Self-Directed Learning of Experienced Adult Online Learners Enrolled in FutureLearn MOOCs

Thesis

How to cite:


For guidance on citations see FAQs.

© 2016 The Author

Version: Version of Record
Self-Directed Learning of Experienced Adult Online Learners

Enrolled in FutureLearn MOOCs

Thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Educational Technology

Inge de Waard, M.Ed.

Institute of Educational Technology

Centre for Research in Education and Educational Technology

The Open University, UK

September 2016
A search for understanding. Dedicated to my parents Maria & Willy, my beloved partner Ciska and my fabulous son Isaak. Inspired by a sentence uttered to my grandfather almost 30 years ago.

A PhD journey is never taken alone, especially when you have a family. Somehow the roller coaster of emotions, doubts, moments of perceived genius, passion, and numbness become part of family life. And no family member gets a title for enduring it, or finding creative solutions for all those moments that sentences like: “I really need to make this deadline! NO time, NO time for anything else!” (spoken with anxiety) or “I am going to a conference, so a solution needs to be found for ... days to organise everything”. Ciska always makes things happen, supporting my dreams, always being her wonderful self and living her dreams as well. Isaak has had to organise his spare-time himself at times, he grew a lot and has become a responsible, humoristic, witty 5 year old. It is easy to seem smart if your family members are intelligent, provide a nurturing mental environment and when my personal ups-and-downs are taken in good stride. Ciska and Isaak, I love you both with all my heart and I am truly grateful for providing room to get this PhD realised.
Acknowledgements

First of all, I want to extend my enormous gratitude to Mike Sharples and Agnes Kukulska-Hulme for their patience, guidance, discussions and inspiring ideas. Having such great supervisors makes it easy to learn, reflect and move forward.

My fellow students and CREET colleagues helped to make my PhD adventure enjoyable and fulfilling. And I would like to send out a special thank you to Anne Foward who always kept me up to date on what I had to do with all the paperwork.

I am lucky to be surrounded by such a supportive online network of friends, especially Ronda Zelezny-Green, Michael Sean Gallagher, Nilgün Özdamar Keskin and Adele Botha. Somehow it seems we are all in this together.

Thank you to all the course leads that enabled me to conduct this study: Ian Larson, Lex Hoogduin and Hazel Rymer. And of course, to all the wonderful FutureLearn course participants who were willing to share their data, which basically meant writing and thinking on top of their MOOC learning.

Also, a warm thank you to the full FutureLearn support team who was kind enough to respond to my questions and take up some extra work making this study possible.

And thank you to my fabulous sister Amber, who makes me realise anything is possible.
Contents

Acknowledgements........................................................................................................ iv
Contents ............................................................................................................................ v
List of Tables ................................................................................................................... xi
Appendices ...................................................................................................................... xii
Acronyms ....................................................................................................................... xiii
Abstract ........................................................................................................................... 1
1. Introduction .................................................................................................................. 2
  1.1 Purpose of this research .......................................................................................... 2
  1.2 Synopsis of this research ......................................................................................... 2
  1.3 Contributions of the thesis ...................................................................................... 7
  1.4 Organisation of the thesis ....................................................................................... 8
2. Literature .................................................................................................................... 10
  2.1 Key areas ............................................................................................................... 10
  2.2 Massive Open Online Courses: research, actual learners and gaps ......................... 11
    2.2.1 Learner demographics ....................................................................................... 13
    2.2.2 What is the MOOC learner experience? .............................................................. 14
  2.3 Rationale behind choosing the self-directed learning concept ................................ 18
    2.3.1 Learner-centered learning as the umbrella concept ............................................ 18
    2.3.2 Concept definitions in the field of educational technology ................................. 19
    2.3.3 Untangling learning concepts in detail ............................................................... 23
  2.4 SDL situated within informal and autonomous learning ........................................... 32
    2.4.1 Self Directed Learning in informal learning ..................................................... 32
    2.4.2 Self-directed learning and learner autonomy .................................................... 35
  2.5 SDL in MOOCs, mLearning and online learning ...................................................... 36
    2.5.1 Taking advantage of technology for learner mobility ....................................... 36
    2.5.2 Literacy and digital skills ................................................................................... 40
    2.5.3 Individual and collaborative mobile and online learning ................................... 41
    2.5.4 Social ................................................................................................................ 45
  2.6 Conclusion of the literature review .......................................................................... 49
  2.7 Research questions following gaps in the literature review ..................................... 50
3. Research methods ....................................................................................................... 51
  3.1 Rationale for choosing Grounded Theory ................................................................ 52
  3.2 Grounded Theory ................................................................................................... 56
  3.3 Rationale behind mixing quantitative and qualitative data ....................................... 58
5.4.3. How do the MOOC participants perceive the effect of individual or collaborative learning on their SDL? .......................................................... 116
5.4.4 Which actions (if any) did the MOOC participants undertake to adapt their SDL? ... 120
5.5 Conclusion and resulting adaptations ...................................................................... 122
6. Main study .................................................................................................................. 124
6.1 Methods overview .................................................................................................. 124
6.2 Data collection ......................................................................................................... 124
  6.2.1 Three FutureLearn courses ........................................................................ 125
  6.2.2 Target population .......................................................................................... 126
  6.2.3 Data corpus and sample size ......................................................................... 129
7. Research findings ....................................................................................................... 132
  7.1 Which individual characteristics influence the learning experience? ................. 133
    7.1.1 Motivation .................................................................................................... 134
    7.1.2 Key personal traits and emotions influencing the learning process .......... 139
    7.1.3 Findings on individual characteristics ....................................................... 143
  7.2 What are the technical and media elements influencing the learning experience? .... 144
    7.2.1 Devices used ............................................................................................. 144
    7.2.2 FutureLearn course elements .................................................................... 146
    7.2.3 Learning new tools suggested in courses .................................................. 147
    7.2.4 Findings on technology influencing learning ............................................. 148
  7.3 How does individual and/or social learning affect the participants' learning? ........ 149
    7.3.1 Individual learning actions ......................................................................... 149
    7.3.2 Social learning: connecting and sharing ................................................... 151
    7.3.3 Social learning actions .............................................................................. 156
    7.3.4 Findings on individual and social learning ................................................ 159
  7.4 Which actions (if any) did the learners undertake to organise their learning? ........ 160
    7.4.1 Scheduling .................................................................................................. 161
    7.4.2 Personal goal setting .................................................................................. 164
    7.4.3 Findings on organising learning ............................................................... 171
  7.5 Unexpected emerging data ...................................................................................... 171
    7.5.1 Contextualizing content ............................................................................ 172
    7.5.2 Findings on context relevance ................................................................. 174
  7.6 Summary of the findings ......................................................................................... 174
    7.6.1 Individual learner characteristics .............................................................. 175
    7.6.2 Technical and media elements ................................................................. 175
List of Figures

Figure 1. Visual of the five learning components and two key inhibitors/enablers of learning ........p. 6

Figure 2. Visual overview of methods and processes ..................................................................p. 52

Figure 3. Diagram from Stern, Corbin, Bowers, Clark & Charmaz, 2009, p.17 with added frames....p. 58

Figure 4. Screenshot of DeDoose data analysis software ..........................................................p. 66

Figure 5. A DeDoose word cloud visualizing codes ....................................................................p. 74

Figure 6. Screenshot of the memos that were written during data iterations in DeDoose ...........p. 76

Figure 7. An overview of a FutureLearn MOOC structure ..........................................................p. 91

Figure 8. Weekly unit overview with progress bars under each unit ........................................p. 92

Figure 9. Visual overview of the learning elements within a weekly unit ..................................p. 93

Figure 10. Screenshot of the FutureLearn home screen March 2013 ........................................p. 94

Figure 11. Screenshots on multiple devices using a course prototype ......................................p. 94

Figure 12. FutureLearn home screen 17 October 2013 ..............................................................p. 96

Figure 13. FutureLearn screenshot of the commenting options ................................................p. 96

Figure 14. Overview of the procedure to select the pilot’s target population ..........................p. 103

Figure 15. Visual overview of the target population selection procedure for the main study ...... p.127

Figure 16. Visual of the five learning components and two key inhibitors/enablers of learning ... p. 178
List of Tables

Table 1. Pre-course online survey data from both courses. Answers to “What do you think might interfere with your learning?” ................................................................. p. 108

Table 2. Cross-tabulation: social media experience versus MOOC experience ....................... p. 112

Table 3. Cross-tabulation: devices used for learning per type of online learning experience ...... p. 113

Table 4. Cross-tabulation: social media experience and device use ..................................... p. 113

Table 5. Answers to the question “which of the elements do you think will be most important for your learning” ........................................................................................................... p. 114

Table 6. Data from learners from both courses answering “How important is it for you to learn by interacting with other learners?” in the pre-course survey .............................................. p. 116

Table 7. Data from weekly learning logs from learners involved in both courses, answering “who did you interact with for this part of your learning?” ......................................................... p. 117

Table 8. Quick overview of three FutureLearn courses from the main study ......................... p. 125

Table 9. Learning logs received per two weeks from n number of participants per course ....... p. 130

Table 10. Comparing learners per FutureLearn course to participant sample ...................... p. 131

Table 11. Learner data coding description ............................................................................. p. 133

Table 12. Looking at personal or professional interest for joining the FutureLearn courses .... p. 135

Table 13. Personal or professional motivation per course ..................................................... p. 136

Table 14. Motivation in relation to completing a learning episode ........................................ p. 137

Table 15. Devices used to access the course ........................................................................ p. 144

Table 16. Who did people turn to find answers and connect to ............................................. p. 152

Table 17. Differences in looking for answers or sharing information (BSE & DMCW course) .... p. 154

Table 18. Keeping a personal notebook .............................................................................. p. 163
Appendices

Appendix 1. Pilot: invitation mail ................................................................. p. 246
Appendix 2. Pilot informed consent form ......................................................... p. 247
Appendix 3. Pilot: filled in daily learning log ................................................. p. 250
Appendix 4. Pilot: filled in weekly learning log .............................................. p. 252
Appendix 5. Welcome to Week 1: research invitation ..................................... p. 254
Appendix 6. Informed consent form ............................................................... p. 255
Appendix 7. Invitation e-mail for the online survey ........................................ p. 260
Appendix 8. Online survey questions ............................................................. p. 262
Appendix 9. Filled in online survey from SOM participant............................. p. 264
Appendix 10. E-mail inviting participants to fill in a learning log .................... p. 265
Appendix 11. Learning log template ............................................................... p. 267
Appendix 12. Learning log example (BSE) sent to participants requesting more information...... p. 272
Appendix 13. Filled in learning log from DMCW participant............................ p. 278
Appendix 14. One-on-one interview questions - post course........................... p. 280
Acronyms

GT: Grounded Theory

mLearning: mobile learning

MOOC: Massive Open Online Course

OER: Open Educational Resources

PLENK: Personal Learning Environments, Networks and Knowledge course

SDL: Self-Directed Learning

SRL: Self-Regulated Learning
Abstract

This research resulted in a conceptual framework describing the actual learning components influencing the learning experience of informal, adult learners engaged in FutureLearn courses. The conceptual framework consists of five learning components: individual & social learning, context, technology and media elements, organising learning, and learner characteristics. These five learning components are driven by two enablers or inhibitors of learning: motivation and learning goals. For adult informal learners, motivation is mostly intrinsic, and learning goals are mostly personal.

