participants, and ensuring that they consider the aspect of unexpressed needs.

7.3.7 Continuous change

The data analysis highlighted in section 6.4.4 that the displacement context involves continuous changes in the stakeholders and logistics, which was explained to affect the availability of the resources and stakeholders. Such changes may affect the logistics of the design process activities.

Stakeholders may continuously change due to relocations or transit, which are typical aspects of displacement. This change in the stakeholders can mean that the participants are changing along the different stages of the design process. In other words, participants who may have provided suggestions in the problem and requirement analysis stage might have travelled by the time where the co-design of the suggestions made by the participant. The continuous change is not limited to the displaced community, the NGOs staff also were changing, and the logistics of the camp were regularly changing. Designers should expect major and radical changes at any time during the design process (examples in section 6.4.4). Parnell et al. (2008) discussed the concept of “management of change” where the authors stated that many changes took place at the school during their projects, such as physical changes, staff changes, and curriculum changes. The authors suggested that even though change can be challenging, it could also mean that change in many aspects may be beneficial as the different changing aspects could be managed to change in accordance with each other. However, such a positive view is more possible in a non-displacement setting such as in Parnell et al. (2008) and not in a displacement context where changes are more radical, making designing in such a changing environment very challenging.
Even in a non-camp displacement setting, change is one of the most commonly faced challenges. Weibert et al. (2019) discuss how regulations for refugees who are allowed to take language courses keep changing. The authors highlighted that many initiatives and projects supporting refugees had a short life where they flourished for a while, but they changed afterwards. This made the social inclusion of refugees and the work of the volunteers organizing language classes very hard.

Such an environment can be very challenging for the designers, and the challenge of continuous change is unavoidable and is beyond the control of the designers. However, its risk and impact could be minimised by considering it in the design process by investigating what may change and how it may affect the design process activities. Thus, the design process developed in this PhD study provides a set of guiding questions that remind the designers to explore the risk of changes. These questions can be found in guiding questions 7, 8, and 9 in the “Planning for later stages” section in Appendix B.

Accordingly, suggestions can be made to deal with expected changes, for example, by using methods and techniques that allow flexibility, such as mixing ideas as it was done in this research or personas and other methods that were not implemented in this research. The CRIT method discusses this by emphasising the aspect of prior understanding (section 6.6.3).

### 7.3.8 Resources limitations

The data analysis revealed how the displacement context suffers from extreme resources complexities on different levels (6.4.3). The lack of resources exacerbates the psychosocial difficulties as the stakeholders find themselves overwhelmed most of the time. The displaced community members are struggling to ensure their essential daily needs, and the NGOs staff struggle in completing their tasks with the limited resources available for them.

Nevertheless, this challenge could also affect the design process activities. Such as the example discussed in the findings (6.4.3) from case study one where some participants came up with designs that were not applicable in the context they are supposed to be implemented. This is a critical concern, especially that it is accompanied by the lack of experience discussed in section 7.3.5. It could result in the participants suggesting the use of the resources in the wrong context or not to their full capacity. For example, section 6.4.3 discussed that in case study one, tablets and laptops were donated to the NGO at the camp. However, since the volunteers did not have the technological experience and capacity, they were unable to make use of them in an educational context, and the equipment was left in storage with no use.

Having limited resources would, in return, limit the possibilities for the designed systems. This could affect the relevance of the designed systems to the requirements identified in the design process.
Pipek et al. (2019) also reported similar challenges where they faced difficulties in finding the required resources for the project, such as rooms, hardware, and internet connection. Thus, this challenge is mostly unavoidable in cases where resources are limited. The designers should keep this challenge in mind while implementing the design process in a displacement context. The design process from this study manages such a challenge by exploring the available resources ahead of any co-design activities. The data analysis in section 6.4.3 suggested the focus on five different resource types in a displacement context when planning the design activities. The resource types are physical spaces (caravans, tents, meeting rooms), technical resources (equipment, tablets, smartphones, WIFI network, applications), human resources (volunteers, facilitators, translators), time resources (availability of equipment and people at specific times), and finally funding resources to cover the cost of essential resources that are not available. When such resources are explored and identified in the early stages of the design process, it becomes easier to scope the co-design workshops towards the available resources or at least acknowledge the absence of such resources so extra funding can be requested.

Moreover, resources limitations could also be linked to challenges in establishing trust relationships. This is because limitations in resources would result in more distress amongst the community as they struggle to ensure their basic needs of food and shelter. This was discussed by Clarke et al. (2021), where the authors worked with NGOs serving communities facing poverty and required to access food banks and credit union loans. The authors explained how resource limitations affected the process of trust relationship building with the NGO staff and the community. Such an environment is quite similar to a displacement context in regards to resources limitation. However, the limitation of resources in a refugee camp would be even worse and would affect people.

The design process provided in this PhD study will provide a set of guiding questions that would support the designers in considering the complexity of resources when implementing the design process.

7.3.9 Ensuring a tangible outcome

The findings (6.5) also discussed that establishing trust might be linked to the perception of the participants to whether the design process goals would support them or not. Furthermore, the same section discussed that a trust relationship could be affected by unfulfilled promises.

This result in a challenge that is, on the one hand, stakeholders would only participate in projects that help and support them directly. And on the other hand, designers cannot just promise the stakeholders a tangible outcome of the design process when it has been established that the context is complex and any project in this area is of high risk.
Within the complex context of displacement and the lack of resources, any design work would have a high risk of not being effective. Thus, giving any promises to the stakeholders even when based on genuine expectations is of high risk for ethical reasons and because it may have a drastic effect on forming trust relationships. The literature on PD by Robertson & Wagner (2012) discusses this point. It highlights the importance of considering what can be offered back to the participant should the designs end up being unsuccessful (2.4.8). However, little has been said regarding how such a challenge can be resolved in a displacement context.

This challenge is unavoidable in a displacement context. This is why the CRIT method and the design process suggest that the researchers and designers should have a plan for what to provide to the stakeholders should the result of the design process end up being unsuccessful. And by keeping ethical and honest communications with the different stakeholders regarding the possible outcomes. Furthermore, section 7.4.3.1 in the discussion discuss how the CRIT method suggests using servicing as a possible technique to resolve such a challenge.

7.3.10 Section conclusion

This section explored some of the most significant challenges that were identified from the data analysis findings of the two case studies. Each of the challenges was discussed in relation to the findings, the literature, and was linked to motivation through SDT. Furthermore, the challenges were discussed in relation to the CRIT method and the design process developed in this research. The next section will go into detail to explore the CRIT method, the design process, and their contribution to the literature.

7.4 RQ2: The CRIT method and the design process

The previous sections discussed the different design challenges (responding to research question 1) identified that affect the design process activities, the resulted systems, and their relationship to motivation, the CRIT method, and the design process. This section will answer the second research, which is: “RQ2: What design process stages, approach, and method should be followed to overcome the identified challenges?”

Sections 2.4.1 and 2.5.9.2 in the literature review discussed the different definitions of a design process and a design method. It was concluded that a design process is all the tasks/work done from the beginning to the end in the creation of new problem-solving tools, whether the tools are software, hardware, or mixed (Dix et al., 2005; Fails et al., 2012; W. R. Miller, 2005). On the other hand, a design
method was defined as a collection of techniques used in conjunction with a larger design philosophy; it includes the attitude and values that the team brings to the design process (Fails et al., 2012).

The literature review identified the gap that there are no design methods or design processes that are adapted to the complex context of designing educational technology systems for displaced war-affected children. This PhD study will present the discussion of a design method (CRIT) based on the findings from this research. The CRIT method from this study is designed to inform both the system design and the design activities. Moreover, this research provided a proposed design process based on the literature review and communications with people from the field. The early contribution of this PhD study was a proposed design process consisting of a set of stages, a design approach (PD), a design process flow, and a set of guiding questions that will support the designers implementing the design process in each stage. The proposed process was implemented and evaluated in two case studies, which resulted in changes in the process flow, and the provided guiding questions.

The next sections will discuss the components of the CRIT method. It will start by discussing the contextual complexity, followed by explaining the core concept of relevance. Afterwards, it will discuss the components of involvement and trust that will describe the attitudes and values that should be followed to achieve a better understanding of the contextual complexity and result in design activities and designed systems that are motivating and relevant to the stakeholders’ context. This will be followed by a section on motivation that illustrates the positioning of SDT within the CRIT method.

### 7.4.1 Contextual complexity

The first component of the CRIT method, based upon the PhD research findings, is contextual complexity. Contextual complexity is not an actionable component of the CRIT method or the design process. However, it is a set of existing dynamics and complexities that are likely to be present in a displacement context and would affect the relevance of the design activities and the designed systems (section 6.4). The findings in section 6.4 suggest that the first step in a design process planning is that designers in the space of displacement should familiarise themselves with the identified challenges related to the contextual complexity theme. Furthermore, the designers will need to understand and assess the contextual complexities that exist in the context in which they will be implementing the design process. This understanding will be done following a two-way involvement method that will be discussed in the section on involvement below 7.4.3. Furthermore, the findings have identified that understanding the contextual complexity requires a trust-based relationship between the designers and the stakeholders.

Numerous research summarised in the literature review (section 2.1) discussed the challenges and complexities in displacement and how it affects the displaced community, the NGOs staff, and the
host countries. This PhD study added to this knowledge base with a thorough discussion (section 7.3) on the different complexities as design challenges in the context of designing educational technology systems for children living in this context. This included providing various empirical examples from two case studies highlighting their effect on the relevance of the design activities and the designed systems.

Furthermore, this PhD study mapped the contextual complexities to the literature and illustrated their effect on motivation related to SDT. It showed that these complexities negatively affect the needs for autonomy, competence, and relatedness resulting in a lack of motivation and relevance. The lack of motivation and relevance has been identified to affect stakeholders’ involvement in the design process and the designed systems.

7.4.2 Relevance

The findings (section 6.2) discussed various codes and examples from the data with their link to relevance as a central core concept. The analysis highlighted how relevance is not a theme, but it is the linking concept that should be kept in mind as the key for achieving design activities and system designs that the stakeholders will trust and get involved with. Such activities and systems, when relevant, would attract stakeholders participation, result in progress, and are sustainable.

Relevance is a known aspect in design literature and has been discussed in the form of contextual relevance, especially in educational technology (Charitonos & Kukulska-Hulme, 2017; McCabe, 2018; Vermeeren & Calvi, 2019). Charitonos and Kukulska-Hulme (2017) emphasised the importance of recognising the power of authentic everyday situations that are personally relevant to the context of the learners for better motivation. Vermeeren and Calvi (2019) also stressed motivation to relevance, stating that people are more motivated and engaged in activities that are more relevant to their interests and environment. However, application of these concepts has not previously been applied to an educational design process for displaced communities. This PhD study positions relevance as the central core aspect of a participatory design method for educational technology systems for displaced communities. It aligns with the previous research on linking motivation to relevance, but it explains this connection in more detail by linking relevance to the psychological needs for self-determination theory. This link is vital in a displacement context where motivation is known to be a significant challenge. Moreover, the CRIT method emphasises that relevance and motivation are not only crucial for the designed systems but also the design process activities. If the design activities are not relevant to the participants’ interests and experiences and relevant to the contextual dynamics such as the continuous change and lack of resources, then the motivation for participation would not be supported, and no involvement nor trust would be achieved.
7.4.3 Involvement

This component of the CRIT method discusses thesis findings that underpin the values, attitudes, and techniques that can leverage different forms of involvement to achieve a better understanding of the contextual complexities identified in the first component of the CRIT method. The findings from this PhD study suggest that involvement in the context of displacement should be a two-way involvement. One involves the stakeholders in the design process, and the other is the designers’ involvement in the stakeholders’ context, which supports the understanding of the contextual complexities. Both are required to achieve motivating and relevant design activities and designed systems.

7.4.3.1 Designer’s involvement in the stakeholders’ context

The findings in section 6.6.3 discussed the involvement of the designer in the stakeholders’ context. It explained that designers’ involvement in stakeholders context should be done in two separate stages. The first is “prior understanding” ahead of the face to face interactions to gain a required contextual understanding for the later face to face interactions and involvement. Then the second stage is done through “ethnography and active participation” in the stakeholders’ context.

Prior Understanding

The findings in section 6.6.3 discussed the importance of prior understanding of the stakeholders’ context for the success of the design activities. The complexity of the displacement context and the different sensitivities such as social division, politics, the effect of conflict, and the logistics require the designers to form a general understanding of these aspects ahead of the face to face interactions. As noted before, this initial step is missed in traditional PD processes. If this is ignored, it could risk the process of establishing trust-based relationships with the different stakeholders.

For example, section 6.5 from the findings discussed the importance of trust and how it requires showing empathy and respect for the different stakeholders, especially the displaced community. Expressing empathy and respect requires an understanding of the challenges, fears, and needs that the different groups of stakeholders are experiencing. Such an understanding must be started in the earliest stages of the design process as it will inform all the later stages. It could be conducted through reading the literature, online articles and reports, and grey literature. Such sources would provide the necessary understanding of the conflict, the displacement, and the stakeholders. Although this may be a natural process for many researchers, it is not explicitly defined as a step in the participatory design process. This understanding will later be enhanced and enriched by the ethnography activities in the later stages.
The contextual understanding stage in case study one (section 6.2) explained how the NGOs initially had a policy not to accept researchers. But this was changed when the NGOs staff realised that this research aligns with their needs and challenges that were investigated as a part of the prior understanding stage that was done as a part of the research planning. This example showed how such understanding is essential to allow for the project plan to be aligned with the stakeholders’ needs from the early stages to ensure that the stakeholders would trust and agree to be involved in such a project. This example shows the link between prior understanding and establishing a trust for access.

The findings in section 6.5 on trust discussed the aspect of avoiding social and political bias in trust-building relationships. To avoid such bias, the designers should have an understanding of the social and political dynamics affecting the displaced people. The concepts of understanding people’s fears, challenges, and needs are represented in the literature on SDT as a primary requirement to achieve an “empathetic stance”, which is essential to foster autonomy (Niemiec & Ryan, 2009; R. Ryan, 2020; R. M. Ryan & Deci, 2000). The need to understand the specific topics of the conflict, the displacement, and the stakeholders’ needs, fears and challenges have been discussed by Miller (2004) as a necessity to form trust, and in the literature on evaluating curricula in emergency education by Tawil and Harley (2004). Contextual understanding has been discussed in the literature on PD processes by Leinonen, Toikkanen and Silfvast (2008) as an early stage for planning the design activities in a generic process. However, they do not cover aspects of politics, conflict and displacement in this process stage. This PhD study adopted the importance of understanding these topics from the literature on displacement psychology by Miller (2004) and emergency education curricula reformation by Tawil and Harley (2004). Moreover, the contextual understanding of these topics was formed as a stage of a design process for educational technology systems in displacement, with providing a list of guiding questions that support the designers in completing this stage (Appendix B).

Ethnography and active participation:

This section will explain the positioning of ethnography in the CRIT method, mapping it to the literature and SDT. Both case studies in this PhD study implemented a form of involvement of the designers in the stakeholders’ context based on an ethnographic approach.

The findings in section 6.6.3 explained that the involvement of the designer in the stakeholder’s context through ethnography resulted in a rich understanding of contextual complexity aspects that were not possible to be captured through literature review or by the conventional methods such as interviews, focus groups, and other methods. This aligns with Clarke et al. (2021) and Le Dantec & Fox (2015), that suggested that designers should engage in community conversations to establish relationships. The authors explained specifically that such conversations could be outside the formal
research, yet, they are necessary to understanding community networks and other dynamics of distrust that could inform the design work. Gaudion et al. (2015) suggested that such conversations can be conducted while participating in a social activity such as cooking. This PhD study agrees with the importance of community conversations and conceptualises these aspects in the form of a design process that emphasises such conversations with links to trust, motivation, and the CRIT design method that is developed with and for displaced communities. The CRIT method stresses the importance of the designer’s involvement in stakeholders context through active participation, volunteering, servicing, and any other form of ethical social interaction that leads to a better understanding of the displaced community’s context and better trust relationships.

The complex and extremely challenging context of displacement, with its power differences between the displaced community and other groups, or even between the different groups in the displaced community itself, along with the psychosocial diversities, all result in a situation that does not ensure democracy and equal voices of different participants. For example, the power of NGOs staff who are managing people’s asylum cases and financial aid cannot be compared to the power of the refugees. Similarly, the power of a refugee parent or a school teacher cannot be compared to the power of a displaced child. Having an equal voice is an essential element of existing PD processes. The findings in section 6.4.2 discussed the presence of severe psychosocial difficulties such as stress, violence, and discrimination. Such aspects make it hard to expect equal discussion amongst the participants, especially with the existing social division and trust difficulties.

The effect of the complex social contexts on PD is documented in the literature (Blomberg & Karasti, 2012a; Halskov & Hansen, 2015; Robertson & Wagner, 2012; Simonsen & Robertson, 2013; Thinyane et al., 2018). Blomberg and Karasti (2012) suggested that ethnography can be an asset for PD to study the everyday realities of people and support PD by achieving the required rich understanding in contexts where the Scandinavian characteristics of PD are not easily applicable. Moreover, Blomberg and Karasti (2012) and Simonsen and Robertson (2013) summarised different aspects of positioning ethnography in PD, such as three different models for implementing ethnography and design and the importance of neutrality. However, these topics were not researched or discussed in a design process for displacement contexts.

This PhD study adopts the suggestion of having ethnography as a component of a participatory design process and positions it in a design process for the context of displacement. The next paragraphs will discuss the findings and the different aspects of ethnography, such as the different implementation methods, neutrality, and will suggest including the aspects of active participation and servicing within ethnography in a displacement context.
Models for implementing ethnography and design

In this research, ethnographic data did not only help in understanding the contextual complexities as an input to the design, but it also assisted in the planning for the design activities. The literature review section on ethnography (section 2.5.9.3) discussed that ethnographers have different views on ethnography. Some researchers suggest that it aims to study the present. At the same time, others believe that it can be used to study both the present and the preparation for change. The findings from this research align with the second opinion. Furthermore, it discussed three different types of ethnography implementation in PD (Blomberg and Karasti, 2012a; Simonsen and Robertson, 2013). The first implementation discussed a reflexive relationship between ethnography and PD, where ethnography is implemented first to understand the current situation only, followed by PD to create the future. The second type is where ethnography is a component of PD, and both work in an iterative process to understand the current situation, and to envisage and plan the future. The third type is where ethnography is used to inform the design, and both are operated in parallel for the cases where user involvement is not possible, hence it is replaced by professional ethnographers to inform the design. There is no discussion in the literature on which model of ethnography in PD is more suitable for a design process in a displacement context.

This research suggests that ethnography in a design process in displacement should be implemented as a component of PD in an iterative process. This is because of the identified complexities, such as continuous changes in stakeholders and context, which would require additional stages of ethnography. Furthermore, the ethnographic data also assisted in the evaluation of the design activities and the implemented systems. Such as when the ethnographic observation captured the children’s communications with their parents regarding the design activities and the digital self-learning space.

Neutrality

The findings in section 6.5 showed that to form trust-based relationships, researchers should avoid any social or political biases, including avoiding commenting on the people’s habits that may look strange. The reason for this is that many people’s habits might be a result of a severe lifestyle. Even when this is not the case, withholding judgement was linked in the findings to respect as NGOs staff repeatedly emphasised the need for visitors and staff not to comment or judge people’s behaviours and habits. This topic links to the literature from Blomberg and Karasti (2012) on the importance of ethnographers being neutral to the context surrounding them. This PhD study suggests that neutrality may not be absolute in such a context. The reason for this is that the findings on trust in section 6.5 also emphasised the need for the designers to be empathetic to peoples challenges and fears,
especially the ones related to the conflict. This empathy may involve the need to carefully express opinions about the conflict or other sensitive topics only if such opinions are required to reassure the displaced community that their fears are shared and understood by the designers. This has been discussed by Miller (2004) in section 2.1.2, where the author stated that her research at the refugee camp would not have been possible without regularly expressing her opposition to the prosecution policies and practices by the government that caused the displacement.

**Active participation and servicing**

This section will discuss the need for including active participation and servicing as components of ethnography in a design process for displacement.

The findings in section 6.5 on trust discussed the aspect of help and care as an essential component of building trust-based relationships. Help was established in this research through servicing and active participation activities such as translation, consultation, and volunteering. The findings discussed how servicing activities were highly appreciated by the different stakeholders. The findings in section 6.6.3 emphasised how active participation and servicing methods provided a way for the researcher to become a helpful subject who supported the community and facilitated establishing trust-based relationships. Volunteering and active participation is being used in HCI literature PD approaches such as in Weibert et al. (2019), where the project had two researchers volunteering at a language café for refugees in order to get more sense of their lives, needs, and communication problems allowing the researchers to gain the required foundation to build a language wizard for refugees. This PhD study linked the aspects of care and empathy to motivation through supporting the SDT needs for autonomy (empathetic stance), and for relatedness. However, current PD methods and processes do not clearly suggest that such a method for relationship building should be an essential part of a design process, which is why relationship building and active participation are core concepts in the CRIT method, and relationship building is presented as a separate stage in the design process developed in this study.

The findings in section 6.5 on trust discussed unfulfilled promises, which would negatively affect the trust-based relationship with the participants and affect their motivation and participation in the design activities. Robertson and Wagner (2012) discussed the possible challenge of PD processes if they fail to result in a tangible outcome that supports the participants and how this would affect stakeholders participation. This challenge could be highly expected in complex displacement contexts; however, PD literature does not specify how to overcome this challenge in a PD process in displacement. This study suggested adding servicing and active participation to ethnography activities as in such cases, the designers would have provided something tangible back to the community, and
such activities would also enrich the contextual understanding. This was evident in my communications with the displaced community, where the community showed me a lot of respect for the volunteering services that I was conducting alongside my research work. Their focus was not only on what we have achieved in the educational systems. But their focus and respect extended to the daily volunteering activities. Through these activities, they started seeing me as a helpful person who deserves their kindness and trust regardless of the outcome of the educational technology project.

In summary, this research suggests that ethnography is an essential component of a design method for designing in displacement due to the complex and changing nature and the need to achieve a rich understanding of the context to establish trust-based relationships. Furthermore, ethnography is suggested to be used to understand the current situation, to assist in planning for the design activities, inform the designs and envisage future solutions, and provide critical reflection on the design activities and implemented systems. Finally, this study suggests that active participation and servicing should be included in the ethnography activities in a design process for displacement as they resolve several challenges that were identified in this study.

This next section will discuss the topic of stakeholders involvement.

7.4.3.2 Involving the stakeholders

The findings (6.6.2) illustrated multiple examples of the importance of involving the different groups of stakeholders in the design process. The whole concept of PD approaches is based on involving the stakeholders. Numerous research linked stakeholders’ involvement of adults and children in PD with more relevant and applicable systems, empowerment and ownership (Druin et al., 1997; Iivari & Kinnula, 2018; Muller & Druin, 1993; Parnell et al., 2008; Simonsen & Robertson, 2013). This PhD study (section 7.3.1) revealed the link between stakeholders’ involvement in a participatory design process and motivation through SDT. This link has not been discussed in the literature before even that the components of SDT align perfectly with the values of PD. The importance of this link between the design process, involvement, and motivation is that extensive research (Wright, 2010; Kukulska-Hulme et al., 2017; Fegert et al., 2018; Tauson and Stannard, 2018; Krüger et al., 2019) agree that motivation is one of the significant challenges in a displacement context and emergency education. Moreover, this research discussed the links between the aspects and challenges of stakeholders involvement, SDT and motivation with the following topics: Lack of motivation (7.3.1), Children behaviour difficulties in displacement (section 7.3.2), conflicting needs and diverse powers (7.3.3), stakeholders diversity (7.3.4), experience diversity (7.3.5), unexpressed needs (7.3.6), continuous change (7.3.7), resources limitation (7.3.8), forming trust-based relationships (7.3.9).
The literature review of this PhD study (section 2.5.4) discussed four main questions suggested by Robertson & Wagner (2012) to plan a participatory design process, which are: 1- who and why do we engage as participants?; 2- How do we engage with them?; 3- How do we represent them?; 4-What can we offer in return?; However, the literature review highlighted a gap that these questions were not researched in a design process for educational technology systems for displaced children.

Who do we engage as participants?;

Section (6.6.2) and Figure 6-7 in the findings revealed the details of the participant groups who should be involved in a design process to design educational technology systems for displaced children. The participant groups are displaced parents, displaced children, teachers, NGOs staff, and the decision-makers. Furthermore, it discussed why each of the groups should be involved and the possible contribution that each of the participant groups could provide to the design process activities. Such as the groups who would provide input on the usability requirements, educational requirements, design activities planning, contextual applicability, or sustainability. These suggestions may differ in other contexts; however, they would still guide the future designers following this research on what to expect from the possible stakeholders in such a context.

How do we engage with the participants, and how do we represent them?

This section will suggest a set of aspects elicited from the findings of the CRIT method on how to engage with the participants and how they should be represented.

*Experience exchange (mutual learning)*

Multiple data analysis examples (section 6.6.4), in addition to the previous section on design challenges, discussed the importance of experience exchange and how it assisted in resolving many of the design challenges such as diverse experiences (7.3.5) and conflicting needs and diverse powers (7.3.3). This support made the participants better able to complete the tasks required from them (section 6.6.4). This is linked to fostering motivation by supporting the SDT need for competence which is linked to the ability to complete a task or an activity.

The aspect of experience exchange links to the concept of mutual learning, which is discussed in the literature review (section 2.5.6.2). Mutual learning is a core value of PD and is a process of communication between the designers and the stakeholders where each of the participants will learn about the contextual aspects of the designers and vice versa (Blomberg & Karasti, 2012a; Simonsen & Robertson, 2013). Experience exchange is also essential between the participants themselves, such as between the volunteers and the displaced community. This links to Weibert et al. (2019), where the authors stressed that facilitating exchange about the different perceptions between the displaced
community and the volunteers supporting them played a crucial role in structuring the participatory design process.

In this PhD, the concept of mutual learning was discussed in a broader context, not only as a process of learning between the participants on the one hand and the designers on the other hand. But also as a process of learning amongst all the participant groups to assist in resolving many of the design process challenges such as lack of experiences and conflicting needs and powers. The findings in (section 6.4.1.4) suggested that the lack of experience is a challenge that exists in various aspects of displacement. Also, the behavioural, psychological, and power diversity difficulties suggested that PD values may not be easily implemented in a displacement context which would require training the participants on how to implement such values in the design activities. Thus, the CRIT method suggests that exchanging experiences (mutual learning) should be a general theme of the design method and the design process where the whole design method is adopting an educational attitude in the different stages. However, as discussed previously (section 7.3.5), experience exchange (mutual learning) should be implemented in a suggestive way that considers and avoid causing any bias, especially with the existing experience and power diversities.

Empowerment

The findings also discussed the importance of empowerment as a concept of involvement in a displacement context, such as choice/control and exchanging experience (section 6.6.4), and involving stakeholders in section 6.6.2. The findings in section 6.6.2 suggested that involving the users should not be limited to the system design but to the planning of the design activities.

Empowerment of adult and children participants has been extensively discussed in the literature on PD in general (Muller & Druin, 1993; Parnell et al., 2008; Robertson & Wagner, 2012; Simonsen & Robertson, 2013) and in displacement (Krüger et al., 2019; Metatla et al., 2020; Talhouk, Ahmed, et al., 2016; Talhouk, Balaam, et al., 2019). The literature discussed how empowerment is done by actively involving the participants, giving them decision making powers, and through mutual learning. Parnell et al. (2008) highlighted that in most cases in schools, even in a non-displacement context like the context they worked in, nobody asks students or teachers what their opinions are, which the authors linked to causing participants’ disengagement. The authors stressed that giving users a voice results in increased engagement due to the sense of ownership, which is illustrated in respect for the artefact (no vandalism), and better relationship amongst the participants themselves.

I have experienced this myself while working with a community, especially with children who were known for regular vandalism and behavioural difficulties. Which I felt are due to the feeling that their surrounding does not belong to them even though the resources around them are supposed to
support them. Various resources were damaged in the refugee camp due to vandalism and the psychosocial difficulties everyone is facing. However, when we all engaged in a design process to work together on a project that was carefully presented as a shared ownership solution. The same population interacted with complete respect.

Thus, this PhD study completely agrees with the importance of a sense of ownership discussed by Parnell et al. (2008), and linked that sense of ownership to motivation through the need for autonomy in SDT, with presenting a design process and a design method that both emphasise the aspects of respect, equal voice, involvement, and empathy with evidence from two case studies.

The literature on HCI in displacement emphasised the importance of empowerment in the context of vulnerable and marginalised communities such as refugees. However, this research provided a further more detailed link between empowerment and motivation through application to SDT. Furthermore, it discussed different aspects of empowerment to resolve design challenges that were identified in a displacement context. Section 2.5.7.1 of the literature review discussed the statement from Robertson & Wagner (2012) that equal voices do not mean equal representation. This PhD study emphasises this statement and suggests that the voice of the displaced communities in designing educational systems should be prioritised and empowered when represented. As discussed in the challenge of powers diversity, the CRIT method highly emphasise that the needs of displaced communities, significantly displaced children, should be put in the heart of the design process goals and planning. Their needs must be prioritised for ethical reasons before practical reasons. Being displaced must not mean losing the basic human rights of freedom of choice, especially in a complex, vulnerable context.

**Positivity**

The findings in section 6.6.4 highlighted the importance of a positive and fun atmosphere in design activities in displacement, section 7.3.2 highlighted the importance of positivity and fun for children behavioural difficulties, and the findings on trust relationships with children in section 6.5 emphasised positive communication and positive reinforcement when tackling the behavioural difficulties with children.