This research investigated the informal learning of 56 adult learners with prior online experience, engaging in individual and/or social self-directed learning using any device to follow a FutureLearn course. Literature from MOOCs, mobile and informal learning provides scientific support, in addition to literature clarifying the rationale for choosing self-directed learning compared to similar learning concepts (self-regulated, self-determined and self-managed learning). The participants of this study voluntarily followed one of three FutureLearn courses that were rolled out for the first time by the end of 2014. Data were collected at three different stages: an online survey (pre-course), self-reported learning logs (during the course), and semi-structured one-on-one interviews (post-course). The data were analysed using Charmaz’s (2014) method for constructing a grounded theory. The analysis included memo-writing, and involved open coding, line-by-line coding, and focused coding in order to construct a grounded theory that provided insights into the self-directed learning experiences of FutureLearn participants.

By getting a better understanding of the self-directed learning in FutureLearn courses, additional insights are gained to enhance informal learning, instructional design, and to contextualize and personalise learning within FutureLearn courses to create an increasingly meaningful learning experience.
1. Introduction

1.1 Purpose of this research

This research examines what characterises the informal self-directed learning of experienced, adult online learners engaging in individual and/or social learning using any device to follow a FutureLearn MOOC. The aim of this research is to understand which learning components emerge when learners self-direct their learning in FutureLearn MOOCs and build a conceptual framework that combines the emerging learning components, adding inhibitors or enablers that influence the learning experience of adult learners who have prior online learning experience. These answers are sought in order to better understand how learners self-direct their learning inside FutureLearn MOOCs, allowing future course facilitators, platform developers, and the learners themselves to enhance the learning experience of informal learners.

1.2 Synopsis of this research

This research consists of two studies: a pilot study collecting and analysing data from 9 participants, and a main study investigating data from 56 experienced, adult online learners. The pilot and the main study investigate adults who are engaging in individual and/or social self-directed learning using any device to follow a FutureLearn course. The pilot study looked at a maximum variance group of adult learners, while the main study specifically investigated adult learners with two years or more prior online learning experience. Literature from self-directed learning (SDL), Massive Open Online Courses (MOOCs), mobile and informal learning is provided as a background for this study. In order to explore the self-directed learning experience in FutureLearn MOOCs, this research poses a central research question, developed as a result of gaps that will be identified in the literature review in chapter 2.
**Central research question:** What characterises the informal self-directed learning of experienced, adult online learners engaging in individual and/or social learning using any device to follow a FutureLearn MOOC?

The central research question is divided into **four sub-questions:**

- Which individual characteristics influence the learning experience?
- What are the technical and media elements influencing the learning experience?
- How does individual and social learning affect the participants’ learning?
- Which actions (if any) did the learners undertake to organise their learning?

The participants of the main study followed one of three FutureLearn courses: “The Science of Medicines” organised by Monash University - Australia, “Basic science: Understanding Experiments” organised by The Open University – United Kingdom, and “Decision Making in an Increasingly Complex and Uncertain World” organised by the University of Groningen - Netherlands. These three publicly available courses were all rolled out for the first time during the last months of 2014. The data for this study were collected at three different stages: an online survey (at the start of the course), learning logs (during the course), and semi-structured one-on-one interviews with participants (post-course) carried out remotely. The online survey was sent to the participants at the beginning of the course, to be able to gather background information on prior online learning experience and the use of different devices (tablets, smartphones, laptops, etc.). Based on the information shared through the online survey the target group of experienced online learners was chosen. In this study the term experienced means that the learner has had at least two years of prior online learning. Once the course started, the learners self-reported on their FutureLearn course learning experiences by filling in learning logs provided to them by myself. The semi-structured one-on-one interviews took place post-course to gain a more in-depth understanding of the actual learning experience of the learners based on their
reflections of the experience. The questions for those interviews were derived from the sub-questions related to this study, as well as coming from the shared data that were retrieved from the learning logs. Once the data were collected, the data were analysed using Charmaz’s (2014) method for constructing a Grounded Theory (GT). “Grounded theory is a rigorous method of conducting research in which researchers construct conceptual frameworks or theories through building inductive theoretical analysis from data and subsequently checking their theoretical interpretations” (Charmaz, 2014, p. 343). Thus, GT provides a flexible way of conducting research that prioritizes exploration of the given phenomenon in a predominantly inductive theory development paradigm (Birks et al., 2013), while also interpreting the results in an emerging theory. The analysis included memo-writing to make the researcher’s train of thought and possible prior assumptions transparent. The GT approach involved open coding, line-by-line coding, and focused coding in order to construct a grounded theory that would provide insights into the self-directed learning experiences of FutureLearn participants.

The information shared by the FutureLearn participants reveals five main components making up the FutureLearn experience: individual & social learning preference, context, technology, organising learning, and learner characteristics. Further analysis shows that there are two major enablers/inhibitors for the FutureLearn experience: motivation and learning goals, where motivation is mostly intrinsic in nature, and the learning goals mostly personal. These two factors have a major impact on each of the five learning components. Although these five components, and the two key impacting factors, are common to most types of learning, the informal factor of the FutureLearn courses together with the FutureLearn platform characteristics (i.e., design, technology, social learning opportunities, tools and interactions) points towards specific actions undertaken by the FutureLearn participants to self-direct their learning in this informal massive open online course setting.
With personal learning goals and intrinsic motivation as core learning inhibitors or enablers, the need to design opportunities to personalise FutureLearn courses, or MOOCs in general, becomes more apparent. The effect of personal learning goals and intrinsic motivation as the main inhibitors or enablers on the five components can be illustrated by using these examples: if there is no (intrinsic) motivation, the learner does not even start to register in the FutureLearn MOOC. Once registered, it is motivation (in most cases intrinsic motivation) that keeps participants wanting to learn more (which is not the same as following all the content of a MOOC, but simply studying that content which is relevant to the learner). If the learning goal/s are not addressed by the FutureLearn course content, learners stop engaging with the course. The learning goals (which can be professionally or personally driven, but chosen for personal reasons) are what make learners move above and beyond the barriers that each of the components might induce in them: they will solve technological problems, they will connect to others despite having a preference for individual learning, they will overcome lack of self-confidence as a learner characteristic, or they will organise their learning against any time constraints they encounter.

The centrality of personalised learning goals and intrinsic motivation in the self-directed learning experiences of FutureLearn participants provides additional insights into a number of online learning actions in MOOCs. For example:

- the importance of providing personalised actions, for example providing assignments that enable different participants to adapt the content to their own context, or integrating aspects of their own context to the assignments, hence making personalised use of the course material and transforming it into real life answers for their own needs.
- the necessity to provide concise yet easily understandable course and module descriptions for every section of the FutureLearn course, enabling learners to better assess what they can expect of the content and whether this suits their search for answers on that particular topic.
- the definition and interpretation of FutureLearn course drop-out needs to be adjusted. When learners sometimes choose to follow only one specific week, but are still satisfied by their learning result as it solved a problem they faced in their own professional or personal setting.
• insights into when or why learners decide (or not) to interact with others inside and outside the course. Depending on the course type (e.g. home schooling course, professionally oriented course) individual/social learning can vary as a learner responds to the perceived importance of specific social learning needs. The data showed that in the more professional oriented courses the participants tended to connect more with peers, while in the more home schooling course, the participants tended to focus more on the family circle to enhance their social learning environment.

By getting a better understanding of the self-directed learning in FutureLearn courses, additional insights are gained regarding informal learning, instructional design options for other online courses, options for continued professional development options with MOOC, and how to contextualize and/or personalise the course content in order to obtain increased learner engagement. Figure 1 provides a quick overview of this study and its findings: five learning components and two key inhibitors and enablers.

Figure 1. Visual of the five learning components and two key inhibitors/enablers of learning
The results of this study provide a conceptual framework for the informal learning experience in FutureLearn courses, specifically from the learner’s perspective. This research also provides an overview of which learning components are essential for the learner and it looks at how the learners self-direct their learning in order to gain new knowledge provided through the FutureLearn courses. The findings coming out of this study add to the body of knowledge of online learning.

1.3 Contributions of the thesis

The contributions of this study can be divided into theoretical, methodological and practical contributions. A brief overview of the contributions is given here, a more detailed overview can be found in section 9.6 of the conclusions chapter. This study contributed on a theoretical level, by identifying five learning components that influence FutureLearn MOOC learning: learner characteristics, technical & media elements, context, individual & social learning, and organising learning. The study also found two key inhibitors or enablers of learning: intrinsic motivation and personal learning goals. The main innovation of this study is two-fold: using a bottom up approach, investigating and analysing learning from the learner’s perspective, and its focus on adult online learners that are informally learning in FutureLearn MOOCs, thus providing an overview of the actual MOOC learning experience by this target group. Previously, the main focus on MOOC research had been from an institutional or teacher perspective, and on students involved in Higher Education engaged in MOOCs, and MOOC learning by professional learners.

The methodological contributions of this study consist of an innovative combination of using two types of Grounded Theory (GT) to guide the data analysis. This combination consisted of Glaser’s (1978) approach for the pilot study. Where Glaser’s constant comparison approach was combined with keeping an open mind and being influenced as little as possible by theory to analyse the pilot study. While the main study made use of Charmaz’s (2014) constructing GT approach, which builds upon
Strauss and Corbin’s (1990) three step approach for analysing data, and which does use theory to guide the dimensionalisation of the codes into categories.

This study contributed to the practical realisation of online learning research, by providing a new set of research instruments (e.g. learning logs) and adding information to the historical narrative of the FutureLearn platform, as the pilot study consists of the first two trial courses, and the main study consists of three FutureLearn courses rolled out only one year after the first public FutureLearn courses were launched.