Wake & Eames (2013) emphasised the aspect of fun as a key part of the co-design journey with children. The authors incorporated fun as a part of their “Skilled facilitation” aspect in their design model. Moreover, they linked fun to the facilitation of trust and personal relationship building from the work of Parnell et al. (2008). This PhD study highlighted the aspect of fun as a facilitator for engagement and motivation and provided examples from the findings on the importance of fun to result in better involvement, which is essential and even more challenging in a displacement context where motivation is a massive challenge to be faced.
The literature on PD with children highlighted the importance of positivity and fun in activities with children especially with special needs (Frauenberger et al., 2011; Metatla et al., 2020, 2019). This PhD study discussed an extended relationship between positivity and motivation through SDT. It explained how positivity could tackle the severe behavioural challenges with displaced children and facilitate establishing a personal relationship which then translates into a trust relationship. In my work with the different stakeholders, especially children, it was obvious to me that children appreciate the effort made by me to make activities fun for them. They appreciate this effort and translate it into seeing that someone cares for their wellbeing, and thus they trust that person.

The findings in section (6.6.4) discussed the importance of a positive atmosphere in the educational message. Participants highlighted the importance of the educational activities and applications to be positive and to avoid encouraging stress and violence that children are already suffering from due to the displacement trauma. The literature review showed examples (section 2.1.2.2.1) on how such an important topic could be missed even by well funded international organisations. Such as the example of the UNRWA interactive educational system designed for Palestinian children in Gaza that involved shooting and war references in a literacy app. The literature on emergency education (section 2.2.2) addresses the importance of ensuring education not to reinforce violence. However, such an aspect is missing or not emphasised in the educational technology processes. The proposed design process from this study highlighted the importance to evaluate the designed systems and educational content against the socio-cultural and political aspects. However, the findings empathised the importance of positivity in the educational message.

**Personalisation and flexibility**

The findings (section 6.4.1) listed various challenges, such as stakeholders diversities in age, language, social division, experience, and needs. Such challenges require the personalisation of the design activities to suit the participants’ diversity. Furthermore, section (7.3.8) discussed the challenge of resource limitations and the need to personalise the design activities and the designed systems to match the available and possible resources with providing a list of resources types to investigate in the design process. Such findings suggest that there should be flexibility in the design and implementation of different activities. Especially with displaced children, case study one indicated how in the design activities with children, the methods had to be adapted for different purposes. For example, drawing was planned to be used as a data collection technique. However, the field notes suggested that such a method was better used to calm some challenging children and engage them in a constructive discussion on education. It should be remembered that children in such an environment may be deprived of enjoying fun activities; thus, even when the activities are planned for a specific group of children, other children may try to join looking for an activity. This study suggests that
designers should consider being flexible in this case and allow these children to participate even if their input may not be considered for the system design.

The literature on PD emphasised the aspects of personalisation (Muller and Druin, 1993; Frauenberger, Good and Keay-Bright, 2011; Robertson and Wagner, 2012; Simonsen and Robertson, 2013; Metatla, Read and Horton, 2020). Personalisation can be implemented by involving the stakeholders not only in the design of the systems but in the planning of the design activities themselves; this can be done with children and adults (Yip et al., 2017). This study provides a design process that includes guiding questions to support the designers to consider and plan for personalisation (Table 10.4 in Appendix B).

Moreover, this PhD study expanded this discussion by relating the importance of personalisation in the identified design challenges in displacement, thus revealing its link to motivation through the need for competence and relatedness in SDT. This is because people are more confident in participating in activities that are personalised to their experience and needs, which links to competence. And they feel more appreciated and respected when the designers make them feel respected when they personalise activities to suit them, which links to relatedness. Thus, personalisation was linked to helping overcome several design challenges that resulted from the case studies, such as experience (section 7.3.5) and stakeholders diversities (section 7.3.4). From my personal reflection, participants would not have participated in the design activities unless I had personalised the activities to suit them. Such as to ensure that activities were being run at a suitable time for their daily schedule, at suitable locations where they feel relaxed, and involved in activities that they are comfortable in participating in and have the required skills to complete. And even when personalisation is not possible due to essential experience limitation, experience exchange was conducted to empower them, as discussed in the previous paragraphs on experience exchange- that links to mutual learning in PD- and empowerment.

Another aspect of personalisation is the importance for the design activities and the educational materials that result from the design process to be personalised to the socio-cultural and politically sensitive topics and aspects for the displaced people, especially with the presence of the culture and language diversity, and the social division. The literature review (section 2.2.2) discussed the importance of emergency education not to reinforce the political conflict of the socio-cultural divisive aspects through education. Nevertheless, such an aspect is not discussed in the design processes for educational technology. This PhD study emphasised the personalisation of education and incorporated this aspect in a design process with accompanied guiding questions that guide the designers investigating the divisive aspects that require consideration.
The previous sections discussed multiple aspects and attitudes that the CRIT method emphasises for stakeholders involvement. The next section will discuss the aspect of trust and personal relationships. The concepts of trust and involvement are interlinked. The discussion on trust and its aspects in the next section can be considered an extension to answering the question of “how do we engage with the stakeholders?”.

### 7.4.4 Trust and personal relationships

The findings (section 6.5) showed that due to the diversity complexities, the political and social division, the context of asylum-seeking and relaying on aids by the organisations, the displaced populations expressed mistrust with the NGOs staff, the government officials, and even with other groups within the displaced community. This illustrates how such context suffers from extreme distrust between the different existing stakeholders.

**For Access, consent, participation, and reliability**

Various findings examples (6.5) emphasised the importance of trust as an essential aspect of access to the different stakeholders in displacement. Trust was required from the earliest stages of the cases studies; the NGOs staff stated that they would not have allowed access to such a sensitive environment to interact with the vulnerable community unless they had trusted the project goals and the researcher. Trust for access has been discussed in the literature on displacement psychology (Miller 2004) and co-design (Clarke et al., 2021; Pipek et al., 2019; Warwick, 2017), where these papers insisted that trust is essential to gain access and permission to design. Clarke et al. (2021) emphasised that design processes should only take place once trust is already established. The authors expanded by explaining that trust can be achieved through informal conversations. Pipek et al. (2019) stressed how collaborating with local partners, and local NGOs that are already trusted by the community was essential to understand the local situation and to gain the trust of the community leading to understanding their real needs and hopes. This was very similar to my experience as it was obvious to me that many stakeholders, especially the staff from the NGOs working in the camp, were seeing me as a trusted person mainly because I was volunteering at the camp and had already established a relationship with the NGO that we partnered with for this research. Thus, they saw me as a -friend of a friend- which is much better than a total stranger in such a context where trust is always a challenge.

Even though lots of research highlights the importance of understanding the context and relationship-building to gain trust, such a topic is not presented as an essential stage in a design process. Even Clarke et al. (2021), who stated that design activities should start after trust relationship building, did
not present relationship building as a stage in a design process. Trust is often discussed as a non-design component that is essential, yet it is not essential enough to be considered a design process stage. This is what this PhD study present in its design process and the CRIT method. Furthermore, This PhD study suggests that the trust-building stage should be preceded by a stage of contextual understanding in order to gain the knowledge required to build a trust relationship. This PhD study and Clarke et al. (2021) agree that trust can be achieved through benevolent acts such as volunteering which was also discussed as a part of ethnography (section 7.4.3.1). The understanding of the stakeholders’ needs and challenges in the “prior understanding” stage of the CRIT method allows the designers to align the research goals with the stakeholders’ needs from the early beginnings of the research. Achieving this result in increased trust and allows for access to the location and stakeholders where further understanding can be achieved. This was discussed with examples in section (7.4.3.1.1).

The findings chapter section (6.5) explained how trust could be achieved through empathy as an essential factor and linked empathy to the prior understanding of people’s needs and challenges in informal communications from the early stage of contextual understanding. Weibert et al. (2019) have also emphasised that cultural empathy is needed to retrieve useful information and evaluation results when designing with a diverse user group such as refugees and displaced communities. This also aligns with Clarke et al. (2021), where the authors emphasised that negotiations take place in the form of informal discussions prior to any design activity as an essential component of trust-building. And any actual design work is described in terms of empathy to also result in trust relationship building (Clarke et al., 2021). This PhD study expanded the concept of empathy further and linked it to motivation and autonomy in several instances in the CRIT method, explaining how such aspects are even more essential in the context of displacement where trust is an existing essential challenge due to the severe lifestyle and conditions of displacement.

The findings (6.5) on the effect of social bias on trust also highlighted the importance of trust for participation, such as the quote from the displaced community leader who stated that trust for the community is essential, especially when it is related to involving children and providing education. This was explained because several organisations and staff sometimes exploit the displacement camps for external agendas (political, religious) that would contradict the already vulnerable and divided social fabric of the displaced community. The discussion section (7.3.6) discussed the importance of trust and personal relationships for the challenge of unexpressed needs. The literature from the psychology of displacement (Miller 2004) discussed this and called it “trust for data reliability”, in addition to discussing the link between social bias and trust. This PhD study presented trust and personal relationships in the context of a design process and system problem and requirement analysis to tackle the unexpressed needs (section 7.3.6). Furthermore, it showed the importance of a contextual
understanding of the social division and sensitive socio-political aspects to avoid social bias. Moreover, it linked the concept of trust and relationships to motivation through supporting the need for relatedness in SDT. This PhD study also suggested techniques that support establishing trust relationships, such as ethnography, active participation, and servicing.

**Trust and personal relationships between adults and children**

This research also discussed the importance of trust and relationship building for participatory design with children. It discussed the importance of trust and relationship building as an essential precondition for successful and ethical interaction with children. This includes better communication, a more balanced partnership, and a possible solution to the behavioural difficulties that are known to exist in the displacement context (7.3.2). Children’s behavioural difficulties accompanied by their lack of experience and literacy difficulties mean that power dynamics between them and adults become extremely challenging and require special attention to balancing this relationship for a successful and ethical interaction.

The literature review discussed that Druin (2002) provided a well-known and implemented model for involving children in participatory design activities (figure 2-16 and Table 2-3). The model discussed the different possibilities for child involvement in PD and the different dynamics associated with each role. The discussion on relationships included the relationship between children with technology, with the goals of inquiry, and with adults. When Druin (2002) discussed the relationship with adults, the discussion was mainly regarding the form of discussion (indirect, feedback, dialogue, or elaboration). However, there was no focus on the importance of trust and personal relationships with adults in this method. This PhD study found that to design in the context of displacement, the aspects of trust and personal relationship should be discussed in the different involvement methods with both children and adult participants. Thus, the work from this research can form such an addition to the pre-existing methods of involvement in PD based on our peculiar experience with the context of displacement.

Yip et al. (2017) expanded on Druin’s method and highlighted the essential importance of relationship building with children for a balanced partnership because children need to feel comfortable that adults take their ideas and designs seriously. Similarly, Parnell et al. (2008) reported that children do identify it when they were being genuinely listened to as opposed to when listening to them is being done just as a tick box exercise. This links directly to the concept of trust as children would not trust adults who do not genuinely listen to them respectfully, which our findings highlighted in section 6.5, where trust was linked to respect, empathy, care, and avoiding biases that may arise from adults not trusting children’s ideas.
The findings in (6.5) included quotes from children specifying that they want the designers and researchers in a design process not only to work on a specific design task. The children emphasised the importance of trusting someone with whom they have a friendship and personal relationship with, someone who spends time with them in non-research activities such as playing football and organising playful events. Such a meaningful relationship had a positive effect on children's behaviour and on their willingness to participate in such a project. Yip et al. (2017) suggested a framework to examine the adult-child relationships with a dimension of personal relationship-building to observe how much social interaction occurs in the co-design group. Moreover, the authors expanded by explaining that social activities outside the co-design workshops, such as playing with children toys and dancing together, were genuinely appreciated by children. Yip et al. (2017) specified that such non-design social interactions helped in tackling the adult-child power structure. Similarly, Wake & Eames (2013) emphasised the aspect of fun as a key part of the co-design journey with children. The authors incorporated fun as a part of their “Skilled facilitation” aspect in their design model. Moreover, they linked fun to the facilitation of trust and personal relationship building from (Parnell et al., 2008).

As discussed earlier in the section on personalisation and flexibility, participants in general, and especially children, do appreciate it when someone makes an effort to make them feel happy. Their lives are most affected by the severe nature of displacement, as discussed in the literature review (section 2.1). Moreover, children have the least power amongst the many groups in this context. This is why child-adult relationships should involve fun, experience exchange, and empowerment to hear their real voice. I personally felt it and heard it from children that when they see someone who genuinely cares—and they can feel it—and makes an effort for them to succeed in a task, they would trust that person. This will translate into better behaviour, respect, and involvement. It helps overcome the existing power imbalance that affects their lives on a daily basis. Finally, this clearly links to the need for relatedness in SDT and motivation.

This PhD study agrees with Yip et al. (2017) and Wake & Eames (2013), the CRIT method suggests that social interaction between adults and children should not be limited to the co-design activities, but to cover non-design activities that are planned specifically for the purpose of relationship building and trust-building. Thus, such interactions, in addition to respectful and full inclusion of the children in the design process as equal partners, are repeatedly emphasised in the CRIT method as they have a direct effect on children’s behavioural problems that are a main character of displacement. This aligns with Jones et al. (2003), who suggested that giving challenging children more involved roles in design activities enhances their behaviour. The CRIT method connected these aspects to motivation through the need for autonomy and relatedness in SDT that results in an internalised intrinsic motivation for a
better behaviour because children adopt the values of the people they are related to and who make them feel valued (Deci & Ryan, 2001).

The challenge of experience diversity explained that many children had difficulties in understanding how technical devices work, which was essential for the tasks in the co-design workshops. It was explained that such difficulty was resolved by educating the children on these devices and how they are used. Furthermore, for children who lack drawing skills, stickers of the required devices were printed and provided to them so they could stick them on their designs to avoid the need to draw them. The CRIT method named this process “experience exchange”, and this links to the facilitation dimension and the design-by-doing dimension in Yip et al. (2017) that examine how much support and mediation takes place between adults and children. The authors stress that support and facilitation of the participatory design workshops should not only be from the adult side but from both sides, adults and children, in a way that motivate children to design. The author provided examples of facilitation from adults that negatively affect children’s motivation who refused to take part in an activity as opposed to other cases where adopting children’s ideas on how to facilitate the session resulted in a better motivation for the children to participate. This links to case study two, where teachers have expressed that children feel proud and happy when they teach the teacher some Arabic and Kurdish words in the classroom. This empowers them and makes them feel like equal participants because they can see that they are participating actively and are not just receivers of information.

The findings from this PhD study are aligned with Yip et al., (2017) by emphasising the value of experience exchange while linking it to the need for autonomy in SDT where children feel that they have control over the designs and the facilitation of the participatory design workshops, which results in a better motivation. Linking the dimensions from Yip et al. (2017) to SDT allows for more investigation on how such a framework can be expanded to unpack its link to motivation.

In conclusion, the relationship between adult co-design participants and children should be built on mutual respect and appreciation. The relationship between adults and children should start ahead of any design work through non-design activities that incorporate fun to break the power inequalities between adults and children. It is highly suggested in a displaced context that children play the role of a full design partner as this results in better behaviour and a higher probability of active participation. A full design partner role involves respecting children’s ideas in designs and their suggestions on how to facilitate the design workshops. Trust, relationship building, and experience exchange are specified as separate stages in the design process developed in this PhD study to emphasise the importance of such aspects when designing in displacement. Furthermore, these aspects are grounded in SDT, explaining how they result in more intrinsic motivation.
Contribution to trust and personal relationships in HCI and PD

The literature review on trust in HCI and participatory design (2.4.6.1) outlined that trust is discussed either between end-users and technology systems (Nickel, 2015), or between the designers and participants but with a focus on trust as a tool for successful co-design activities (Fails et al., 2012; Frauenberger et al., 2011; Kautz, 2010). Furthermore, trust is discussed in the work of (Fails et al., 2012) with children to equalise the power between children and adults to support the collaborative work. The authors stated that a trusting relationship supports the design process for both ethical and design goals. Establishing trust and relationship was suggested to be done using ice-breaking activities before design sessions.