1.4 Organisation of the thesis

This thesis is divided into nine chapters.

Chapter 1 provides an overview of the thesis by outlining the major elements of the research and by briefly touching on the findings.

Chapter 2 locates the research in the context of previous studies into Massive Open Online Courses (MOOCs), informal learning and mobile learning. It also discusses the debates surrounding the concept of self-directed learning, which is closely related to similar concepts such as self-regulated and self-determined learning. The chapter explores learning contexts and previous literature covering online learning experiences in different settings. It identifies the gaps in the literature that can be filled by the research described in this thesis, deriving from the previously mentioned research questions. It outlines the differences and commonalities between MOOC formats. The literature describing MOOC learners also takes into account differences in learner activity while enrolled in MOOCs.

Chapter 3 reports on the methods that are used in the pilot and the main study. The chapter starts with the rationale for selecting Grounded Theory (GT) as the preferred method for this study, indicating elements that support the GT approach. Some of the discussions that surround GT are also mentioned
to provide additional arguments for following Charmaz’s construction of GT approach during the coding process of the data analysis stage.

Chapter 4 highlights the research design, and specifically the rationale behind selecting the research environment and the target population.

Chapter 5 gives an account of the pilot study. The pilot study was used to get a first overview of what the learning experiences could be. The pilot study investigated two closed ‘alpha’ courses, which could only be attended after responding to a FutureLearn call. These two ‘alpha’ courses were not open to the public and only covered two weeks of content, as they were test courses to ensure a strong roll out for the free and public courses. The pilot study was also used to test the research instruments of this study, and to get feedback in order to plan the main study.

Chapter 6 introduces the main study by describing the three FutureLearn courses. The selection of the target population is described in relation to results referring to the importance of previous online learning expertise.

Chapter 7 reports the findings emerging from the GT data analysis and relates it back to each of the research questions stated at the beginning of the main study. The findings give an overview of the five elements making up the learning environment and the two main inhibitors or enablers of learning.

Chapter 8 discusses the findings of this study, and puts them into perspective while taking into account relevant literature. The discussion looks at similarities between this study and existing research, but also focuses on the additions of this study to the existing literature.

Chapter 9 summarizes the contributions of this thesis, lists the limitations of this study, and provides directions for future research. The chapter concludes with the key findings from this research.
2. Literature

2.1 Key areas

In December 2012 the MOOC platform FutureLearn was founded by The Open University, UK as a company and within a couple of years it had attracted a large number of partners and three renowned non-university institutions: the British Museum, the British Council and British Library (Scanlon, McAndrew & O’Shea, 2015). In section 4.2 of the research design chapter a more detailed description of the FutureLearn platform is given, including some of its course features. To provide some background with regard to FutureLearn as the learning environment a brief introduction is given here, to indicate the importance derived from the FutureLearn design, i.e. choosing Mobile First and social learning as core design features of the platform. The FutureLearn platform has been open to the public since 2013, and is constantly refined by results coming out of evidence-based research. Up until 2013, the major MOOC platforms (e.g. Coursera, EdX) were built initially for desktop access. FutureLearn however, embraced mobile learning (mLearning) pedagogies from the start (Ferguson & Sharples, 2014) and was built on the idea of a Mobile First design. FutureLearn also sets itself apart from the other major MOOC platforms with its outspoken focus on social learning. In the literature chapter learner-centered learning is taken up, using different learning concepts (e.g. self-regulated, self-directed, self-determined, self-managed learning) as will be shown in section 2.3 within this literature chapter. Research is needed to investigate if and how learners guide their learning in of FutureLearn courses in order to get a better understanding of what drives or inhibits them from learning. As FutureLearn MOOCs are part of the latest evolutions in educational technologies and online learning, they create a new online learning ecology combining mobile, online and social learning. This study builds upon previous research situated in these areas. MOOCs are analysed in their current context, including FutureLearn courses, a specific brand of MOOCs. The rationale behind choosing SDL will be
highlighted by describing it in its own right, as well as comparing it to similar learning concepts. Once the choice for the SDL concept is stated, SDL is situated within informal and autonomous learning as being part of adult learning within freely available online courses. In the last section the literature review covers the SDL concept within MOOCs, mLearning and online learning, creating the full research background for this study.

2.2 Massive Open Online Courses: research, actual learners and gaps

In their systematic study of the published MOOC literature covering 2008 to 2012, Liyanagunawardena, Adams & Williams (2013) concluded that MOOC related articles discussed empirical evidence from case studies, the influence on higher education structure, or educational theory relating to MOOCs. Additionally, the first MOOC literature emerged from early MOOCs, often described as connectivist MOOCs, or cMOOCs and not what has become known as xMOOCs. Rodriguez (2012) classifies MOOCs into two categories: connectivist MOOCs (cMOOCs) and xMOOC courses. He associates xMOOC courses predominantly with cognitive-behaviourist approaches where the MOOC facilitator offers the course content, and cMOOCs with connectivist approaches where MOOC participants are actively involved in the creation of additional course content. However, in 2013 Conole classified MOOCs using twelve dimensions and she argued that cMOOCs and xMOOCs were all scattered across most of these twelve dimensions. This indicated that there were more commonalities to MOOCs than previous literature assumed. As a consequence MOOCs could then be designed following any pre-set dimension to build a MOOC to the wishes of the course organizers, be it anywhere between x- or cMOOCs. Conole (2013) put the design and the interactions of a course in the hands of the course organisers, but with limitations depending on the MOOC delivery platform and its technical as well as pedagogical options, but she opened up the MOOC-realm to more nuanced options and not simply a c- or xMOOC.
dichotomy. Conole saw that participation in MOOCs can range from informal non-accredited participation through to engagement as part of a formal course offering.

Veletsianos and Shepherdson (2016) made a systematic analysis of empirical MOOC literature between 2013 – 2015, continuing on the previous literature analysis done by Liyanagunawardena, Adams, and Williams (2013). Veletsianos and Shepherdson identified student-focused studies as the most common research strand within empirical MOOC research, good for 84% of the chosen literature of their study. Interestingly, these student-centered studies were mainly looking at completion and retention rates, as well as learner subpopulations (Veletsianos & Shepherdson, 2016), but not the full MOOC learning experience. They also add that “even though their results suggest that research on MOOCs focuses on student-related topics, learners’ voices were largely absent in the literature” (p. 17).

While universities entered into the MOOC realm from 2012 onwards (with the AI-Stanford course as the xMOOC pioneer), a research shift in publications took place in favour of a growing amount of xMOOC oriented research (Veletsianos & Shepherdson, 2016; Breslow, 2016). Due to its disruptive perception on higher education, early xMOOC literature has focused on research involving institutional experiences in setting up MOOCs, and MOOC studies examining higher education students (Skiba, 2012; Yuan, Powell & Cetis, 2013; Kaplan & Haenlein, 2016). Kizilcec, Piech and Schneider (2013) investigated three computer science MOOCs and concluded that “the vast majority of active learners are employed full-time” (p. 171) which could point to a conscious relation between the learner and a professional reason for following MOOCs. This adds to the strand within recent MOOC literature which is related to professional learning with MOOCs (Milligan & Littlejohn, 2014; Milligan, Littlejohn & Ukadike, 2014; Mori & Ratcliffe, 2016).
2.2.1 Learner demographics

Research looking at MOOC demographics shows that most MOOC learners are already employed, well educated, from developed countries and have higher levels of formal education (DeBoer, Stump, Seaton, & Breslow, 2013; Christensen, Steinmetz, Alcorn, Bennett, Woods, & Emanuel, 2013; Morris, 2014; Ho et al., 2014; Liyanagunawardena, Lundqvist, & Williams, 2015, Breslow, 2016; DeBoer et al., 2016). But this contrasts with the target groups of the majority of research investigating MOOC experiences, which looks at MOOC experiences of students enrolled in Higher Education. Remarkably, not much literature is found with regard to the actual learning experience of the biggest target groups of MOOCs, namely adult learners not necessarily enrolled in college or university. In terms of gender and the MOOC learner there is a distinction between the FutureLearn platform and the Coursera & EdX platforms, with Coursera and EdX having more male learners and FutureLearn having more female learners on average (Morris, Hotchkiss & Swinnerton, 2015; Liyanagunawardena, Lundqvist, & Williams, 2015). This disparity could not have been picked up when this study was planned as FutureLearn was only just being developed, but at present the reason for this disparity is still unknown, which makes it of interest for future research.

The diversity in demographics has a bearing on learning outcomes. In their 2015 study, Morris, Hotchkiss and Swinnerton investigated the demographic backgrounds of MOOC learners who were enrolled in five FutureLearn MOOCs offered by the University of Leeds to predict learner outcomes. Morris, Hotchkiss and Swinnerton (2015) also found strong evidence of an association between age and degree of completion. They saw that ‘completers’ (i.e. those learners who obtained a certificate) had the highest median age at 43 years (n=132), whereas those who drop out in the first week are the youngest group with a median age of 34 years (n=1035). Those who drop out in the first week have the least prior online experience with 39%, (n=402) whilst ‘completers’ had the most experience with 49%
having studied online before (p. 202). These insights built a case for this research to select learners that have experience in online learning. If learners with prior online experience are more frequently course completers, their learning experience might shed extra light on which learning actions can result in successful FutureLearn MOOC experiences.

This coincides with what Morris (2014) concluded as a relation between diverse learners and their actual learning: “MOOCs attract an audience which is often not predefined, from 16 year old school students, current undergraduate and postgraduate students, through to professionals and leisure learners. MOOC participants are all at different levels trying to reach a clear learning goal from the same materials within a defined learner journey” (p. 3). This study provides a better understanding of how learners direct their learning within FutureLearn courses, to shed light on the overall learning experience.

2.2.2 What is the MOOC learner experience?

Liyanagunawardena, Adams and Williams (2013) noticed a gap in research related to the learner experience and the reasons why learners participate in MOOCs: “it would be valuable to learn about the actual motivations in place, the percentage of participants taking up MOOCs for those reasons, and to know how those motivations might vary from one course to another” (p. 219). The interest in motivation is echoed in Kizilcec and Schneiders (2015) conclusion that there has not been a systematic approach to identifying learners’ motivations or how they relate to subsequent learning. But understanding motivational factors is not enough as Terras and Ramsay (2015) pointed out, researchers need “to understand learners’ expectations and how they cope with the specific challenges that are associated with MOOCs” (p. 477).

One of the potential challenges that has been identified was why MOOC completion rates are low (Jordan, 2014; Perna et al., 2014; Weller, 2014; Morris, 2014). To enable understanding we need to use
a methodology that allows data related to MOOC experiences to emerge so potential reasons for differences in MOOC engagement can be found. Is drop-out rate effectively a negative thing, or can it be a result of a positive learning experience? One of the most cited metaphors on this subject comes from Stephen Downes (2014), where he states that ‘nobody ever complained that newspapers have low completion rates’ and he adds that it is actually very rare to find media of any sort that is intended to be consumed in its entirely, as we pick and choose what is important to us. Breslow (2016) indicates we need to get a better understanding of the actual learning experience in MOOCs. To explore the varying and shifting learners’ intentions for participating in MOOCs, calls for new metrics in addition to more traditional benchmarks of certification such as grades or completion, that are often used in traditional higher education. These new metrics will add to the understanding of what actually happens in a MOOC (Bayne & Ross, 2014; Ho et al., 2014, Kilgore, Bartoletti & Al Freih, 2015). This is supported by Hood, Milligan and Littlejohn (2016) who concluded that completion and retention rates, as proxies for learning, are not the most appropriate measures to understand the rich nuances of learning taking place within a MOOC context.

Adamopoulos (2013) investigated what makes a successful MOOC in terms of learning based on reasons for not dropping out. His study used a Grounded Theory approach using quantitative data from 133 MOOC courses offered by 30 universities. The data consisted of opinions shared by MOOC students in discussion fora, as well as opinions available on the courstal.org website (website for course reviews). The aim of his study was to come to a better understanding of why students drop-out of MOOCs. In Adamopoulos’ study it becomes clear that he sees course completion as a learning success, while to me as a researcher of this study learning can have multiple meanings depending on the knowledge need of the learner, and personal learning success is not always related to course completion.
Most MOOC learners do not learn in a linear fashion. Guo and Renicke (2014) investigated how learners navigate through MOOCs and they found that most learners engage in non-linear learning trajectories that do not follow a pre-established, sequential progression through a MOOC. They also found that older MOOC certificate earners covered more course materials and repeated more lecture sequences than younger students. This led Guo and Reinicke to conclude that older learners follow non-linear, self-defined learning paths, indicative of a field-independent learning style. However, ‘older’ might not be a valid term when it comes to online learning, as age requirements are something much more connected to formal learning than to online learning or lifelong learning. Allowing learners to choose what they want to learn “allows individuals to choose how to engage with courses is another strategy for supporting the diversity of learner needs” (Kizilcec & Schneider, 2015, 6:21). This relates to earlier statements from Conole (2013) that “we need to make more informed design decisions that are pedagogically effective, leading to an enhanced learner experience” (Conole, 2013, p. 13). But in order to make informed design decisions, the MOOC learning experience itself must be investigated from the learner’s point of view not by following institutional benchmarks or indicators.

In their small qualitative auto-ethnographic study, using Carroll’s model of learning, Park, Jung and Reeves (2015) used self-reported learning journals (on average seven per participant) written by themselves to explore engagement and learning in MOOCs. Although the study only looked at data from three learners, the authors found that MOOCs have to address individual learners’ needs to improve the overall learning experience (Park, Jung, & Reeves, 2015). Littlejohn, Hood, Milligan and Mustain (2016) organised a quantitative SRL research investigating the learning behaviours of 788 MOOC participants, with follow up interviews from 32 learners. Their research found that “learners’ motivations and goals were found to shape how they conceptualised the purpose of the MOOC, which in turn affected their perception of the learning process” (p. 1). They also added that “research has not
adequately addressed the unique nature of learning and learners in MOOCs” (Littlejohn, Hood, Milligan, Mustain, 2016, p. 1).

Terras and Ramsay (2015) made a rational argument for priority research involving MOOCs and psychological elements “The massive and open nature of MOOCs places the control of learning at the discretion of the learner” (Terras & Ramsay, 2015, p. 472). Due to the limited interaction between MOOC facilitators and learners, the onus is placed on individual learners to create and navigate their own learning journey (Littlejohn, Hood, Milligan, Mustain, 2016). This also puts a greater responsibility on the learner. “It is essential to evaluate the psychological challenges and the barriers and enablers to effective engagement and learning concerning MOOCs” (Terras & Ramsay, 2015, p. 475). There is also quite a variance in the learners’ reasons for enrolment. Research indicates that learners enrol in MOOCs for four main reasons: to extend or develop their knowledge of an area, curiosity about MOOCs, personal challenge, and the acquisition of qualifications (Hew & Cheung, 2014). Considering these elements, it becomes clear that the “understanding of student motivation, metacognitive skills, learning strategies, and attitudes is of paramount importance for research and practice of learning and teaching in MOOCs” (Gasevic, Kovanovic, Joksimovic & Siemens, 2014, p. 168).

Morris (2014) already emphasized the importance and scientific need to “explore the potential of learning technologies to offer a participatory, active, networked and personalized online learning experience” clearly putting the social factor as a key influence of learning at the middle of the MOOC experience. Reich (2015) stated that a collective research effort is required to fully understand the impact of MOOCs, and he added that “we have terabytes of data about what students clicked and very little understanding of what changed in their heads” (p. 1).

Only when a holistic overview of the learning experience is established, and the key impacting factors on the learning process have been identified, we can take a closer look at what changes in the mind of
the learners. From the above mentioned research a literature gap emerges related to the actual MOOC learning experience of adult learners engaged in MOOCs. In order to investigate the learner experience it is important to look at the full scope of what and how the learner actually learns including personal factors, social learning, etc. As the learner in MOOCs is seen as an active learning agent who choses which course to take, what content to engage with and which peers to interact with, it was important to choose a central learning concept as a starting point to investigate the learners’ experience and how learners adjust their learning. This means an informed choice had to be made between the current set of learning concepts that see the learner as an actor in the learning process.

2.3 Rationale behind choosing the self-directed learning concept

The next section untangles learning concepts that have emerged in the last decades and are related to learner-centered learning: self-directed learning, self-regulated learning, self-determined, and self-managed learning. Untangling these concepts is necessary to ensure that one of the key terms of this research – self-directed learning - would be situated within the spectrum of learner-centered online learning. Defining as well as delimiting the term of self-directed learning was also necessary to construct the research instruments within the scope of this study and the chosen concept.

2.3.1 Learner-centered learning as the umbrella concept

Self-directed learning is part of an array of learner-centered concepts. “In the 20 to 25 years following the Second World War, the ideas of autonomy and self-direction became the subject of intense scrutiny” (Gremmo & Riley, 1995, p. 152). The idea of learner autonomy, and learner-centeredness came as a counter-reaction to the mechanistic psychology of behaviourism. Learning was no longer seen as something that could be pushed onto people, but as a personal experience (Ausubel, 1968;
Bruner et al., 1966). As such, all of the following learning concepts can be placed within a humanistic philosophy.

With the emergence of learner-centered learning in the field of educational technology, a number of concepts have come up that are all closely related to each other: self-regulated learning, self-determined learning, self-directed learning, and self-managed learning. Due to the novelty of these concepts, as well as their historical emergence and scientific uptake, the differences between them are not always clearly defined in literature and their definitions tend to overlap each other. In the next section the different learning concepts will be examined. At present learner-centered learning is expanding into learner-centered MOOCs. Where learner-centered MOOCs favor a learner-centered approach providing strategies that change the perception of learners as active participants in the establishment of individual goals and a personal trajectory (Guardia, Maina & Sangra, 2013), which is the case with FutureLearn, a MOOC platform developed with the intention to increase social learning interactions.

### 2.3.2 Concept definitions in the field of educational technology

In the last years running up to the millennium, a number of research interests arose related to the field of learning, including: how do learners learn, what are the contemporary learning patterns, what are the main factors impacting learners. At the same time online learning started to become more widely adopted (Moore & Kearsley, 2011; Lynch & Dembo, 2004; Daniel, 2012) and this translated into new research looking at learning in online environments. As the concept of learner-centered learning in online environments was applied in different fields, similar concepts were put forward. These concepts were in turn the starting point of new research, and as such parallel developments appeared.
2.3.2.1 Andragogy and Heutagogy: different stepping stones for learning

Pedagogy or the theory and practice of teaching has been informally described for millennia, with Plato describing the Socratic method as an enabler of critical thought and self-development of young learners. But pedagogy as an academic discipline only emerged at the start of the 19th century with Johann Friedrich Herbart emphasizing five key ideas which composed his concept of individual maturation: Inner Freedom, Perfection, Benevolence, Justice and Equity or Recompense (Blythe, 1981), and a teacher (which could be any figure of authority) was put in the middle as the actor of the learning process. Andragogy builds upon pedagogy by moving away from the idea that teaching is only related to children, and it shifts more power from the teacher to the learner as an actor in the learning process. But andragogy also has a history that gradually shaped the conceptual meaning, defining what andragogy actually meant academically. Andragogy started out as a pedagogical discipline which looked at the best way to teach adults; then it became a relatively autonomous science within the framework of the general science of teaching and educating; and after WWII andragogy became a method, skill, theory or model of adult learning (Kaplan, 2002). It is this last interpretation of andragogy that will be discussed in section 2.3 to come to a rationale for choosing a specific learning concept for this study. Knowles (1970) promoted the concept of andragogy for adult learning and he defined self-directed learning as:

“The process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing learning strategies, and evaluating learning outcomes” (p. 7).

Hase and Kenyon (2000), the originators of heutagogy or the study of self-determined learning, proclaimed heutagogy not as a departure from andragogy but, rather an extension that incorporates...
self-directed learning. Hase and Kenyon (2000) found that Knowles’ 1970’s definition provided a linear approach to learning which seemed to them more about solving problems, than about being proactive as a learner, whereas they saw heutagogy as more intuitive, not linear and not necessarily planned. Hase and Kenyon (2007) proposed the following definition:

"Heutagogy is concerned with learner-centred learning that sees the learner as the major agent in their own learning, which occurs as a result of personal experiences ... and where the curriculum and learning activities [designed by the teacher] may become increasingly irrelevant at any point in the so called ‘learning process’ of the learner" (p. 112).