However, such discussion of trust is often limited to the success of the design activities, ethics. It is discussed to a limited extent with little details on how the trust should be initiated and how essential it is. This research aimed to produce a design process for the context of displacement where trust is paramount and yet rarely discussed to the right extent. Evidence of this is the literature review that Tahir & Wang (2019) conducted on the “methods and guidelines for child-computer interaction research with refugee children”, where trust was one of the identified factors for literature comparison. Our paper (Alain et al., 2018) which is built on the initial analysis of case study one, was the only paper from HCI that was mentioned in the review to discuss trust as an essential factor of designing with displaced communities. Other papers that mentioned trust in the review paper were from psychology and international development disciplines.

The PD literature has started recently to acknowledge trust as an essential component in the design processes, such as one case study reported by Krüger et al. (2019) where the designers team recruited a designer who had spent a long time with a marginalised community ahead of the design activities. The authors stated that this designer became the primary connection with the community regarding any criticisms from the community and to mediate any sensitive topics. More research in child-computer interaction is also discussing trust and personal relationships, such as in inclusive education for marginalised children (S. Ibrahim et al., 2020), and methods of designing with children through proxy design (Metatla et al., 2020). However, establishing trust and personal relationships has not been clearly highlighted as a separate and essential design process stage, same as requirement analysis and implementation, which is one of the main highlights of this PhD study that situated trust and personal relationship in a design process and explained its role and relation to the other stages.

In conclusion, this research extends the discussion on trust in HCI. It suggests that trust and relationship building should be an essential and independent stage in the design processes in such contexts where the stakeholders are overwhelmed, vulnerable, and facing socio-cultural and
psychosocial difficulties. It revealed the relationship between trust and children’s behaviour in such a complex context and linked it to motivation. Furthermore, this research showed how trust and relationship building in this context requires a prior understanding of the stakeholders, location, and conflict. This contributed to adding further details to the contextual understanding stages in the design processes in HCI which allows the contextual understanding to prepare for the stage of trust and relationship building. Finally, the CRIT method also suggested techniques that were used in this research to establish trust relationships, such as ethnography, active participation, and servicing (section 7.4.3.1). Finally, this PhD study also contributed by linking the aspect of trust to motivation through SDT in different sections and by linking trust and relationships to tackling several of the identified design challenges in section 7.3.

It should be noted that establishing trust and personal relationships may rely on language. In this case study, it was significantly more comfortable for the researcher, who is from Syria, to establish trust and personal relationships with the community since the researcher spoke the same language and shared the same culture. If this method is to be replicated by other researchers, it may prove to be much more challenging to implement if the designers do not speak the same language and understand the culture (Metatla et al., 2020). Thus, it could be suggested to do like Fisher, Yefimova and Yafi (2016) and Krüger et al. (2019), where both designer groups recruited team members who speak the same language and understand the culture of the community.

7.4.5 Designer’s position

This section is a personal reflection on my position as a researcher/designer during this PhD study which link to the other points that were discussed in the previous sections. It aims to discuss the personal challenges that I faced as a researcher during this research. These challenges are related to the subject of closeness and distancing and to the design challenges of conflicting needs, diversity, and other challenges. It was added in a separate section to avoid repetition.

In addition to all the points discussed above regarding the conflicting needs and diversity of power, it could be helpful to express that I - as a researcher- felt that I am also affected by all of these diversities and conflicting needs, diversity of culture, and power dynamics. In several cases, I felt that my role as a researcher was complicated. On the one hand, I am a professional researcher conducting a PhD study and has to maintain equal distance from all different groups. And on the other hand, I am a Syrian refugee myself, who had experienced the power dynamics and the feeling of being reluctant to express myself in front of others whom I consider more experiences due to their nationality or position. This personal experience may have supported me in building more empathy towards the displaced community. But I had to keep reminding myself to use this to the benefit of the research by
empowering the displaced community, but without confusing empathy with a bias towards any group. Being with the volunteers, NGOs staff, and teachers helped me maintain a professional yet empathetic stance towards all the different groups as I was also experiencing the challenges of all the different stakeholder groups on a daily basis.

However, this might be even harder for other researchers and designers in such a context who have never had similar experiences as the community they are studying and designing for. It is irrational to expect that each researcher should have experienced the same challenges as the community they are researching or designing for to ensure achieving the empathetic stance that is discussed by (Ryan & Deci, 2000; Ryan, 2020). This is why it becomes even more important for other designers in this context to spend enough time learning about the communities and the different groups as suggested in stage one of the design process, work on establishing trust relationships with the community and the different stakeholders as in stage 2 of the design process, and consider these two stages just as important as any other stage of the design process.

During the understanding, it is important to understand the needs and fears of the different stakeholders, yet to also keep the same distance from all the different groups. Which links to section 4.3 of the methodology discussed the topic of the position of the researcher in this PhD study. In qualitative research, “the goal is understanding rather than measuring and manipulating, the subjectivity of the researcher is an essential part of the production of an interpretation” (Adams, Lunt and Cairns, 2008, p.139). Moreover, in cases where the researcher/designer belongs to one of the groups they are studying, it is more than important to maintain reflexivity, as discussed in section 4.3, which involves questioning one’s own taken for granted assumptions (Finlay, 2008). In other words, researchers should allow themselves to question their assumptions that originate from their personal experiences. In summary, a researcher should be understanding and empathetic with others and reflexive with self. All of this is essential for the effectiveness of the research and design work in managing conflicts and power dynamics. And then, this attitude of understanding and reflexivity should be exported to other group members in order to resolve the conflicts that will arise from the conflicting needs, diversity of culture, and every challenge other displacement challenge.

7.4.6 Positioning self-determination theory in the CRIT method

The previous sections discussed the CRIT method by linking its components to SDT and motivation. It can be seen that motivation is an overarching concept that is a core of the CRIT method and the design challenges that the CRIT method has been developed to tackle. This section will discuss the positioning of SDT in the CRIT method.
**Previous research on SDT and PD**

The previous discussion sections all provided evidence on the relevance of SDT to the displacement context and to the values of PD. Even though SDT is well known and used in disciplines like educational technology, business, and gamification, very little has been discussed on developing PD methodologies and design processes based on the needs of autonomy, competence, and relatedness from SDT. As discussed in the literature review section 2.5.10, some research like Davis et al. (2017) and Jessen et al. (2017) used SDT to categorise and understand the requirements of systems designed in a participatory design process. But this was only a reflection on the designed systems from the lens of SDT without discussing the relationship between SDT and PD values. In other words, SDT was not involved in the PD design processes in these papers, but it was used only to evaluate the resulting system requirements. Little research such as Dent-Spargo (2018) suggested that PD and SDT have a lot in common and can be integrated together in a design process rather than using SDT to evaluate the outcome of PD. The paper suggested a link between autonomy, competence, and relatedness and the practices and values of PD. However, SDT was not discussed as a component of PD in a design methodology. This PhD study presents SDT as a theory to plan and understand the aspects of motivation in both the design process activities (through the CRIT method), and to design and analyse the resulting system requirements. The next paragraph and Figure 7-2 will summarise the positioning of SDT within the CRIT method.

**Contribution to PD and SDT**

Contextual complexity in the CRIT method describes the challenges and complexities that exist in a displacement context. These complexities all result in a state of no motivation or external motivation enforced by external factors such as laws and regulations. If these complexities are not well understood and addressed, both the design activities and the designed systems will render irrelevant to the stakeholders’ context resulting in a lack of trust and involvement. The CRIT method suggests that implementing the components of involvement and trust will help to understand the contextual complexities and will encourage the elements which are included in SDT (autonomy, competence, and relatedness). This will result in increased intrinsic motivation and more relevant design activities and designed systems. The increased motivation and relevance will result in an internalised motivation which will manifest in increased involvement and trust.
7.4.7 The design process

This section will discuss the findings regarding the design process. Section 7.4.7 will discuss the process stages. Section 7.4.8 will discuss the design process flow change as a result of the findings.

7.4.7.1 The process stages

The design process stages remained the same in regards to the count, the rationale, and the order. However, the data analysis challenges revealed several aspects that suggested additions to the guiding questions in Appendices (B, C, and D). Thus, each of the tables in the appendices will have a column that illustrates whether the questions were added in the proposed process or as a result of the case studies implementation and findings. The tables will also include section numbers of the source that is discussing the need for these questions.

7.4.7.2 The design process flow

This section will discuss the findings in light of the literature on data process types and flow. The findings regarding the design process evaluation showed that in the context of displacement, contextual complexity is a significant challenge that involves continuous changes in both the context
and stakeholders. The system requirements were challenging to identify due to the lack of experience. Furthermore, the requirements were regularly changed throughout the process implementation and required continuous stakeholders involvement. The implementation of the design process required extensive time due to the need for contextual understanding and ethnographic approaches. Thus, it can be suggested that designing in this context is considered of high risk. The data findings from the design process evaluation also discussed that the implementation of the design process involved repeating all of the design stages more than once.

The aspects of regular changes in requirements, long design time, users involvement, and complex context have been discussed in the literature on system design (Alshamrani & Bahattab, 2015; Balaji, 2012) and instructional systems design literature (Allen & Sites, 2012; Bichelmeyer, 2005; Molenda, 2003). Both disciplines suggested that such aspects result in the need for non-sequential design processes and favour the iterative design process when these aspects are present. This was confirmed in this research as the implementation of the design process was not sequential.

The proposed process discussed in chapter 3 suggested that when following a PD approach, overlap often happens between different stages to allow flexibility (Stappers et al., 2009). This is why the proposed design process developed in this research was illustrated in the figure below before the case studies.

![Figure 7-3 The proposed design process flow](image)

However, the findings on process evaluation from this research study (section 6.5.1) suggested that once a process stage starts, it extends to all the process stages that follow it. This means that a more suitable illustration of the design process in the light of the findings would be more like the onion method below.
Figure 7-4 The final flow diagram for the design process

The understanding of the stakeholders and the conflict should be the first stage as it is required for trust relationship building that needs a prior understanding of the stakeholders’ culture, needs, and challenges. The understanding stage is extended to all the following process stages as the understanding continues and keeps getting deeper. The trust relationship-building stage starts next and extends to all the following stages. Trust relationships improve with the different stakeholders over time, even in the later stages, especially with the continuous changes that mean that new stakeholders may emerge in different stages. The problem and requirement analysis begins afterwards and extends to the design stage as there were many examples where the design activities and the designs revealed new aspects of the problem definition or even provided the additional contextual understanding that suggested further changes and personalisation of the design activities. This aspect links to the concept of intertwining between the analysis and the design stages (Bratteteig et al., 2012; Carroll & Rosson, 1992; Schon & Wiggins, 1992; Simonsen & Robertson, 2013), which was discussed in the literature review. Finally, implementation and evaluation follow the design, and they also contribute to all the previous design process stages.
7.4.8 RQ2 conclusion:

This section has presented the CRIT method and the design process. The two components together answer RQ2 as they have presented a design process that has been evaluated in two case studies, in addition to a CRIT method that includes the values, attitudes, and practices that should be followed when implementing the design process. The final section, 7.6 will include further details regarding answering the main research question of this research and will add further details on how the design process and the CRIT method answer the main RQ.

7.5 RQ3: The systems

This section will answer the third research, which is: “What are the lessons learned from implementing the proposed design process regarding the requirements of educational technology systems to support the learning of displaced children?” This will be done by discussing the data findings regarding the resulting systems, the use of technology, and their link to motivation and SDT. The discussion of this RQ aims to provide suggestions for future projects that will harness technology for the educational technology of displaced children based on the findings from both case studies.

The findings showed several examples of how participants suggested that technology is fun and engaging (6.6.4). The words “fun” and “interesting” were mentioned various times by the parents and children regarding technology and are linked to the need for competence in SDT. However, various quotes in the findings discussed that technology on its own is not helpful and that fun should not be the end goal. Examples from all participant groups emphasised that attendance, progress, and learning are the main goals and not fun (section 6.6.5). The aspects of progress and learning are also linked to the need for competence in SDT as they reflect the mastery of new skills. The teachers specified that the resulted system must also be usable by them and by the children; usability is also linked to mastery which is related to the need for competence. Thus, technology in this context supports student engagement, which is linked to the behavioural difficulties that are known to exist in the displacement context. However, this can only happen if it is designed in accordance with the educational needs and challenges and usable by the end-users.

The discussion in sections 7.3.4 and 7.3.5 discussed how many displaced participants had literacy difficulties due to missing on schooling or even never attending schooling. Furthermore, all the different groups, such as the displaced community, the volunteers, and the NGO staff, were very diverse by culture, language, and expertise. Thus, systems designed for such a community should consider depending more on visuals rather than text to reduce difficulties for many in this particular audience due to language and literacy challenges. Weibert et al. (2019) discussed this point where
they designed a language learning support wizard, and they specified that their wizard was more of a visual nature in its interface to be usable and accessible by learners who are still in their early level of language learning and might not be able to read foreign text. Thus, the use of more visuals and icons was favoured.

The findings in 6.4.1.4 discussed how many children use their parent's smartphones. This is similar to the findings from Weibert et al. (2019) and Pipek et al. (2019), where both projects suggested that smartphones are commonly used amongst displaced communities and could be harnessed for technological systems.

The context of displacement was discussed to suffer from lack of resources, which was evident in case study two (section 6.4.3), where the teachers did not have printed educational materials to work with nor any support to obtain materials that are suitable for the special education of the displaced children. This was a significant area for technology to help in this challenge, as the teachers found it more accessible and almost costless to use online educational materials. The teachers said that technology, in this case, allowed for rich and interactive educational materials which supported engaging the pupils in the classroom. This suggests a possible future use of technology to tackle the challenge of a lack of resources in a displacement context. Furthermore, it also shows a possible link between technology and interactive educational methods that have been discussed in the literature review by Gettinger and Walter (2012) and Gredone (2010) as facilitators of engagement.

The designs by the children in case study one favoured self-learning systems (section 6.2). They described it to give them more control over what they want to learn the pace of learning. This was because children had diverse educational needs, skills, and academic knowledge levels, which are linked to the context of displacement. The concept of control and self-learning is linked to the need for autonomy in SDT.

Many educational technology designs for children consider their age as an indicator of their knowledge. This PhD study aligns with Weibert et al. (2019) by suggesting that age is not an indicator of knowledge amongst the students who may have missed school or university due to their displacement journey. Mapping educational technology lessons, activities, or educational packages should be based on their previous academic knowledge rather than age. This was already discussed earlier in the context of educational needs planning; however, it is worth mentioning in the systems section as some systems may organise the learning material by age instead of skills.