An important issue raised by Hase and Kenyon concerned: the difference between perception and actuality of online learning resources as opportunities for learning, and the myth of flexible delivery of online materials, including all online material which is curated by teachers, professors, or course facilitators. The myth states that carefully crafted media somehow enable self-directed learning and enable ‘flexible learning’. The delivery of online learning can be flexible (e.g. delivering content for different devices, learning across time and location), but not the learning as the materials are in fact teacher-centred, not learner-centred. A heutagogical approach recognises the need to be flexible in the learning where the teacher provides resources but the learner designs the actual course he or she might take by negotiating the learning (Hase & Kenyon, 2000, p. 6). And they conclude “we suggest that a shift in thinking towards heutagogy will enable the control of learning to shift more appropriately to the learner. Furthermore, it will enable a far more creative approach to learning, no matter what the context” (p. 10). In short, heutagogy stands at the end of a continuum that progresses from pedagogy to andragogy, where self-directedness is a key attribute (Knowles, 1975), to heutagogy which proposes self-determined learning and which sees learners as highly self-determined, creative and productive individuals (Blaschke, 2012).
In self-determined learning, as a concept arising from heutagogy, it is the learner who constructs the actual learning experience, whether this happening in a course or through other content location such as libraries or Wikipedia searches. Looking at the wide array of learning that can comprise self-determined learning, I see this as a learning capacity which goes beyond the scope of FutureLearn courses. For if the learner constructs their learning, it means she or he will most likely choose elements from selected courses, the internet, their personal learning network, and any space, object or person that might have additional information on the subject of interest. Within heutagogy, the learner also becomes a capable human, an idea that one does not only acquire skills, but also appraises them within the whole of the system in which the learner resides, e.g. in view of society as a whole (Hase & Kenyon, 2007). To me this means self-determined learning is a more holistic approach to learning, and requires more skills and knowledge to reach the idea of a capable learner. Self-determined learning focuses on a bigger learning goal which extends beyond one single course at one moment in time, whereas self-directed learning happens within a course for a limited duration.

Self-directed learning has developed from adult learning and in particular from informal adult learning projects that were not embedded in organised adult education. Tough’s (1971) research on informal learning showed that 70% of the studied adult learning projects were planned by the learner him or herself. Tough (1971) also emphasized that adult learning is motivated by emotion, a loose term that can describe some of the informal MOOC learning done by participants in a leisurely manner. Due to the informal character of self-directed learning, learning can happen on the basis of sheer curiosity. Additionally, the learner can choose whether or not to set goals, because no particular pre-set goal needs to be in place for any learning to be planned. This makes the concept of self-directed learning open to serendipity, where the learner might choose to learn something perceived as an opportunity, and not as much as a deliberate goal. This study wants to draw up a conceptual framework for informal
learning in FutureLearn MOOCs. Given the choice between andragogy and heutagogy, then andragogy seems to be more relevant to MOOC learners with their wide variety of adult learners. Whereas if self-determined learning would be the learning concept of this study, it would mean that the study would not only need to consider FutureLearn MOOCs, but the whole learning environment as it is built by the self-determined learners. A more in-depth look at each of the learning concepts will provide additional insights into the best possible learning concept to use in this study.

2.3.3 Untangling learning concepts in detail

Self-regulated, self-directed, self-determined and self-managed learning need to be untangled if a clear definition of a learning concept is to be chosen. In order to untangle the learning concepts, each of them will be described in more detail, starting with self-managed learning. In the case of the self-regulated and self-determined sections, learning concepts that have more in common with self-directed learning than self-managed learning, arguments will be added as to why self-directed learning is more suitable for this research compared to the other two concepts. The self-directed learning section is used to elaborate that particular concept in relation to the study itself in terms of its suitability for FutureLearn MOOCs and its socio-constructivist as well as mobile design.

2.3.3.1 Self-managed learning

Self-managed learning is a learning approach that mirrors the management process within companies. This means that the outcomes from learning are being returned into the company to improve each or a specific part within the company processes (Cunningham, 1981, Honold, 2001). The term self-managed learning was coined by Ian Cunningham in the late ‘70s, referring to a specific learning approach derived from elements of several other methods including self-development, self-directed learning and action learning. It is essentially a holistic approach to the individual and is underpinned by strong values, including a corporate morale (Garrow, 2007). Self-managed learning is grounded in
organisational needs so that the individual is learning firmly in an organisational context. In addition there is a ‘collective responsibility’ whereby learners support each other as colleagues and are active participants in the learning of others. Although self-managed learning was set up in close relationship to self-directed learning, the concept is embedded in a corporate context, which makes it less relevant for this study looking at adult learners in general.

2.3.3.2 Communalities self-regulated, self-determined learning and self-directed learning

The three remaining concepts (self-regulated, self-directed and self-determined learning) came out with ground-breaking papers around the year 2000, when three important papers, each connected to one of the concepts were published: “Andragogy and Self-Directed Learning: Pillars of Adult Learning Theory” by Merriam (2001); “Becoming a Self-Regulated Learner: An Overview” by Zimmerman (2002); and “From Andragogy to Heutagogy” by Hase and Kenyon (2001). These publications have similarities in terms of the importance of learner-centeredness, the importance of reflection, the autonomy of the learner, the idea that learning autonomously is a skill that needs to be learned. They all point towards lifelong learning, and towards the fact that a dialogue with others can result in additional learning. In the rest of this section the concepts are discussed in more detail.

2.3.3.3 Self-regulated learning versus self-directed learning

Pilling-McCormick and Anderson (2007) mentioned that the common terminology and understanding between self-directed learning and self-regulated learning contributes to considerable confusion theoretically, which carries over to the application of these concepts in practice. Self-directed learning reflects its historical connection with adult learning. Self-regulated learning stems from educational psychology (Boekaert, 1996), is related to metacognitive awareness (Boekaert, 1996) and is defined as a student's ability to independently and proactively engage in self-motivating and behavioural processes that increase goal attainment (Zimmerman, 2000). “Self-directed and self-regulated learning
have similarities with respect to active engagement, goal-directed behaviour, metacognitive skills, and intrinsic motivation” (p. 426) according to Loyens, Magda & Rykers, (2008). But they add that self-directed learning sees learners as having more control over the learning environment, which provides the learner with the potential of initiating a learning task.

Both self-directed and self-regulated learning have been mentioned in relation to online learning (Carneiro et al., 2011; Littlejohn & Milligan, 2015; Littlejohn et al., 2016). The concept of self-directed learning relates to research into adult learning self-direction by Merriam (2001, 2014), based on the andragogy concept of Knowles (1975), but embeds technology as an influencing factor for self-directed learning. Knowles (1975) described self-directed learning as “a process in which individuals take the initiative, with or without the help of others, to diagnose their learning needs, formulate learning goals, identify resources for learning, select and implement learning strategies, and evaluate learning outcomes” (p. 18). The fact that adult learners are one of the key audiences of MOOCs (Fini, 2009; Bell, 2011) adds to the argument for using self-directed learning in this study.

Garrison’s (1997) model of self-directed learning includes self-direction as a personal attribute as well as a learning process involving online learning. The fact that MOOCs are learner-centered also adds to the potential of self-directed learning in online learning, as researchers propose that online learning gives more control of the instruction to the learners (Garrison, 2003; Gunawardena & McIsaac, 2003). An interesting addition is also provided by Song and Hill (2007) who built a conceptual model for understanding self-directed learning in online environments. They looked at self-directed learning in relation to the online context and how this context influences the amount of control that is given to (or expected of) learners, and how it also impacts a learner’s perception of his or her level of self-direction. This possible reciprocal influence of the online context and self-directed learning is of interest to this
study and some of the sub-questions investigate whether or not the online context influences self-directed learning.

An additional reason to choose self-directed learning is related to its reach. Loyens, Magda & Rikers (2008) look at self-directed learning in problem-based learning and its relationship to self-regulated learning. The paper is of interest, as it aims to establish conceptual clarity between self-directed learning and self-regulated learning. They conclude that “the concept of self-directed learning is broader than self-regulated learning. Self-directed learning as a design feature of the learning environment stresses students’ freedom in the pursuit of their learning.” (Loyens, Magda & Rikers, 2008, p. 416). The added remark from Loyens, Magda & Rikers (2008) that self-directed learning includes “an additional premise of giving students a broader role in the selection and evaluation of learning materials” (p. 411) fits the content reality of MOOCs, where learners are supposed to choose what to learn, when and why.

The conclusion of Kop & Fournier (2011) that some of the dropout rates may be related to the lack of self-directed learning skills of the learners, also added to the urgency of investigating self-directed learning in this study. Especially as many MOOCs have been suffering from significant dropout rates (Fini, 2009; McAuley, 2010; Daniel, 2012; Jordan, 2014; Catropa, 2013; Clow, 2013). Kop and Fournier (2011) also mentioned a lack of research into the learner experience, specifically self-directed learning.

As mentioned self-directed learning is historically linked to adult education, but it also extends into lifelong learning. Mobile learning researchers Arrigo, Kukulska-Hulme, Arnedillo-Sanchez and Kismihok (2012) add that “the need for those in post-compulsory education to manage and direct their own learning is widely recognized as essential to their success as lifelong learners” (p. 17). Arrigo et al. (2012) also cite Fischer and Konomi (2007) who argue that lifelong learning outside school is different from school-based learning because it is self-directed, driven by interests and needs, informal, often
collaborative and carried out in tool-rich environments. Research by Sheu, Bonk and Kou (2013) investigating SDL while using Open Educational Resources (OER), open courseware and MOOCs, also emphasized the importance of informal learning for the concept of self-directed learning. MOOCs are delivering courses outside of formal schooling, making self-directed learning an important focus point. Self-directed learning with its emphasis on learners’ responsibility is often linked to the development of skills for lifelong learning (Dynan et al., 2008; Loyens et al., 2008). As MOOCs move into the realm of lifelong learning (Downes, 2005; de Waard, 2013), it is important to add what Knowles (1970) wrote: “it is no longer functional to define education as a process of transmitting what is known; it must now be defined as a lifelong process of continuing inquiry. And so the most important learning of all - for both children and adults - is learning how to learn, the skills of self-directed inquiry” (p. 41). With lifelong learning being one of the possible goals to attain, then self-directed learning must be supported for those learners interested in directing their learning.

2.3.3.4 Self-regulated learning from Zimmerman’s perspective

Boekaerts (1996) suggested that an adequate model of self-regulated learning in the broad sense would have to consider how the achievement of imposed goals (related to the demands of the learning environment) as well as the achievement of personal goals is regulated by the individual. She based this conclusion on the fact that self-regulation involves several components: “self-regulation involves cognitive, affective, motivational and behavioural components that provide the individual with the capacity to adjust his or her actions and goals to achieve the desired results in light of changing environmental conditions” (Zeidner et al., 2000, p.751). Carneiro et al. (2011) defined self-regulated learning as “the processes in which learners engage when they plan, monitor and evaluate their learning activities” (p. 8). Zimmerman (1989) put forward three major self-regulated learning categories: self-observation, self-judgment, and self-reaction. This is embedded in the cyclical model of
Zimmerman, Bonner and Kovach (1996) who emphasized four self-regulatory processes: (1) self-evaluation and monitoring, (2) goal setting and strategic planning, (3) strategy implementation and monitoring and (4) strategic outcome monitoring. This means that the learner is aware of metacognitive elements within their learning: setting goals, monitoring their own learning progression, and consciously using learning strategies. It also emphasizes the capacity and presence of metacognitive skills to increase learning success. However, the present study does not want to increase the success of learning for learners engaging in MOOCs, but wants to understand the experience of learners engaged in FutureLearn courses. This focus on experience and choosing the actions (whichever actions they are), demands a broader view of learning which allows learners to handle their learning in a more voluntary way. It is as informal and on-the-go as life permits it (with all its complexities of professional, personal and mental nature). This study is not looking for the most successful FutureLearn participant, it wants to draw up a conceptual framework, incorporating the learning elements and actions that make up the learning experience within a FutureLearn course.

Zimmerman (1989) emphasizes that “to qualify specifically as self-regulated in my account, students’ learning must involve the use of specified strategies to achieve academic goals on the basis of self-efficacy perceptions” (p. 329). This makes self-regulated learning a concept of interest for studies looking at academic goals, or looking into learner actions driven by goals related to formal recognition of their learning goals. This study looks at learning experiences of adult learners who do not necessarily want to achieve formal and/or academic goals. By taking the focus away from performance or academic success per se, the learner is allowed to embrace learning in a way that is useful to them, defined by their own willingness as well as capability to learn. In a way, this study adds to the idea of playful learning, or leisure learning. Additionally, Zimmerman kept the instructor’s central role in the self-regulated learning process (Zimmerman & Schunk, 2001; Zimmerman, 1989; Zimmerman, 2001).
Though in self-regulated learning the instructor was seen as the actor providing support to the learner, it was so they could achieve improved self-regulated learning skills and not necessarily as the content expert. In MOOCs the facilitator is in general the content expert, but not necessarily providing support to the learner. This adds an additional gap between MOOC learning and self-regulated learning, when a study wants to understand the actual FutureLearn MOOC experience.

Zimmerman (2001) starts from a premise that “learners are guided by personally set goals and task-related strategies” (p. 66). This seems too limited for this study, and for a more open type of online learning. It will of course be true that a number of learners will indeed have personally set goals on why they follow a specific FutureLearn course, but there might also be learners who are much more serendipitous in choosing their FutureLearn courses, and who are not necessarily setting goals from the start. As such the concept for this study needed to embrace a more open starting point for learning and this can be found in self-directed learning.

According to Beishuizen and Steffens (2012), “self-regulated learning in a wide sense seems to be equivalent to self-directed learning” (p. 7). But they add a sense of agency to self-directed learning: “in self-directed learning (SDL), the individual takes the initiative and the responsibility for what occurs. Individuals select, manage, and assess their own learning activities, which can be pursued at any time, in any place, through any means, at any age” (p. 7). This added agency is of interest to this study, as it allows looking at learning actions as indicators for self-directed learning. Whereas self-regulated learning is happening often on a metacognitive level, which is an internal cognitive process and therefore difficult to isolate purely based on written reports of learning as this involves understanding what metacognitive learning actually is. However, if meta-cognitive elements do emerge from the study, an in-depth study using self-regulated instruments to get a deeper understanding of self-regulated processes might be of interest. But in this case, self-directed learning fits this study as it allows a broader, more
action directed learning to be investigated, embedded in a learning experience that tries to find all the components of the learning experience, not only the meta-cognitive ones.

2.3.3.5 Self-determined learning and heutagogy

The heutagogical approach to learning stands at the end of a continuum that progresses from pedagogy, to andragogy (with self-directedness as a key attribute), to heutagogy. Movement along the continuum is marked by ever-increasing learner autonomy, a greater flexibility in course structure, and a decrease in tutor control (Beaven, 2014). Looking at the definition of self-determined learning, I found it focused too much on the conscious aspect of the learner, who is deemed to be able to decide at all times what they learn, how they learn it, and to have a clear view on where this type of learning will take them. A study on self-determined learning would comprise multiple learning resources, all of which the learner chooses among in order to reach a higher learning goal. The learner would be capable of choosing what she or he learns every step of the way, choosing between different curated content (e.g. across courses), using all types of contemporary learning (e.g. networked learning). In short the learner would be firmly at the steering wheel of their own learning. For this study, the learning experiences are limited to those learners who are engaged in a FutureLearn course and the learning only happens during a short period of time. The learning experiences might include learning outside of the course as well, but it will be seen as learning in connection to the FutureLearn MOOC. Additionally, at present there is need for a study that provides an overview of the FutureLearn MOOC experience, which might include advanced learning approaches by the learner, but which should also be open to serendipitous learning choices, or choices that are not only a result of a conscious thought prior to the learning.

Technology Enhanced Learning would benefit from a strong heutagogical study, but in this case the concept of self-determined learning is too laden with prior learning expertise, skills and knowledge to
be helpful in mapping out a general idea of what a learner experience is for adult learners that are taking up a FutureLearn course for a specific amount of weeks. The selection of learners would have been different using target group filtering based on their meta-cognitive reflection skills, having learned how to take tests, and participatory literacy skills. Self-directed learning is also associated with individual learners (Beaven, 2014) who are agents of their own learning, but with andragogy there is not the additional barrier that those learners need to have the full advanced learning skill set.

Another element in favour of self-directed learning is the fact that the MOOCs in this study have more in common with xMOOCs, when relying on the simple classification of xMOOCs versus cMOOCs. Beaven et al.’s (2014) paper is of interest when reflecting on the choice between self-determined or self-directed learning as a concept. Beaven et al.’s study draws on data from OT12, an 8-week MOOC on open translation tools and practices run in 2012 by the Department of Languages of The Open University in the United Kingdom. Beaven et al. (2014) saw cMOOCs with their emphasis on creation, creativity, autonomy, and social networked learning to be more in line with a heutagogical view of the learner. “One of the main principles of heutagogy is that people know how to learn” (Beaven, et al., 2014, p34). In general xMOOCs rely less on advanced learning, creation and production skills (Rodriguez, 2012).

The fact that self-determined learning exceeds one particular goal, or one set of learning skills makes it more difficult to use as a concept for this study. Especially when one looks at one particular FutureLearn course, it might be difficult for such a course to provide an answer to a self-set goal (related to self-determined learning), as any learning goal is contextualized and as such has many variables or embedded factors that need to be met. Self-directed learning can be used in any learning setting, big or small, as the learner decides on the basis of what is available to move through the material.
Summing up, the reason for choosing self-directed and not self-determined learning as the main concept of my study is based on distinctions related to goals and granularity. Self-directed learning is a tool to probe learning episodes or specific courses, whereas self-determined learning is concerned with reflecting on a life-course. From a goal perspective, self-directed learning is more open to ad hoc influences or adaptations. There is no conscious goal put forward at every step during the learning process. A self-selected goal might influence the actual learning, but it does not have to be made explicit. By taking out the need to put forward a goal that needs to be achieved via learning, the study can still embrace goal-oriented learning, but also self-selected learning that can be taken up or left at the discretion of the learner her/himself. This choice is also reflected in the research instruments, which were consciously kept open to many types of learning, and the types of influences occurring during the learning experience of being engaged in a FutureLearn course. Self-directed learning seems to be a concept that can be self-attained in a variety of ways as the learner sees fit.

2.4 SDL situated within informal and autonomous learning

2.4.1 Self Directed Learning in informal learning

Merriam and Kee (2014) who investigated self-directed learning in older adults stated that “most adult learning is through non-formal and informal means” (p. 138). Garrison (2003) adds an interesting viewpoint to self-directed learning when he highlights the informal character of self-directed learning. Garrison (2003) investigated the origins of self-directed learning and found that it emerged largely from an informal context where learner freedom was a sine qua non (Rogers, 1969; Tough, 1971). “The challenge is to conceptually construct a continuum of learning at a distance that ranges from the informal to the formal. Certainly SDL could be the core concept spanning such a perspective” (Garrison, 2003, p. 164). Rogers (1969) was largely responsible for outlining the concept of self-direction. He was a psychotherapist who strongly believed in personal responsibility and freedom to choose. This
translated into a “nondirective” approach accompanied by extreme trust in the individual to learn and learn how to learn. Self-directed learning pioneer Allan Tough (1971) studied individual informal learning projects in the natural societal setting, adding to the informality of the concept. Tough (1967, 1971) investigated sixty-six Canadians during their self-planned learning projects, where the learning happened as part of the adults’ everyday life and which did not depend on an instructor or a classroom. From its onset self-directed learning has been investigated through observation and description of the actual learning taking place (Tough, 1971; Knowles, 1975; Merriam, 2001). Schugurensky (2000) also concluded that there were three types of informal learning: self-directed learning, incidental learning, and socialization (p.2), described as follows:

- **Self-directed learning** refers to ‘learning projects’ undertaken by individuals (alone or as part of a group) without the assistance of an ‘educator’ (teacher, instructor, facilitator), but it can include the presence of a ‘resource person’ who does not regard herself or himself as an educator. It is both intentional and conscious. It is intentional because the individual has the purpose of learning something even before the learning process begins, and it is conscious, in the sense that the individual is aware that she or he has learned something.
- **Incidental learning** refers to learning experiences that occur when the learner did not have any previous intention of learning something out of that experience, but after the experience she or he becomes aware that some learning has taken place. Thus, it is unintentional but conscious.
- **Socialization** (also referred to as tacit learning) refers to the internalization of values, attitudes, behaviours, skills, etc. that occur during everyday life. Not only have we no a priori intention of acquiring them, but we are not aware that we learned something.

Schugurensky (2000) also stated that informal learning can occur in groups or individually, takes place in any space, using a wide variety of resources, and can occur at any age. This relation between self-directed, informal and lifelong learning compares to what Scanlon, McAndrew and O’Shea (2015) found in that “informal channels are part of a potential learning journey for lifelong learners” (p. 5).