Many of the designed systems by the children in case study two involved the aspects of the challenge, feedback, and rewards. These aspects were represented by designing gamified quiz that tests their
knowledge and provides feedback, in addition to multiple instances where children expressed positive feelings about the digital rewards in some of the used educational apps in the digital self-learning space. The aspects of challenge and feedback are linked to the need for competence in SDT. Moreover, digital rewards are linked to the needs of competence and relatedness as they are linked to illustrate the mastery of a task and also support the feeling of self-value. However, Hanus and Fox (2015) highlighted that using digital rewards and gamified learning with children should avoid using gamification aspects that compare children such as leaderboards as they may cause stress and affect the self-value of the child and result in a decreased motivation. Moreover, the authors emphasised that digital rewards should only be additional facilitators for enjoyment and motivation in the learning process and not be the learning goal itself.

The implementation of the digital self-learning space in case study one could not be implemented using technology on its own even though it is a self-learning space. There had to be human support for the children to help them not only in any usability issues but to support their learning process by reminding them of their learning goals and providing further human feedback and encouragement, and compensating for any limitations in technology. Children feedback on the space showed that they appreciated the aspect of human interaction in addition to the technology, which is why the NGO later appointed a teacher at the space to support children education alongside the digital apps. This can link to the research of (Gaved et al., 2013) that emphasised the importance of the social dimension in learning. This aspect of human interaction links to a personal relationship and the need for relatedness (relationships) and competence (feedback and encouragement) in SDT.

This section on RQ3 showed the link between the findings regarding the designed systems and the aspects of motivation (SDT) and student engagement. The findings, in general, illustrated that many of the displacement challenges are linked to student engagement and motivation. This section illustrated several links between aspects of the designed systems in this PhD study and the needs for motivation, according to SDT. This links to the gap that was identified in the literature where (Tauson & Stannard, 2018) studied hundreds of educational technology projects in emergency education and suggested that technology may support motivation without specifying how this can be done. It can be suggested that the success of technology systems for displaced war-affected children requires fostering the needs for autonomy, competence, and relatedness in the design of the systems themselves.

It is paramount to highlight that technology on its own does not resolve educational challenges. The findings discussed that the stakeholders evaluate the systems by the learning progress, attendance, and sustainability (section 6.6.5). This confirmed that for systems to work, they must be associated
with clear educational goals and challenges, usable by the end-users, and results in progress and improvements in the identified challenges. Furthermore, this research suggests that the presence of human interaction is essential for the success of technology. This was evident in the findings from both case studies that the implemented systems were unable to be sustainable without the presence of a human aspect that has an interaction with the children, support their use of the systems, and support their learning and learning goals. Weibert et al. (2019) highlighted this aspect by stating that a major aspect of sustainability in the language wizard was the presence of many an association of volunteers that took full stewardship of their platform ensuring its sustainability. Pipek et al (2019) also stressed that collaboration with local partners was essential for maintaining sustainability of their project.

However, it is being missed by many of the international NGOs that are spending large amounts of funds on projects that donate technology hardware to displacement locations with little planning and discussion to whether this hardware matches the educational needs and challenges of the displaced populations (Tauson & Stannard, 2018). Finally, this research suggests that technology must have suitable relevant educational content that is relevant to the educational needs, challenges, and the complexities of the displacement.

7.6 Conclusion: What makes an effective design process?

This chapter has discussed the data analysis findings in with reflection on the literature review and answered the research questions of this PhD study. This section will provide a short summary and illustrate how the main research question of this study was answered.

Main research question: What is an effective design process for the design of educational technology systems for displaced war-affected children?

In order for a design process to be effective in such a complex context, it has to be backed by the literature covering the different related disciplines. This was done as an early contribution of this research mapping the interdisciplinary literature to produce the proposed design process. Moreover, to evaluate the effectiveness of the process, it has to be implemented in real-life situations; this was done in the two case studies described in chapter 5. In both cases, the design process yielded practical solutions that were adapted and appreciated by the stakeholders.

For the process to be replicable and helpful to other designers, the data analysis findings illustrated the many design challenges that may arise in such a displacement context. These challenges were
discussed in the findings (contextual complexity theme) and in the discussion chapter in section 7.3. The challenges were discussed with a reflection on the literature and were used to inform additional guiding questions that would assist the designers in implementing the design process in the future.

Section 7.4 answered RQ2 by discussing the CRIT design method and the design process, highlighting the different values and attitudes that would facilitate successful design activities with a contribution to the literature. It also highlighted how values and aspects of the CRIT methods could overcome or minimise the effects of the challenges identified in RQ1 by providing examples from the findings and reflecting back to the literature.

Section 7.5 provided suggestions regarding the future use of technology in displacement based on the data findings and reflecting back on the literature on self-determination theory.

Section 6.7 in the findings chapter summarised the findings in regards to the design process evaluation. It included various quotes and examples from the data highlighting the feedback of the participants and supporting the effectiveness of the design process from the perspective of the participants.

7.6.1 Evaluating the CRIT method and the design process against PD values

One final form of evaluating the effectiveness of the design process will be answering the questions provided by Robertson & Wagner (2012), which were discussed in the literature review in section 2.5.4, which aim to evaluate a participatory design process against the PD essential values.

Do users actually have decision power? If so, what kind?
The aspect of stakeholders decision power has been highlighted in all the different stages of the design process and section (7.4.3) in this research. Users are considered co-design partners and are empowered with equal voice and support through mutual learning throughout all the different stages.

Does a design method, tool or process recognise and encourage participants’ abilities to learn?
Various sections in the data analysis findings and the discussion chapters highlighted the importance of supporting users learning. This was referred to as exchanging experiences in the CRIT method (section 7.4.3.2.2). Moreover, this was also discussed in the involvement section in this chapter (7.4.3), where it was linked to mutual learning. Supporting and encouraging stakeholders learning was discussed as a solution for several design challenges in the displacement context, such as the psychosocial difficulties and the lack of experience. Furthermore, it was linked to the SDT need for competence and relatedness as it supports participants ability to master and complete their tasks and their feelings for self-value and significance in the design process.
Does a design method, tool or process guide designers and researchers to analyse and develop their interests and attitude towards participants? This aspect is covered in the design process by adding a stage of contextual understanding at the beginning of the design process. This stage was explained to aim to understand the different needs and challenges of the different participants. This understanding would inform the relationship between the designers and the participants and the planning of the design activities. Besides, the understanding from the first design process stage would inform the trust and relationship building stage with the participants. The design process provides the designers with a set of guiding questions (Appendices B, C, D) to cover several categories. These categories would allow the designers to achieve the required understanding to position themselves with the context and the participants correctly.

Does a design method, tool or process include participants’ evaluations not just of what is being designed but of the design process itself, including the opportunities for and process of participation? The first stage of contextual understanding discusses involving the participants in the decision making of the activities planning for the later stages, including recruiting the different participant groups and their experiences. Furthermore, the CRIT method specifically emphasises involving the users not only in the system design but in the planning of the design activities (7.4.3.2.2). This inclusion was linked to motivation as it links to the need for autonomy in SDT.

Does a design method, tool or process deal with a justified loss or change of design focus, for example when participants identify problems that require non-information technology solutions while the process was initiated to design information technology)?

The loss of design focus was discussed as a result of the participants’ lack of experience and the contextual lack of resources. The findings from case study two showed the example where the teachers chose behavioural difficulty as the main problem to resolve. In this case, technology was not able to be designed to tackle this problem directly. This case was resolved by researching the behavioural difficulties and unpacking them until reaching an agreement that supporting better student engagement would indirectly improve the behavioural problems. The process suggested that in such cases, the design should start by identifying the educational needs and challenges, identifying the available resources and researching the identified problems unpacking them to the full details before beginning the co-design activities. This process would add more structure to the problem and requirement analysis and co-design activities. Furthermore, the design process acknowledges that there might be problems that cannot be resolved through technology. Such difficulties can be identified following the same participatory approach, but this would be a limitation in the design
process from the co-design stage onwards. Finally, in answering RQ3 7.5, it was highlighted that technology is only an educational tool in the context of displaced war-affected children and should not be the goal itself, and it was emphasised that there should be more focus on the human aspect of the systems.

7.6.2 Conclusion and reflection

The design process from this research resulted in successful designs that were adopted and approved by the stakeholders. Moreover, the findings regarding the design process from the perspective of the participants and stakeholders confirmed the process effectivity. Especially that the epistimology in this research believes that the truth is represented by the people, who are the participants and stakeholders in this context. Finally, section 7.6.1 provided the answers to the evaluating questions illustrating how the process matches with the core PD values. We can then state that the main research question has been answered.

In summary, enablers of better problem definition are supporting motivation and engagement, emphasising trust and relationship building, and involvement. The previous aspects result in an increased relevance of the design process activities and the resulting systems. These enablers are highlighted in the CRIT method. Furthermore, this section highlighted the importance of adopting the Scandinavian values of PD. And the research linked the values of PD to motivation which is an essential aspect of displacement. These values were discussed in several sections as essential needs for trust and involvement.

The power diversity and complex nature of displacement require us as designers and researchers in this context to carefully consider the different vulnerabilities of the displaced community. People in this context have much more needs than the ordinary user needs in a technology system design context. Such vulnerable communities require the basic human needs of respect, empathy, friendship, and care to be incorporated into the design process for various ethical and practical reasons. Participants in this context are not only users but are humans before anything else, who are struggling for their basic rights and needs and are lost amid politics, laws, wars, and xenophobia. Designers in such context should ensure equal representation and defend the needs of the displaced community putting them in the centre of any design process. Furthermore, designers should include the displaced communities as real partners in the decision making in the design process planning and the design of the resulting systems.


8 CONCLUSION

8.1 Research summary

This research aimed to develop and evaluate a design process to design educational technology systems for displaced war-affected children. The importance of such a topic is self-explanatory as for children in displacement, education could provide the only sense of normality in their complex and challenging life. Thus, supporting displaced children’s education should be supported by all possible ways, including technology where applicable. However, the main problem of the research was the absence of a design process that could guide and support the efforts of the different actors from international development organisations, education, and designers interested in designing technology for such complicated context.

The research showed how such a process would require combining knowledge from multiple disciplines. Thus, the research started by reviewing the literature from various disciplines such as refugee studies and psychology, emergency education, motivation and engagement, design processes and instructional system design, and participatory design approaches. The literature review was accompanied by informal communications with different actors from the field to contribute to understanding the problem and the possible solutions.

The conclusion from the literature review and the informal communications showed a gap in how technology implementation for emergency education is being approached. There was a focus on technology as hardware with little emphasis on the distinct educational needs and challenges of each different displacement situation. Moreover, the available design processes that are specialised for educational technology and do cover the educational and pedagogical aspects do not cover the aspects of displacement with its peculiar challenging context.

Thus, the research suggested a design process that was proposed and evaluated in two case studies with Syrian displaced refugees in Greece. One case study was in a refugee camp context, whereas the other was in a formal educational setting. The research followed an ethnographic approach focusing on people perception of the implementation and evaluation of the design process. The collected data was thematically analysed and led to a design model that emphasises the understanding of contextual complexity with its subcategories as a key to achieving the required relevance of the design activities and resulting systems. The model also showed how the understanding of such complexity requires a two ways involvement of the stakeholders in the design process and the researcher in the
stakeholder’s context. This involvement was explained to require establishing trust and personal relationships with the stakeholders.

Furthermore, the research resulted in a design process evaluated in both case studies, which added further elaboration on its stages, the flow, and should each stage cover. Moreover, the discussion of the findings suggested a list of the challenges that were faced in the design process implementation with discussing them in regards to the self-determination theory, the CRIT method, and the design process. In addition, the discussion suggested a set of aspects that were identified in the findings to support better problem definition in displacement. The motivation was found to be the central point of importance for both the challenges and supporting aspects which were linked to the psychological needs of self-determination theory. The discussion of the challenges and the supporting aspects would provide essential help and guide to the designers and any actors who would conduct projects that involve designing technology solutions for this context, and educational technology solutions in particular.

8.2 Research summarised take-aways

8.2.1 Guidelines regarding the challenges of displacement contexts

Challenges of displacement context are various and were presented with examples from the case studies in the data analysis findings in the contextual complexity section 6.4, and were discussed in light of the literature and the design process and the CRIT method in the discussion chapter section 7.3.

Lack of motivation

This challenge is discussed in section 7.3.1. The first and most urgent challenge is the extreme lack of motivation amongst the different stakeholder groups such as the displaced community, displaced children, the NGOs staff, teachers, etc. Thus, it is essential to understand the various stakeholders, their fears, challenges, and needs. This is to form an empathetic stance and to be able to establish trust relationships ahead of any design activities. Understanding the context and stakeholders and building trust relationships are emphasised in stages one and two of the design process developed in this PhD study. Moreover, the guiding questions to answer in these stages can be found in Appendix B and Appendix C. Furthermore, any design activities and resulting systems should consider the aspect of motivation, which can be done through supporting the needs of autonomy, competence, and relatedness as discussed in the CRIT model.
**Children behavioural difficulties**

This challenge is discussed in section 7.3.2. Various research has repeatedly reported children’s behavioural difficulties in displacement contexts. Behaviour difficulties can be minimised by forming trust relationships with the children ahead of the design work through playful non-research activities, involving children as equal partners from the early stages of the design process, consulting children on the design activity structure and planning, ensuring a positive and empowering atmosphere, showing empathy and genuine care towards children ideas, and supporting them when they lack experience by teaching them new skills for the design rather than informing them on what to do.

**Conflicting needs and diversity of power**

This challenge is discussed in section 7.3.3. Various groups of people exist in a displacement context, and they will have different needs and powers. It can be illustrated in conflicting educational needs, design ideas, or by some groups trying to use their power to enforce what they want on other groups at any stage of the design process. Therefore, it is essential to understand the context (stakeholders, the emergency, and the location) and form trust relationships with the different groups of people as suggested in stages one and two of the design process. Moreover, it is important to have the same distance from all the conflicting groups. Ensure that all the voices are heard equally by supporting those with limited power. When conflicting needs arise, it is good to remember that all the work in displacement is supposed to help and assist the displaced community with the least power. Thus, it is crucial to keep their needs and challenges at the heart of any conflict management process. An empathetic stance should be achieved and exported to all the conflicting groups, so they understand each other’s fears and needs.

**Stakeholders Diversity of age, culture, and language**

This challenge is discussed in section 7.3.4. The challenge of culture, language, and age diversity is natural to a displacement context. It is essential to remember that age does not reflect experience, knowledge, or education amongst displaced children as they may have missed schools for years while others did not. The diversity of culture and language requires an excellent understanding of the stakeholder cultures and the context they live in, so the design activities and the designed systems can be personalised to suit the diverse needs of the different stakeholders. Design activities could be held with the various groups separately where sensitivities arise. Diversities should be met with respect and empathy.
Experience diversity

This challenge is discussed in section 7.3.5. Diverse communities, such as in a displacement context, will often have diverse expertise. This could mean that some groups may not have the required skills to participate in a design activity. Such cases should be tackled with experience exchange, support, and by personalising the activities to suit those with limited experience. Experience exchange should be empowering without enforcing ideas or biases on the participants due to their knowledge limitation. Furthermore, participants should be involved in planning the design activities, so any experience difficulties could be discovered in advance.