Kim, Jung, Altuwaijri, Wang and Bonk (2014) designed a study to reveal the essential characteristics of successful informal, online resources that are important for self-directed learning using a qualitative,
grounded theory approach (Strauss & Corbin, 1990) that provided data from participants engaged in 305 free online websites and courses. After coding these resources, Kim et al. (2014) came up with eight evaluation criteria for informal online resources: content richness, functionality of technology, extent of technology integration, novelty of technology, uniqueness of learning environment/learning, potential for learning, potential for life-changing impact, and scalability of audience. Surprisingly, interaction or social learning was not part of the eight evaluation criteria. However, the cited websites were a mix of self-paced, as well as cohort learning resources. As such, interaction dynamics might have been a difficult criterion to use when evaluating a social-mix of resources. One sub-group of the resources were MOOCs. And while comparing the MOOCs to other online resources, Kim et al. found that MOOCs scored the highest in terms of content richness, potential for learning, and scalability for informal learning success. With potential for learning Kim et al. (2014) described learners looking for a new career and who considered MOOCs as a potential life changer. Kim et al. concluded that informal learning tools and resources need to be studied to get a better understanding of their actual self-directed learning potential. Although following the self-regulated learning concept, a study by Hood, Milligan and Littlejohn (2016) is important to underline the informal learning opportunities that MOOCs can offer when learners are left to choose what to learn. In their 2016 mixed methods study Hood, Milligan and Littlejohn investigated the self-regulated learning which 788 learners applied in a MOOC. The focus of the research looked at how learners’ motivations for taking a MOOC influenced their self-regulated learning strategies, which was followed up by interviews conducted with 32 learners. Learners who perceived themselves as high self-regulated learners were conceptualizing “the MOOC as a non-formal learning opportunity, enabling each learner to independently determine activities and material they would engage with based on their individual needs” (p. 10). These learners with higher
self-acclaimed learning abilities showed a less uniform and less-linear trajectory throughout their MOOC learning experience.

2.4.2 Self-directed learning and learner autonomy

Although goals are not necessarily needed to engage in an informal learning journey, one simple condition must be present. Luken (2008) noted that self-directed learning can only happen in a learner that has the distinct will to learn, the intention to learn. Learner autonomy is also seen as an important component of self-directed learning (Kop & Bouchard, 2009; Kop & Fournier, 2010). This autonomy is related to the learner context, as well as the learner’s connections during learning as factors of success for SDL (Kop & Bouchard, 2009; Kop & Fournier, 2010). In terms of the FutureLearn courses there is a certain autonomy provided to the learner, as the learner is allowed to follow any nugget of information and can autonomously choose whether or not to engage with other course participants or its facilitators.

Tough (1971) noted that learners move through different phases of self-direction as their learning progresses. Bouchard (2009) identified four dimensions that influence SDL: one dealing with psychological issues, one with pedagogical issues, one with economic issues and infrastructural issues. Self-directed learning can be done without self-reflection upon how one learns, but simply directed to what one wants to learn. However, if self-directed learning happens within a course, it is the course-related actions and the content which provide boundaries, challenges and options to self-direct the learning throughout the course. When taking into account the FutureLearn platform, one other feature also still needs to be explored in order to situate its impact: the technology of the FutureLearn platform and its potential impact on self-directed learning.
2.5 SDL in MOOCs, mLearning and online learning

This section will consider the challenges regarding self-directed learning (SDL) in the FutureLearn environment by analysing papers related to SDL in MOOCs, mLearning and online learning. This points to possible gaps looking at the intersections of those three areas. This section also refers to specifics within the FutureLearn platform to emphasize why this platform is a good environment in which to investigate SDL influenced by contemporary technologies and collaborative learning actions for this study.

2.5.1 Taking advantage of technology for learner mobility

FutureLearn, the MOOC platform co-founded by The Open University, is the first major MOOC platform launched from within the United Kingdom. The platform rolls out free courses built upon mLearning pedagogy, embedding social media, and with a clear focus on collaborative learner interactions (Ferguson & Sharples, 2014). By building an online platform, constructed on mobile learning (mLearning) principles, FutureLearn is designed for access with multiple devices by learners in a variety of contexts. The use of multiple devices brings along challenges for the learner with regard to their contexts (Vavoula, 2005; Song & Hill, 2007), as well as their skills necessary to use the mobile devices in a way that is beneficial to learning (Sharples, Taylor & Vavoula, 2007; Song & Fox, 2005), and these skills have a bearing on their social interactions with other learners or with a MOOC course (de Waard, 2013). A full and detailed description of the FutureLearn platform is provided in section 4.2.

2.5.1.1 Multiple learner contexts

As ubiquitous learning gains research interest, there is a tendency within online learning to include mobile learning while the first focus of online learning was on web-based learning. What is interesting is that mobile learning has a longer history in investigating informal learning and might add relevancy
to the potential informal learning experience in FutureLearn MOOCs. Mobile learning is defined by Crompton (2013) as “learning across multiple contexts, through social and content interactions, using personal electronic devices” (p. 4). This chosen definition aligns with the need to build upon a mobile theory that takes into account context and social interactions, which fits the emerging learning components of this study.

In her 2005 research on everyday mobile adult learning for the MOBIlearn project, Vavoula found that 49% of the reported learning episodes took place away from home or the learner’s own office. There was no consistent relation between the topic of learning and the location of learning, but learning did occur in multiple learner contexts. Those multiple contexts arise due to the mobility of the learner. Vavoula’s (2005) study which was based on personal diaries kept by the adult learners, showed that people create settings for learning out of technology or resources that are ready-to-hand. The research of Song & Hill (2007) introduced a research-based conceptual model for understanding SDL in an online learning context. Song and Hill mentioned that “we do not have an adequate understanding of the impact of a specific learning context (i.e., physical classroom instruction, a web-based course, a computer-based instructional unit) on self-direction” (Song & Hill, 2007, p. 29). In addition to these considerations, the contexts of each individual learner might also vary depending on their socio-economic, cultural or other backgrounds, making context and the way a learner uses it a factor that could influence SDL.

Kop and Fournier’s (2011) connectivist MOOC research on the Personal Learning Environments, Networks and Knowledge course (PLENK, which was organised in 2010 by Rita Kop, George Siemens, Dave Cormier and Stephen Downes) found that learning happens outside of the learner’s home or office as mentioned by Vavoula (2005) and Song & Hill (2007). Kop and Fournier (2011) found that the most important factors restricting participation in the Personal Learning Environments, Networks and
Knowledge (PLENK) MOOC were issues outside the course, related to people’s everyday lives, such as time, job, family, and other commitments, which was true for 80.6% of respondents to the lurkers (non-interacting, consuming learners) survey. These external course factors are not taken up by Song & Hill (2007) in their study on SDL in online learning, although it might be that external course factors do have an effect on SDL.

While Song & Hill (2007) noted that it appears that SDL is context-dependent in that the level of a learner’s self-direction [personal attribute] may vary in different learning contexts, it has been proposed by Candy (1991) that some of the attributes are trans-contextual (e.g. social learning, technology for bookmarking, comparing to find meaning for learning). In mobile accessible MOOC learning environments the context risks becoming increasingly complex due to innovative educational tools and techniques being embedded and tested. Once a learning environment uses social media while opening up access via multiple devices, and it introduces learner interactions that are both individual and collaborative as FutureLearn claims to do, it might become a difficult task for the learner to successfully negotiate within this complex context and still arrive at successful learning strategies.

Lonsdale et al. (2003) refer in part to this complexity by mentioning that the common ground of learning is continually shifting as we move from one location to another, gain new resources, or enter new conversations. MOOCs appear in a variety of formats, pedagogical approaches, languages, collaborative options and technological designs. As such SDL might become increasingly important for those learners who want to manage learning amidst this diversity. The profound effect of this re-conception of learning across contexts is described by Sharples et al. (2007) as that it removes the solid ground of education and “replaces it with a cybernetic process of learning through continual negotiation and exploration” (p. 242). As research indicates that complex learning environments affect learning, the study investigated if or how this complexity was managed by the different learners.
2.5.1.2 Switching between multiple devices

There is another factor to learning across multiple contexts, which is the technological learner experience as she or he moves between these settings by using multiple devices. Seamless learning is a term that designates switching between contexts in a fluent way. Wong and Looi (2011) came up with a Mobile Seamless Learning (MSL) framework. Their framework is based on an analysis of mobile-assisted seamless learning (MSL) literature published between 2006 and March 2011 from which they identified ten salient features that characterize the seamlessness of a Wireless, Mobile, and Ubiquitous Technologies in Education (WMUTE) design. In their framework Wong and Looi describe the importance of switching between devices and contexts without losing focus or losing time relocating where one left off as a learner, and how this is a necessary factor for a fluent learning experience.

A MOOC environment which allows seamless learning needs to offer integrated learning including web-based options as well as mobile options. In theory this can be done by offering a mobile Learning Management System (Uosaki, 2013) or it can be achieved by using Cloud solutions. Ozdamli (2013) offered an interesting view on the effectiveness of the Cloud for developing positive seamless learning perceptions. Ozdamli’s research analysis looks at the conditions which affect students’ perception of self-directed abilities and seamless learning using cloud systems and social network applications. Ozdamli’s research looked at a cloud system called Evernote which was monitored for its seamless benefits and challenges. The Cloud software “gives the students the opportunity to communicate, cooperate, share and learn with their peers, teachers, and family members regardless of time and space” (Ozdamli, 2013, p. 605). Ozdamli mentioned that cross-platform software has the potential to allow education practitioners to provide mobile support to their learners’ learning endeavours, while offering similar functionality to non-mobile users via more traditional computing platforms. Using
Cloud systems enables individuals to connect from their mobile devices and/or desktop computers depending on the learner’s preference.

According to Song & Fox (2005), research into technologies that are coming together and the use of different combinations of mobile technologies has promising results, providing powerful new outcomes for learners. Song and Fox investigated English as a second language (ESL) for vocabulary learning by working adult learners using mobile devices for learning. They showed that the attitudes of learners who experience a hybrid form of learning are positive. However their study only made use of sms-based learning, which was the major mobile text communication available at that time. Building on Song & Fox’s findings it was of interest to research a mobile accessible MOOC and the attitudes the learners have towards these learning environments.