Unexpressed needs

This challenge is discussed in section 7.3.6. Some participants may have trouble expressing their needs due to being cautious, afraid, shy, or simply being unaware of those needs. Such needs can be educational or non-educational such as needs regarding the design activities logistics. Thus, designers need to be involved in the stakeholders’ context. This involvement helps to better understand their difficulties and needs through active participation and observation. In addition, unexpressed needs could result from psychosocial problems, especially with children. Thus, a prior understanding of participants difficulties, even on a personal level, could assist in planning the design activities to suit those with special needs.

Continuous change

This challenge is discussed in section 7.3.7. Changes in environment, stakeholders, spaces, and resources are likely to happen in a displacement context. For example, displaced members can transit to another country or another camp, and NGOs could cease to exist due to lack of funding or a project finishing. The same applies to resources such as electricity, internet connection, or equipment to be stolen or damaged. Such changes could affect the design process if they are not expected and considered. Tackling the continuous change is limited as it is out of the designers’ control. However, the presented design process suggests that designers should scope for the aspects that are likely to change and plan their design activities accordingly with the support of the guiding questions.
Resources limitations

This challenge is discussed in section 7.3.8. Displacement contexts are known for resources limitations. The lack of resources could affect the design activities if they require specific resources. This can be as basic as the availability of physical meeting space or stationery items. Furthermore, designs might be unusable if they include resources that do not exist in the context for which the systems are built. Thus, it is critical to scope for the available and possible resources from the early stages of the design process. Then, design activities would be planned to match the known and potential resources. The design process developed in this research question provides guiding questions. The resource types suggested for scoping from the case studies are physical spaces (caravans, tents, meeting rooms), technical resources (equipment, tablets, smartphones, WIFI network, applications), human resources (volunteers, facilitators, translators), time resources (availability of equipment and people at specific times), and finally funding resources to cover the cost of essential resources that are not available.

Ensuring a tangible outcome

This challenge is discussed in section 7.3.9. Due to the many limitations and challenges that exist in a displacement context. It is possible that the design activities do not result in a tangible outcome that serves the people’s needs. This is even harder when unmet promises are known in a displacement context to cause trust difficulties. Consequently, it is imperative to keep an honest discussion with all stakeholders and to avoid making promises that are not guaranteed. Moreover, the CRIT method and the design process suggest that the researchers and designers should have a plan for what to provide to the stakeholders should the result of the design process end up being unsuccessful. Such a plan could be by providing non-design support and services such as volunteering and teaching throughout the project to ensure that something tangible was provided to the stakeholders should the design process fail to introduce a tangible outcome. Such volunteering and servicing could also enhance the understanding of the stakeholders’ context and building trust relationships.

8.2.2 Guidelines regarding the design process and its application

The design process is presented in section 7.4.7, and the CRIT method is explained from section 7.4.1 to section 7.4.6.

The CRIT design method starts from the concept of contextual complexity, which explains the effect of the many challenges summarised in the previous section. These challenges result in a state of
demotivation amongst the different stakeholder groups in displacement by causing a lack of relevance. The designers should get involved in the stakeholders’ context to successfully understand their different needs and fears. Moreover, designers should implement the facilitators of successful involvement when involving the stakeholders. Involving the stakeholders and establishing trust relationships result in overcoming the contextual complexity challenges. As a result of overcoming the contextual complexity challenges, relevance increases, which is illustrated with the indicators of successful involvement.

**Contextual complexity**

The first step in the CRIT method is identifying the challenges that are related to the contextual complexity. This is done in stage one of the design process through understanding the stakeholders, the emergency, the location, and the general context. This achieves the required prior understanding of the context for involvement to start.

**Involvement**

Involvement is one of the critical concepts of the CRIT design method. It is implemented first by designers’ involvement in stakeholders context through ethnography and active participation, as explained in 7.4.3.1. This is followed by involving the stakeholders in the design activities. This involvement should follow the design process order of involving adult participants first, involving children participants afterwards for ethical and practical reasons. The stakeholders’ groups that are suggested to be involved in the design of educational technology systems for displaced children are displaced parents, displaced children, NGOs staff, educators, and decision-makers.

Engaging with the different participants should involve experience exchange (mutual learning) to help overcome the contextual challenges discussed in the previous section, such as diverse experiences, conflicting needs, diverse communities. Involved participants should be empowered by giving them an equal voice in the design activities. Achieving equal voice may require empowering the vulnerable groups that have less power than others. Empowerment leads to a sense of ownership that is linked to autonomy and better motivation. Involving the stakeholders should involve a positive atmosphere with fun and positive feedback. Activities should be personalised to match the participants’ expertise, age, culture, language, and other diversities. Activities should also consider the socio-cultural and politically sensitive topics that could cause sensitivities. Without implementing the previous aspects of experience exchange, empowerment, and personalisation activities, they will be at risk of becoming irrelevant to the participants’ context and result in demotivation for involvement.
Trust and personal relationships

Establishing trust and personal relationships is vital to gain access, consent, participation, and reliability in a displacement context. Achieving trust happens through establishing personal relationships with the stakeholders based on the prior contextual understanding. Personal relationships are achieved through respect, genuine care, empathy, honesty, and avoiding biases such as social or political biases. Empathy and care can be initiated through active participation and help even in the non-design contexts. This is because, in such a severe context, there is always an opportunity for help and care. Establishing trust relationships should be initiated and completed ahead of any design activities, specifically with children.

Interacting with children

Involving children is a delicate yet critical aspect of educational technology design in displacement. Children are the core end-users of any educational system that is designed to support their learning. However, children are the most affected in a displacement context as they have the least power and are facing life challenges that affect their development and psychosocial wellbeing. This often results in behavioural difficulties. Relationships with children should be established ahead of any design work through playful and joyful activities, care, and empathy.

Involving children in design activities should be carefully implemented with full acknowledgement and personalisation to any difficulty they may have. Designers should be aware of any psychosocial difficulties or disabilities that a child may have ahead of the design activities. Children are suggested to be involved in a full design partner role as this increases their power and sense of ownership, minimising their behavioural difficulties and allowing them to express themselves freely. Children’s activities should include methods that involve fun and that suit their skills. They should be empowered by supporting their ability to complete the design tasks through mutual learning rather than enforcing ideas on them. Enforcement gets noticed by them and would reduce the sense of ownership resulting in demotivation and misbehaviour. Children’s designs should be considered the core of the design process as they are the core end-users.
8.2.3 Guidelines regarding educational technologies design

Technology systems for displaced populations systems have to support the needs for autonomy, competence, and relatedness for motivation.

Technology should incorporate the aspects of fun. However, fun should not be prioritised over educational objectives. Fun should always be accompanied by a pedagogy plan to ensure the success of learning.

Displaced children are often diverse in language, skills, and technical experience. Thus, technology should be designed to allow for flexibility. Self-learning systems could be favoured in the cases of conflicting educational needs and diverse experiences. Many designs involved self-learning aspects because children suggested that this allows them to learn at their own pace and choose tasks that suit their expertise. Self-learning can be merged with group activities to ensure the development of social skills.

The screen content should rely more on visuals rather than text for more accessibility by non-literate children, especially due to the language barrier challenge. The aspects of the challenge, gamification, interactivity were suggested in most children designs. Learning tasks should focus on the user’s knowledge rather than age.

Rewards could be used in gamified learning experiences. However, rewards and leaderboards could make learning demotivating if it is designed in a way that causes stress and affects the self-value of children who are already suffering from various psychosocial challenges. The human aspect is essential to the learning process as it maintains the social support for children in their learning process.

Technology can support formal learning in the case of a lack of resources such as printers and books and in the presence of projectors, smartphones, and tablets. This is because digital materials do not require additional costs such as printing.

Even though technology could support learning well when designed to match educational needs and challenges. It is paramount to highlight that technology on its own does not resolve educational challenges. The findings discussed that stakeholders evaluate the systems by the learning progress, attendance, and sustainability.
8.3 Contribution

The main contribution of this research is providing the design process and the CRIT method. Both contributions would provide much-needed guidance for future work in this area and would help in bridging the gap between the different disciplines and approaches. The design process and the CRIT method, along with the other findings, will help designers and international actors. This is done by combining the knowledge from the different disciplines, providing detailed suggestions on the possible challenges that could be faced and how they may be resolved, and suggesting several aspects that should support the design of educational systems in displacement. This depth of knowledge could not have been achieved from the literature only without the field evaluation of the design process.

The discussion of the findings suggested a significant link between the displacement context challenges and motivation with providing measures to resolve the challenges through supporting the psychological needs for self-determination theory. The aspect of motivation can be adapted and reused for multiple research in displacement. Furthermore, the discussion on motivation and self-determination theory suggested multiple links to the participatory design values. This suggests future work on linking PD to motivation through self-determination theory.

This research expanded the discussion on trust in HCI and participatory design literature. It suggested that trust should be emphasised in design processes and a prerequisite for the problem and requirement analysis in the cases where the socio-cultural aspects are vital. Moreover, it highlighted the need to emphasise trust and personal relationships in the child-involvement models in participatory design to greater detail. The discussion on trust also provided suggestions on how trust can be achieved in the displacement context and the importance of prior contextual understanding of the conflict, the displacement, and the needs and challenges of the different stakeholders.

The CRIT design model is an important outcome of this research as it highlights the importance of relevance as a core aspect for successful involvement and trust. In addition to providing the reasoning behind the design process, which would support any future implementation and adaptation of the design process in other contexts.

The case studies chapter provides knowledge that will support future research or development project planning by explaining the context and methods that can be used to collect data from different possible stakeholders.

The discussion on systems and technology implementation in displacement, which answered the third research question of this research, suggested multiple possibilities on the use of technology in such context. It provided examples from the findings and the participants’ designs of linking technology to
the challenges of displacement and emergency education and the needs for motivation and engagement. It showed examples of how technology might support the aspects of self-determination theory and student engagement. Furthermore, it discussed examples of how some actors are approaching technology incorrectly by focusing on the hardware rather than the software.

8.4 Limitations

Due to the nature of displacement context and its complexity, planning the case studies and the implementation of the design process faced limitations of the depth of structure in some areas. This was due to the continuously changing nature of displacement, which affected the planning for the research. Communicating with different NGOs in different countries to find a location for the case studies was challenging. And in several cases, agreements were made but then cancelled due to either travel limitations or my refugee passport, which did not allow me to access the countries in the middle east such as Jordan, turkey, or Lebanon, which were the target countries. Or due to the changes with NGOs and camps relocations.

In addition, it was tough to gain a remote understanding of the locations ahead of the visit. This was because the NGOs staff were very busy, had internet connection problems, and little documentation to offer. This forced flexible planning of the case studies to ensure the best possible structure in such a complex context. These constraints added limitations on the time that we have in planning some parts of the research.

In the evaluation of the case studies, no learning progress was tested; this was because of the short implementation period and the lack of suitable technology to capture the personal learning progress of individual children. The tablets and laptops were shared without the possibility to create personal accounts for each child on the application. However, the attendance and involvement, the personal reflection of the participants, and the sustainability of the projects were used as indicators for the evaluation.

Following up with the individual attendance records of the children after the end of the case study was not possible. Because the volunteers at the camp who were running the space could not manage to follow this up, the children were regularly changing due to the relocations at the camp.

The stakeholders in both cases studies were supportive of the projects, and the conflicting needs and any other differences were managed and resolved with the implementation of experience exchange and mutual learning aspects. However, this may not necessarily be the case in other implementations.
The contexts in which the design process was implemented were both considered stable relatively compared to other refugee camps situations. For example, it was reported in the case studies that the camps in the Greek islands suffer from a significantly higher relocation and change rate, violence, and lack of resources. Such contexts may prove to be more challenging for the design process and technology implementation in general.

8.5 Future work

The work from this research suggests multiple avenues for future work. It suggests further work on trust and contextual understanding in HCI and participatory design. It also suggests further inclusion of the aspects of motivation in design processes, especially the self-determination theory, as it aligns perfectly with the values for participatory design approaches. The process developed from this research would benefit from further evaluation and replication in different contexts and cases. Such an evaluation would improve and contribute to the effectiveness of the process. We suggest more participatory work between the designers, the HCI community, the instructional design community, and the international development community. This is because each of the disciplines has a lot to offer to the other communities, and the participatory work would result in more effective processes and international development projects. The last suggestion would use the lessons learned from this research in researching the possibilities to design and create scalable open learning digital materials for children. Such content should be structured, scalable, easy to translate, use visuals and multimedia, and supports the need for motivation and engagement. The importance of such educational content is that it would support the different projects worldwide that can implement the needed hardware but lack the educational materials. Further work on child-adult relationships in co-design is also needed for the context of displacement.

8.6 Personal reflection

Writing this section takes me in time to the moment when I joined the open-world learning program for my PhD study. It shows me the massive contrast between me now and then. Other than becoming older, getting married, becoming a citizen who is able to travel and go to conferences after years of refugeehood and travel limitations, this PhD study changed me in many aspects personally and professionally. I joined the PhD program coming from a pure information technology background. My master’s degree programme involved designing software with little focus on the HCI aspects that focus
on people and their needs. And I just wanted to use my technical knowledge in creating helpful tools for the other displaced communities who were less fortunate than me.

Thus, I came into the PhD program as a person who believes that technology is the key to everything. In my first week of the study, I was thinking about which software to use which programming language if I required a powerful computer or not. Even for a prolonged period throughout my PhD, I was always only thinking about technology. The later progress of this study, being introduced to the HCI literature, and my communications with multiple people working in displacement, who explained how implementing technology on its own helped them with nothing. In addition to my field studies, all of this changed my mindset 180 degrees.

On a professional level, it made me see the art of technology in simplicity and opened my eyes to the importance of people. Technology is not how it is perceived from the outside by how complicated and elegant it is. Technology can only be perceived from the perspective of the people using it and how it improves their lives, even if it is in the simplest forms like using PowerPoint in case study two. This showed me how essential understanding people is and made me more curious about several social topics. Thus, I have decided to pursue a career in user experience research, as this is where I believe I can use my technical abilities and my newly acquired skills from HCI, social science, and research.

On a personal level, this study also changed me and made me another person. My daily interactions with the displaced community taught me to appreciate how much people in such a challenging context can smile, live, and be super kind and hospitable to a stranger like me. I could have done my PhD study on many subjects, But if I go back in time, I would never choose anything else because the positive feelings which I felt in my field studies were above any expectation. The smile on the faces of the children running into the digital self-learning space was much more rewarding than coming up with a new artificial intelligence algorithm. One of my many favourite moments from my field study was when a child once told me that he had a dream about the scenes that he saw in the world atlas application, and he was happy that he was dreaming about something beyond the limitations of the camp.

If we can help a child learn, this would be saving a human now and a future family from the effects of the conflicts and politics that were enforced on them.
# References


Scaife, M., & Rogers, Y. (1999). Kids as informants: telling us what we didn’t know or confirming what we knew already? In *The Design of Children’s Technology* (pp. 1–26). Morgan Kaufmann. https://doi.org/10.1145/258549.258789


## 10 APPENDICES

### A. List interviews during the preliminary study

<table>
<thead>
<tr>
<th>Interview ID</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>P01</td>
<td>head manager of the NGO (10 schools in Lebanon)</td>
</tr>
<tr>
<td>P02</td>
<td>head manager &amp; former manager of Jusoor NGO (3 schools in Lebanon) that has implemented technology trials to support displaced children’s education</td>
</tr>
<tr>
<td>P03</td>
<td>Head manager at “White Hands” NGO, 3 Schools in Jordan. Member of the Jordanian parliament</td>
</tr>
<tr>
<td>P04</td>
<td>Education Officer at UNHCR Jordan</td>
</tr>
<tr>
<td>P05</td>
<td>Senior Advisor on Education at UNICEF</td>
</tr>
<tr>
<td>P06</td>
<td>Manager at “Molham Team” NGO Jordan, which has more than 170 volunteers providing aid and education in several refugee camps in Jordan, Lebanon, and Turkey</td>
</tr>
<tr>
<td>P07</td>
<td>Manager at “Souriate across borders” NGO</td>
</tr>
<tr>
<td>P08</td>
<td>An employee at “Basma wa Zaitouna” NGO Lebanon (3 Schools)</td>
</tr>
<tr>
<td>P09</td>
<td>A researcher from Birkbeck university London, who researched Syrian refugee children education in Jordanian schools and refugee camps</td>
</tr>
<tr>
<td>P10</td>
<td>Emergency education researcher at Save the Children UK who conducted multiple studies on EdTech and Displaced children</td>
</tr>
<tr>
<td>P11</td>
<td>Consultant psychiatrist and Cognitive Psychotherapist. Trained many mental health supporters working with Syrian refugee children in Turkey and Jordan.</td>
</tr>
<tr>
<td>P12</td>
<td>Researcher and volunteer with MSF who visited refugee camps in Greece as a part of his PhD in emergency education and literacy.</td>
</tr>
<tr>
<td>P13</td>
<td>A researcher who conducted Participatory Design workshops at several refugee camps in Jordan</td>
</tr>
<tr>
<td>P14</td>
<td>Manager of an NGO that trains teachers at schools for displaced Syrian children within Syria</td>
</tr>
</tbody>
</table>
### B. Guiding Questions for design Process stage one: contextual understanding of the conflict, the displacement, the stakeholders, and the culture

#### Table 10-1 Guiding questions to understand the conflict

<table>
<thead>
<tr>
<th>Substages</th>
<th>Guiding questions</th>
<th>planned</th>
<th>Added or Expanded</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understand the conflict</td>
<td>1- What is the nature of the conflict? (armed, civil war, international war)</td>
<td>✔️</td>
<td></td>
<td>Tawil and Harley (2004); Miller, 2004;</td>
</tr>
<tr>
<td></td>
<td>2- What are the groups involved in the conflict?</td>
<td>✔️</td>
<td></td>
<td>Tawil and Harley (2004); Miller, 2004;</td>
</tr>
<tr>
<td></td>
<td>3- What are the groups affected by the conflict? (civilians, refugees, armies,</td>
<td>✔️</td>
<td></td>
<td>Tawil and Harley (2004); Miller, 2004;</td>
</tr>
<tr>
<td></td>
<td>neighbouring countries, host country people)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4- What is the nature of the social division? (political, racial, sectarian)</td>
<td>✔️</td>
<td></td>
<td>Tawil and Harley (2004); Miller, 2004;</td>
</tr>
</tbody>
</table>

#### Table 10-2 Guiding questions to understand the displacement

<table>
<thead>
<tr>
<th>Substages</th>
<th>Guiding questions</th>
<th>Proposed process</th>
<th>Added or Expanded</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understand the</td>
<td>1. What is the nature of the displacement?</td>
<td>✔️</td>
<td></td>
<td>Miller, 2004; Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td>displacement</td>
<td>2. Where are people fleeing from, and how are they fleeing?</td>
<td>✔️</td>
<td></td>
<td>Miller, 2004;</td>
</tr>
<tr>
<td></td>
<td>3. Which groups of people are fleeing to where do they flee to?</td>
<td>✔️</td>
<td></td>
<td>Miller, 2004; Tawil and Harley (2004)</td>
</tr>
<tr>
<td></td>
<td>4. What is the situation back home and in the host country</td>
<td>✔️</td>
<td></td>
<td>Salmi 2004 ; Tawil and Harley (2004)</td>
</tr>
<tr>
<td>Substages</td>
<td>Guiding questions</td>
<td>planned</td>
<td>Added or Expanded</td>
<td>Source</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------------</td>
<td>---------</td>
<td>------------------</td>
<td>--------</td>
</tr>
<tr>
<td>understand the stakeholders and culture:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-</td>
<td>Which groups, organisations, and government entities are involved in the management of the location in which the design process will be implemented?</td>
<td>☑</td>
<td></td>
<td>Miller, 2004; Miller, Kulkarni and Kushner, 2006; Block et al., 2013; Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td>2-</td>
<td>What is the demography, languages, and culture of the different groups of people and organisations?</td>
<td>☑</td>
<td></td>
<td>Miller, 2004; Kukulska-Hulme, 2017; Krüger et al 2019; Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td>3-</td>
<td>What are the habits, interactions, and relationships between the different groups of people and organisations?</td>
<td>☑</td>
<td></td>
<td>Miller, 2004; Krüger et al 2019; Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td>4-</td>
<td>What are the concerns, fears, needs, and hopes of the different groups of people and organisations?</td>
<td>☑</td>
<td></td>
<td>Miller, 2004; Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td>5-</td>
<td>How are the conflict and social division reflected in the stakeholders community?</td>
<td>☑</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-</td>
<td>What are the socio-cultural sensitive topics that should be considered when communicating with or designing for the different stakeholders?</td>
<td>☑</td>
<td></td>
<td>Miller 2004; Tawil and Harley 2004; Salmi 2004; Van Ommering, 2011; Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td>7-</td>
<td>Whose voices are not heard, why, and how can they be involved?</td>
<td>☑</td>
<td></td>
<td>Tawil and Harley 2004; Krüger et al 2019</td>
</tr>
<tr>
<td>8-</td>
<td>What can we offer in return for the stakeholders’ participation?</td>
<td>☑</td>
<td>☑</td>
<td>Robertson &amp; Wagner (2012), (Section 2.5.8), (Section 7.4.3.1); Preliminary Study (Section 3.1.8)</td>
</tr>
</tbody>
</table>
The following table addresses the important aspects of planning the design activities. The questions in this table would be revisited regularly during the design process and depending on the design stage.

**Table 10-4 Guiding questions for location contextual understanding and planning for later stages**

<table>
<thead>
<tr>
<th>Substages</th>
<th>Guiding questions</th>
<th>planned</th>
<th>Added or Expanded</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning for later stages</td>
<td>1. Which groups should be identified as stakeholders in the design process?</td>
<td>☑️</td>
<td></td>
<td>(Robertson &amp; Wagner, 2012); Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td></td>
<td>2. How should the stakeholders’ involvement be done, where, how, which methods?</td>
<td>☑️</td>
<td>☑️</td>
<td>(6.4.3.2.2)</td>
</tr>
<tr>
<td></td>
<td>3. What should or should not be done when interacting with the different groups of stakeholders? relating to the culture and social division.</td>
<td>☑️</td>
<td>☑️</td>
<td>Miller 2004; Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td></td>
<td>4. What are the experiences of the different stakeholders?</td>
<td></td>
<td></td>
<td>(Section 7.3.5)</td>
</tr>
<tr>
<td></td>
<td>5. Are there any missing experiences or skills that are essential for the design activities? How can such essential input be obtained? (e.g. consulting the literature, recruiting additional participants)</td>
<td></td>
<td></td>
<td>(Section 7.3.5)</td>
</tr>
<tr>
<td></td>
<td>6. How should the design activities be personalised to match the experiences of the different stakeholders? (e.g. experiences exchange, mutual learning)</td>
<td></td>
<td></td>
<td>(Section 7.3.5)</td>
</tr>
<tr>
<td></td>
<td>7. What is the nature of change in the context? What is likely to change during the design activities and the research/project period? (e.g. changes in stakeholders, logistics, resources)</td>
<td></td>
<td></td>
<td>(Section 7.3.7)</td>
</tr>
<tr>
<td></td>
<td>8. How would such changes affect the design process activities?</td>
<td></td>
<td></td>
<td>(Section 7.3.7)</td>
</tr>
<tr>
<td></td>
<td>9. How can the design process activities and methods be adapted for such change?</td>
<td></td>
<td></td>
<td>(Section 7.3.7)</td>
</tr>
</tbody>
</table>
### C. Guiding Questions for design process stage two: problem and requirement analysis

**Table 10-5 Guiding Questions for design process stage two: problem and requirement analysis**

<table>
<thead>
<tr>
<th>Substages</th>
<th>Guiding questions</th>
<th>Planned</th>
<th>Added or Expanded</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding the educational context</td>
<td>What are the current /previous educational projects implemented in the context</td>
<td>☑️</td>
<td>☑️</td>
<td>Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td></td>
<td>What factors make each of the current or previous projects successful or unsuccessful</td>
<td>☑️</td>
<td>☑️</td>
<td>Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td>Conceptualising education</td>
<td>What is the motivation and purpose for education from the perspective of the learners and stakeholders?</td>
<td>☑️</td>
<td></td>
<td>Skinner and Pitzer (2012); (section 2.2)</td>
</tr>
<tr>
<td></td>
<td>What are the educational needs and goals?</td>
<td>☑️</td>
<td></td>
<td>(Section 2.4.5) ; Tauson and Stannard (2018); Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td></td>
<td>What are the challenges that are preventing the educational needs from being met?</td>
<td>☑️</td>
<td></td>
<td>(Section 2.4.5) ; Tauson and Stannard (2018); Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td>Conceptualising engagement and motivation</td>
<td>What are the factors that interest and engage children in general? (to inform the design activities and the system design)</td>
<td>☑️</td>
<td>☑️</td>
<td>Skinner and Pitzer (2012) (section 2.3.2.2) (Section 2.5.5.1)</td>
</tr>
<tr>
<td></td>
<td>What are the factors that make learning a pleasant or unpleasant experience from the perspective of the children learners?</td>
<td>☑️</td>
<td></td>
<td>Skinner and Pitzer (2012) (section 2.3.2.2)</td>
</tr>
<tr>
<td></td>
<td>What are the causes for disinterest, giving-up, loss of hope, distraction etc for the stakeholders and especially children?</td>
<td>☑️</td>
<td></td>
<td>Skinner and Pitzer (2012) (section 2.3.2.2); Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td>Managing conflicts</td>
<td>Are there any conflict in the needs and requirements reported by the different stakeholders?</td>
<td>☑️</td>
<td></td>
<td>(Section 7.3.3) (7.4.3.2.2)</td>
</tr>
<tr>
<td></td>
<td>How can we empower the marginalised groups to ensure democratic equal representation?</td>
<td>☑️</td>
<td></td>
<td>(Section 7.3.3) (7.4.3.2.2)</td>
</tr>
<tr>
<td></td>
<td>Are the needs of the displaced children and displaced community being addressed and prioritised?</td>
<td>☑️</td>
<td></td>
<td>(Section 6.3.3) (7.4.3.2.2)</td>
</tr>
</tbody>
</table>
If needs and requirement conflicts persist, what measures can be taken to minimise the conflicts and reach an agreement? (e.g. experience exchange, mutual learning, and dialogue) (Section 7.3.3) (7.4.3.2.2)
### D. Guiding questions for design process stage 4: Co-Design

<table>
<thead>
<tr>
<th>Topic</th>
<th>Questions</th>
<th>Planned</th>
<th>Added or Expanded</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recources planning</td>
<td>What are the available or possible resources that can be used in the system design? Such as (physical spaces, technical resources, human resources, time resources, funding resources)</td>
<td>☑</td>
<td>☑</td>
<td>(Section 7.3.8) Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td>System stakeholders:</td>
<td>Who are the system stakeholders, and who are the system end-users?</td>
<td>☑</td>
<td></td>
<td>Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td>Methods and techniques</td>
<td>Which design methods and techniques are suitable for the context, system requirements, and the stakeholders?</td>
<td>☑</td>
<td></td>
<td>Tahir and Wang, 2019; Fisher, Yefimova and Yafi, 2016;</td>
</tr>
<tr>
<td></td>
<td>Are the chosen methods and techniques suitable for the skills and experiences of the participants?</td>
<td>☑</td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td></td>
<td>How can the participants be supported to complete the design tasks?</td>
<td>☑</td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td>System design</td>
<td>How can the available and possible resources be used to form a system that tackles the identified educational challenges and lead to achieving the educational goals?</td>
<td>☑</td>
<td></td>
<td>Tauson and Stannard (2018);</td>
</tr>
<tr>
<td></td>
<td>Have the system design activities revealed new requirements and how can such requirements be confirmed with the stakeholders to inform future design iterations?</td>
<td>☑</td>
<td></td>
<td>(Section 7.4.7)</td>
</tr>
<tr>
<td></td>
<td>Are there any existing systems/educational materials that can be evaluated to inform the system design?</td>
<td>☑</td>
<td>☑</td>
<td>(emerged from both case studies) Preliminary Study (Section 3.1.8)</td>
</tr>
<tr>
<td></td>
<td>How can the aspects of Autonomy, Competence, and Relatedness be incorporated in the system designs for better motivation and engagement?</td>
<td>☑</td>
<td></td>
<td>(Section 7.5)</td>
</tr>
<tr>
<td>Evaluating and confirming the resulting designs</td>
<td>What methods can be used to confirm the resulted designs with the system stakeholders?</td>
<td>☑</td>
<td></td>
<td>Van Ommering, 2011, Tawil and Harley (2004),</td>
</tr>
<tr>
<td></td>
<td>Are the resulted designs and educational material suitable to the context, culture, and the identified sensitive socio-cultural topics?</td>
<td>☑</td>
<td></td>
<td>(6.4.3.2.2), Salmi 2004, Van Ommering, 2011, Tawil and Harley (2004),</td>
</tr>
</tbody>
</table>
E. Adult consent forms English/Arabic

HREC consent form template

Institute of educational technology

Consent form for persons participating in a research project

A process for designing technology to improve student engagement in emergency education for displaced children: A field trial of the process at Ritsona refugee camp

Name of participant:

Name of principal investigator(s): George Alain

1. I consent to participate in this project, the details of which have been explained to me, and I have been provided with a written statement in plain language to keep.

2. I understand that my participation will involve interviews, focus groups, and co-design activities and I agree that the researcher may use the results as described in the plain language statement.

3. I acknowledge that:
   a. the possible effects of participating in this research have been explained to my satisfaction
   b. I have been informed that I am free to withdraw from the project without explanation or prejudice and to request the destruction of any data that have been gathered from me until it is anonymized at the point of transcription point on __________. After this point data will have been processed and it will not be possible to withdraw any unprocessed data I have provided
   c. the project is for the purpose of research
   d. I have been informed that the confidentiality of the information I provide will be safeguarded subject to any legal requirements
   e. I have been informed that with my consent the data generated whether printed or digital will be stored at protected locations and services.
   f. I have been informed that (anonymized) research data may be made available to other members of the research community.
   g. If necessary any data from me will be referred to by a pseudonym in any publications arising from the research
   h. I have been given contact details for a person whom I can contact if I have any concerns about the way in which this research project is being conducted
   i. I have been informed that a summary copy of the research findings will be forwarded to me, should I request this.

I consent to this interview/focus group/workshop being audio-taped/video-recorded = yes = no (please tick)

I wish to receive a summary project report on research findings = yes = no (please tick)

May 2017

http://www.open.ac.uk/research/ethics/human-research

361
Email or postal address to which a summary should be sent:

Participant signature:          Date:

Contact details for the Principal Investigator (PI) and Research organisation and Faculty:

George Alain
George.alain@open.ac.uk

Contact details for an alternative contact if you have any concerns about the way the research project is being conducted:

- Open University
  Institute of Educational Technology
  The Open University
  Walton Hall
  Milton Keynes
  MK7 6AA
  UK

  Telephone and fax:
  Telephone: +44 (0)1908 655581
  Fax: +44 (0)1908 654173

- Or: I Am You representative in this project

  Name:

  Mobile number:
الجامعة البريطانية المتخصصة، مركز دراسات التعليم والتكنولوجيا
استدلال مشترك في مشروع
مشروع بحث الخروج لنموذج تغريبة هذه جذور تعلم الأطفالي المتقربين بالصيغة العربية والمتفائلين في بلد
العوامل: مشروع تغريبة حلول تطبيقية في منطقة زمنية في البلدين وتعاون مع المسكين والعاملين والمحللين والأطفال
اسم المشاركات:

الهدف:
تأتي على هذا الاستمارة بعد المراقبة على التالي:

1. تلقى القرار في المشاركة في المشروع، تنفيذ المشروع والإفصاح والتقارير، أن الموقوف يخضع لحق وراءه في المشروع.
2. يوافق على المشاركة بجانب أو كل الخدمات المتصلة بالشبكة، استماعاً للمشاركين آخرين لمثل الأثاث.
3. بلغات المحتوى لحوار الاعتدال والممارسات، حيث أن هذا النوع من المداخلات يمكن أن يكون ذا صلة مع المشورة وعلاج المشاكل.
4. يمكن للمشاركين الاستغلال من التواجد في المشروع وطلب مساعدة به، سواء كان في حين تشعر مشاركة مع الأشخاص المتورطين في الخطاب أو الإعداد المعرفي للمشروع.

أوافق على المشاركات بجانب أو كل الخدمات المتصلة بالشبكة، استماعاً للمشاركين آخرين لمثل الأثاث.

الخاتمة:
لا يمكن للباحث المشارك في المشروع أن يكون مسؤولياً عن حدوث هذا المشروع.

اسم وتوقيع المشارك
Open University, Institute of educational technology

A process for designing technology to improve student engagement in emergency education for displaced children: A field trial of the process at Ritsona refugee camp

Consent Form for Research Involving Children

As a parent/guardian you are making a decision whether or not to have your child participate in this study about "A process for designing technology to improve student engagement in emergency education for displaced children: A field trial of the process at Ritsona refugee camp". Your signature indicates that you have read (or been read) the information provided about this research and have decided to allow your child to participate. I am aware that activities which the child will participate in may be audio/video recorded.

You will receive a copy of this consent document.

________________________________________  ______________________
Signature Of Parent or Legally Authorized Representative Date

________________________________________  ______________________
Signature of Investigator Date

________________________________________  ______________________
Signature of Witness Date

Asent of Child

________________________________________
(name of child/minor) has agreed

to participate in research titled ________________________________

________________________________________  ______________________
Signature Of Child Date

OR

Waiver of Asent

The assent of ___________________________ (Name of Child) ___________________________ name of child/minor) was waived
because of:

Age
Maturity
Psychological state of the child

________________________________________  ______________________
Signature of Parent or Date
Legally Authorized Representative

Contact details for the Principal Investigator (PI) and Research organisation and Faculty:

George Alain
George.alain@open.ac.uk

Contact details for an alternative contact if you have any concerns about the way the research project is being conducted:

- Open University
  
  Institute of Educational Technology
  The Open University
  Walton Hall
  Milton Keynes
  MK7 6AA
  UK

  **Telephone and fax:**
  Telephone: [+44] (0)1908 555581
  Fax: [+44] (0)1908 554173

- Or: I Am You representative in this project

  Name:

  Mobile number:
المشروع يبحث الطرق الإلزامية لتعزيز الأداء المتأثر بتحديات الألفية وتحديات المجتمع في البلدان المتقدمة: مشروع يصمم حلاً تعريفي في منظمة جودة في الجوائز والتعاون مع المشاركين والمعايير والمثقال وتحديات الأطفال

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مشروع بحثي للفترة الإسبانية للتعليم
حلول للتكنولوجيا لدعم التعليم في المنطقية العربية 

البحث عن التكنولوجيا المعتمدة في التعليم في المناطق العربية 

لا يوجد أي محتوى مكتوب في الصفحة المقدمة.

ما هو هدف هذا المشروع؟

ماذا عن سرية المعلومات؟

كيف سيتم البحث وجمع المعلومات؟

هل على المشاركون مساهمة في المشروع؟

ماذا يجب أن يكون بناءً على مستوى المشاركين؟

ملاحظات:
Για τον όποιο ενδιαφερόμενο,

Είναι με μεγάλη μου χαρά που συντάσσω την συγκεκριμένη συστατική επιστολή για τον Κύριο George Alain (760071432).

Γνωρίζω τον George από την απαρχή εργασίας του ως εθελοντής και πολιτιστικός διαμεσολαβητής στην I AM YOU στο αντίστοιχο εκπαιδευτικό μας πρόγραμμα στη δομή προσφύγων της Ριτσώνας, όπου εργάστηκε και συνεχίζει να εργάζεται μέχρι σήμερα.

Ο George χαίρει διευρυμένης εμπειρίας στους τομείς της εκπαίδευσης και διαπαιδαγώγησης. Το γνωστικό του υπόβαθρο επί των αντικειμένων όντας διδακτορικός φοιτητής είναι εξαιρετικά υψηλού επιπέδου. Βάσει αυτού συνέδραμε κατακλυσμικά στην μεθοδολογία και σχεδιασμό προγραμμάτων εκπαίδευσης και καλλιέργειας των ανηλίκων της δομής. Χαρακτηρίζεται από άμεμπτο ήθος, ευγένεια και εργατικότητα. Η δε απόδοσή του εστί αρίστου επιπέδου όπως και η συνεργασία του με εκπαιδευτικούς, γονείς και παιδιά. Αποτελεί άνθρωπο φεργγυο, αξιόπιστο και είναι πολύτιμο μέλος της ομάδος μας.

Δια των προαναφερόμενων λόγων δεν φέρω καμία αμφιβολία ότι ο George θα αποτελέσει εξαιρετικό αρωγό και χείρα βοηθείας σε οποιοδήποτε σχετικό εργασιακό πλαίσιο τοποθετηθεί εξού και μπορώ να τον προτείνω ανεπιφύλακτα.

Μετά τιμής,
It is with great pleasure that I write this letter of recommendation for Mr. George Alain (760071432).

I have known George since the beginning of his work as a volunteer and cultural mediator at I AM YOU in our respective educational program in the Ritsona refugee structure, where he worked and continues to work to this day.

George enjoys extensive experience in the field of education and upbringing. His knowledge of the subjects being a doctoral student is extremely high. Based on this, we contributed immensely to the methodology and design of education and cultivation programs for the juveniles of the structure. It is characterised by impeccable ethos, courtesy and diligence. The performance of the esti is excellent as well as its cooperation with teachers, parents and children. He is a reliable person, reliable and is a valuable member of our team.

For the above reasons, I have no doubt that George will be an excellent helper and helping hand in any relevant work environment placed from there and I can highly recommend him.

Sincerely,

Signature of Katina Saoulli Executive Director, I AM YOU
I. Process stage one questions of the informal interviews with NGO staff

<table>
<thead>
<tr>
<th>Informal interviews with NGO staff Question sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>24- Self-introduction, background of the PI, and overview of the research plan</td>
</tr>
<tr>
<td>25- The name of the interviewee</td>
</tr>
<tr>
<td>26- The position, the organisation, and area of work and expertise of the interviewee</td>
</tr>
<tr>
<td>27- Discussing the location of the case study</td>
</tr>
<tr>
<td>28- Discussing the people, demography and challenges and the nature of the social division</td>
</tr>
<tr>
<td>29- The possibility for the case study to be implemented and how could this be achieved</td>
</tr>
<tr>
<td>30- Who should be involved, and how?</td>
</tr>
<tr>
<td>31- Any feedback from previous experience on the best methods to involve the participants in the design activities</td>
</tr>
<tr>
<td>32- Do you have any suggestions for other contacts that I should interview</td>
</tr>
</tbody>
</table>
J. Stickers of different technology peripherals used as probes in the children’s workshops:
<table>
<thead>
<tr>
<th>Code</th>
<th>Parent theme/sub-theme &amp; Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age diversity</strong></td>
<td>parent sub-theme: Stakeholders diversity-&gt; theme Contextual Complexity</td>
<td>Field notes case study two: “the age range in each classroom is between 6 and 11 years old in one classroom. Teachers were shocked when they learned that they have to teach this age group in one class regardless to the knowledge gap”</td>
</tr>
<tr>
<td><strong>Diverse experience</strong></td>
<td>parent sub-theme: Stakeholders diversity-&gt; theme Contextual Complexity</td>
<td>Case study one, Educational Coordinator: “in previous years, when we had schooling activities, teachers were struggling, especially with behavioural problems, so keeping the class focused, keeping them learning. Very few teachers were experienced, most of the others were not experienced at all.”</td>
</tr>
<tr>
<td><strong>Needs diversity</strong></td>
<td>parent sub-theme: Stakeholders diversity-&gt; theme Contextual Complexity</td>
<td>“The Greek Ministry of Education representatives, school principals, and policymakers who prioritised teaching the Greek language as a primary educational goal. However, displaced community -who were mostly relocating to countries other than Greece- emphasised the need to learn in languages that would benefit their children after relocation such as English, German, or French”</td>
</tr>
<tr>
<td><strong>Language Diversity</strong></td>
<td>parent sub-theme: Stakeholders diversity-&gt; theme Contextual Complexity</td>
<td>Case study two teacher interview “Can you believe that I am teaching 12 kids who speak 3 languages, non of and them speaks Greek?”</td>
</tr>
</tbody>
</table>
| **Culture Diversity** | parent sub-theme: Stakeholders diversity-> theme Contextual Complexity | Field notes Case study one “camp residents are from various backgrounds. Some people from a
describes the cases in which culture diversity result in a contextual complexity

Case study two “Greek school organise a Christian prayer in the morning for all children, the MoE suggested that displaced children arrive 15 minutes late to avoid the Christian prayer, mainly because they didn’t want the children to feel awkward”

Field notes: “I asked a male displaced person, why don’t you go to English classes in the morning. He said I am asleep until 13:00 pm... he explained that he cannot express what he wants to the NGOs volunteers because he believes that they will do whatever suits them because they are the ones organising activity schedule and no one has any power on them to change it. He said that If they want to have an English class at 10:00 am, they can do it, even if most residents will be still asleep”

Case study two, teacher interview “I can only print 4 pages per week in black and white, we have not books yet and no one knows when the book will

<table>
<thead>
<tr>
<th>Power Diversity</th>
<th>parent sub-theme: Stakeholders diversity -&gt; theme Contextual Complexity</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>describes the cases in which power diversity result in a contextual complexity</td>
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<tr>
<th>Stakeholders Changing</th>
<th>parent sub-theme: Continuous change</th>
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<tr>
<th>Extreme lack of resources</th>
<th>parent sub-theme: Resources Complexity -&gt; theme Contextual Complexity</th>
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</thead>
</table>

specific community considered wearing yellow clothing to school a very bad sign of luck as it brings sickness from their beliefs. They refused to let their children wear the yellow jackets and the yellow backpacks requesting a different colour

Field notes: “I asked a male displaced person, why don’t you go to English classes in the morning. He said I am asleep until 13:00 pm... he explained that he cannot express what he wants to the NGOs volunteers because he believes that they will do whatever suits them because they are the ones organising activity schedule and no one has any power on them to change it. He said that If they want to have an English class at 10:00 am, they can do it, even if most residents will be still asleep”

Field notes Case study two “The MoE has confirmed that teaching will be in Greek, even to refugees awaiting relocation outside Greece. Regardless to the requests to teach English or French”

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<table>
<thead>
<tr>
<th><strong>Logistical Changes</strong></th>
<th>Describes cases where extreme lack of resources result in a contextual complexity</th>
<th>arrive, how can I teach a kid with a notebook and whiteboard only?“</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stakeholders changing</strong></td>
<td>parent sub-theme: Continuous change-&gt; theme Contextual Complexity</td>
<td>Describes cases of logistical changes that affect the design process</td>
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<td></td>
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<td>Field notes “the caravan booked for the design process activity was booked by another the red cross for first aid lessons, I had to wait for 3 days to find an alternative caravan for the digital self-learning space activities”</td>
</tr>
<tr>
<td><strong>Sampling Difficulties</strong></td>
<td>parent sub-theme Psycho-social difficulties-&gt;theme Contextual Complexity</td>
<td>Describes cases of stakeholders changes that affect the design process</td>
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<td></td>
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<td>Field notes “ NGO 04 were supposed to assist in children sampling for design activities, the NGO was relocated due to their license withdrawn from the Greek government, three days later they were gone”</td>
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<tr>
<td></td>
<td>parent sub-theme Psycho-social difficulties-&gt;theme Contextual Complexity</td>
<td>Explains cases where psychological difficulties result in a contextual complexity that affects participants sampling to design activities and require prior understanding and exploring to avoid them</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Field notes “3 children had communication difficulties. One child from Workshops 303 who tried to destroy the photograph of another child when his request to take another picture was denied with offering him a digital smartphone picture, he kept screaming at everyone until the end of the session, (NGO staff name) told me that he suffers from depression and ADHD. his mother wants to put him in a special education school but the MoE cannot guarantee him a place there …two other children (brothers) from workshops 401 were not communicating much, mostly silent and they barely reply to a question.” Their mother told me that their father has disappeared 6 months ago and that they have become less communicative since then. 16.October.2017</td>
</tr>
<tr>
<td>Help</td>
<td>Parent theme Trust</td>
<td>Describes the cases of participants expressing that help is related to trusting someone</td>
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<tr>
<td>Avoiding social and political bias</td>
<td>Parent theme Trust</td>
<td>Describes the cases where participants express their sensitivity to forms of biases, even if their sensitivity is not justified</td>
</tr>
<tr>
<td>Fun</td>
<td>parent sub-theme facilitators of successful involvement-&gt;Theme: Involvement</td>
<td>Describes cases where participants express joy and fun as a result of an involvement in the design process</td>
</tr>
<tr>
<td>Choice/control</td>
<td>parent sub-theme facilitators of successful involvement-&gt;Theme: Involvement</td>
<td>Describes cases where participants express a sentence that links to ownership of a decision</td>
</tr>
<tr>
<td>Exchanging experience</td>
<td>parent sub-theme facilitators of successful involvement-&gt;Theme: Involvement</td>
<td>Describes cases where there is an action or a mention of support in skills to complete a task</td>
</tr>
</tbody>
</table>