2.5.2 Literacy and digital skills

A range of psycho-social and cognitive factors such as metacognition, executive functioning, self-regulation and motivation have been identified as influencing digital literacy and online learning skills (Bonk & Khoo, 2014; Terras & Ramsay, 2015). Song & Hill (2007) also mentioned the digital skills challenge related to SDL in online learning: “increasing learners’ information literacy skills ... remains an issue that needs to be explored further” (p. 34), referring to critical thinking and retrieving relevant, valid information. In cMOOCs, information literacy skills are seen as very important as research into the first cMOOCs saw that the learners became active creators of content/resources, and needed to sift through more information (Fini, 2009). Kop & Fournier (2011) picked this up as well, and emphasized in their SDL in MOOC research that “some literacies have been identified that are critical for learners to be able to effectively direct their own learning in an open online networked environment” (p. 4), and all the literacies must be mapped (and described). Literacy skills are of course not only limited to information, they also concern use of technology and more specifically how the learner can use their
technology to support their learning. The research findings from Lea and Jones (2011) focus on digital literacies and provide evidence of graduate students as adept readers in an increasingly complex digital world across different contexts. Their research also showed the complexity of the technology used to reach content and in combination with the actual learning act itself, which leads to additional literacies having to be mastered by the learner. And although the work of Lea and Jones was related to tertiary education, this coping with complexity can be assumed to be of importance for FutureLearn MOOC participants as well for they too have to cope with the FutureLearn platform.

Cross-cultural literacy might also be a factor that influences non-English native speakers engaging in a MOOC. Non-native English speakers might have an additional barrier to start interacting in English in a MOOC due to the cultural otherness narratives brought forward by not being part of the majority group and the learners' perceptions of their experience of an academic course, either in terms of the way they position themselves in contrast to the English-speaking course, or to fellow students perceived as having different ways of interacting (Goodfellow, Lea, Gonzalez & Mason, 2001). This cross-cultural literacy also relates to cultural contexts, where people bring different expectations on what learning should be, how to learn, and how to respond to social interactions.

2.5.3 Individual and collaborative mobile and online learning

Kukulska-Hulme et al. (2009) mentioned that “moving the focus away from the mobile technology and towards the social practice it enables, allows for a different conceptualization of mobile learning” (p. 9) and they added that researchers in mobile and ubiquitous learning will be keen to tackle the new challenges arising from learner activity across multiple virtual and physical contexts. The realities of today’s global online learning represent a significant shift in comparison with the previous generation of online learning: “new technologies have changed the educational landscape. It is now possible for self-directed learners to participate informally in learning events on open online networks, such as in
Massive Open Online Courses” (Kop & Fournier, 2011, p. 3). But rightly so, Kop & Fournier immediately added that this “raises new challenges and opportunities for the self-directed learner, who might no longer be able to call on a trusted educator for support in his or her learning endeavor” (p. 3), and the learners will become more self-reliant. With the new structures and environments in place where people can learn autonomously, one might question if people will be able to do so effectively (Kop & Bouchard, 2011).

An interesting case study comes from Bonk, Lee, Kou, Xu & Sheu (2015), investigating the learning preferences, goals and motivations, achievements, challenges, and possibilities for life change of self-directed online learners who subscribed to the monthly OpenCourseWare (OCW) e-newsletter from MIT. Bonk et al. (2015) came to the conclusion that MOOCs must embed a sense of choice and control for the self-directed learner, both in terms of technology, and in terms of interactions. Informal and self-directed learning were already seen by Bonk et al.’s participants as being life changers, and playing an important educational role in society. One of the priorities for future research according to Bonk et al (2015) is to get a better understanding of the characteristics of self-directed learners and processes of self-directed learning.

Learning is no longer limited to the individual. Although learning itself is seen as learner-centered, there are more social spaces to connect with peers. There is more emphasis on learner-centeredness, which comes from the idea of the connected/networked world, where collaborative learning and peer-to-peer learning are of interest to the actual learning of the individual (Siemens, 2005; Downes, 2005; Williams, Karousou, Mackness, 2011; Bell, 2011; Siemens, 2012). In their mLearning research Wong & Looi (2011) refer to learners at the center of production of knowledge as well, which fits the MOOC learning hypothesis as put forward by Siemens (2005). But placing the learner at the centre does not mean that she is the center of attention of teachers, but rather, the centre of production of knowledge
that occurs in various contexts within the multidimensional learning spaces as mentioned by Layte & Ravet (2006). A factor affecting personal learning for example was coping with the abundance of information: “people did make decisions about this at a later stage and devised coping strategies with the help of others” (Kop & Fournier, 2011, p. 17), which is part of social learning.

Technology also has a social factor. Kukulska-Hulme, Sharples, Milrad, Arnedillo-Sánchez, & Vavoula (2009) stated that “research attention should be directed at identifying those simple things that technology does extremely and uniquely well” (p. 22). Mobile technologies enable communication and collaboration (Traxler, 2010) and Kukulska-Hulme & Jones (2011) indicate that “in those university programs where communication and collaboration are important, the added dimension of mobile interaction may soon be considered essential” (p. 68). This social factor is also part of some mobile frameworks. An interesting pedagogical framework for mLearning is provided by Park (2011). Park mentioned that the major purpose of her study was to review and classify a variety of educational applications with mobile technologies. For this purpose, she built a conceptual and pedagogical framework which was generated based on high versus low transactional distance and individualized versus socialized activity. The Park framework combines mlearning with online learning and ubiquitous learning and describes the technological attributes and pedagogical affordances of mobile learning presented in previous studies following the transactional distance theory as put forward by Moore (2007). Park offers a set of indicators to categorize MOOC participants and their actions (e.g. individual ⇔ collaborative mobile action, high ⇔ low distance of the transaction).

Another mobile framework that takes into account the technical aspects, as well as the learner aspects and refers to SDL is FRAME by Koole (2009). FRAME links mobile learning to interaction learning with an emphasis on social constructivism. In this view, learning is collaborative with meaning negotiated from multiple aspects. “The FRAME model takes into consideration the technical characteristics of
mobile devices as well as social and personal aspects of learning” (Koole, 2009, p. 26) which is of interest to this study as it will research individual as well as collaborative SDL. Koole mentioned that equipped with a mobile device, the learner can choose to consult a web page, access audio or video tutorials, send a query via text message to a friend, or phone an expert for practice or guidance. Koole also added an important question: “how can such a learner take full advantage of the mobile experience?” (p. 25). This aligns with the previous section on the importance of contexts for SDL, as well as the seamless learning section.

The need for SDL in online learning is emphasized by Song & Hill (2007). They mentioned that “students need to have a high level of self-direction to succeed in an online learning environment” (p. 29) and they proceeded to state that “successful learning in every learning environment involves the use of effective learning strategies” (p. 34), so developing learning strategies is an important part of SDL. A reference is also made to the level of learner responsibility “for seeking assistance is also much more centered with the learner since they are directly involved in monitoring the process, and seeking resources to improve the situation as needed” (p. 36). And although turning to peers for help is an option, in the end this can pose a problem for some individual learners, as this implies overcoming potentially personal barriers (self-esteem, ego, language) as emerged from the de Waard (2013) study when searching for the main interaction drivers in a MOOC.

External factors also influence collaboration. “Time management, goal setting, and time availability were mentioned as the most important factors influencing people’s participation” (Kop & Fournier, 2011, p. 17). This coincides with what de Waard (2013) concluded after investigating the impact of mobile access to learner interactions in discussion forums that were part of a MOOC, but it also refers to the aforementioned factors surrounding the daily life of the learner. This is an additional reason to incorporate an investigation into elements of daily life as part of SDL in the FutureLearn courses.
The individual and collaborative learning section points towards some research that has been done in mLearning, MOOC’s and online learning in general, but research gaps remain when it comes to the MOOC learning environment that combines new technologies as well as social learning. This makes the individual versus the collaborative learning element an interesting aspect of learner experience to monitor when researching SDL, which is investigated in one of the sub-questions.

2.5.4 Social

2.5.4.1 Social learning

Social learning theory (Bandura & Walters, 1977) posits that learning takes place through observation or direct instruction, even in the absence of knowledge reproduction or direct reinforcement. Bandura and Walters posited that learning is a cognitive process which takes place in a social context, but they also added that social learning can occur purely through observation or direct instruction, even in the absence of direct reinforcement (by which they embed social learning in a more behaviourist paradigm). However, social learning has come a long way since the inception of social learning theory by Bandura and Walters (1977). Smith and Ragan (1999) built further on social constructivism and in their view learning “is collaborative with meaning negotiated from multiple aspects” (Smith & Ragan, 1999, p. 15). Looking at research into social learning in MOOCs, there is a distinction being made between active learners and passive learners (described as lurkers), and an emphasis is put on the social construction which happens when learning in MOOCs. This calls for a definition of social learning that fits this social construct of learning inside MOOCs. Therefore, this study uses the definition as offered by Sol, Beers and Wals (2013) who define social learning as “an interactive and dynamic process in a multi-actor setting where knowledge is exchanged and where actors learn by interaction and co-create new knowledge in on-going interaction” (p. 36). As Sol, Beers and Wals (2013) investigated social learning in a multi-actor innovation network, they built upon prior theory on social learning, and
concluded that social learning is a very dynamic process, in which trust, commitment and reframing are continuously produced and reproduced through the (inter)actions of the individual actors, in this case FutureLearn learners.

To be able to engage in a productive conversation, “all parties need access to a common external representation of the subject matter that allows them to identify and discuss topics” (Sharples et al., 2007, p. 226). But this is a capacity/skill loaded ability: language, personal courage and self-confidence, prior knowledge, being able to use the technology to exchange ideas, having literacy skills... especially in courses that attract international learners, i.e. non-native English speakers (de Waard et al., 2011; de Waard, 2013). For some FutureLearn course participants this combination of social skills might be a threshold, keeping them from any learning that might be derived from collaborative learning, but on the other hand it might help specific learners as well, and as such it might influence the individual SDL overall. How learners let the social interactions influence their learning might not yet be clear, but social learning is gaining interest within MOOCs. In the past social learning has been investigated in terms of communities of practitioners, allowing individuals to be drawn into the communities of practice at whatever rate is comfortable but where the group shares a craft and/or a profession (McAuley, Stewart, Siemens, & Cormier, 2010; Mackness, Waite, Roberts & Lovegrove, 2013; Eynon, 2016). The FutureLearn course model sees social learning more broadly than its use within a community of practitioners, all of the members enrolled in a course can interact regardless of their shared profession. FutureLearn has embedded social learning in its platform based on the conversational model of Laurillard (2013) which places conversation and social learning at the heart of the MOOC platform (Brown, Costello, Donlon, & Giolla-Mhichil, 2015; Ferguson, Clow, Beale, Cooper, Morris, Bayne, & Woodgate, 2015; Sharples, 2016; León, Cobos, Dickens, White, & Davis, 2016).
While investigating mobile learning Laurillard (2007) created the conversational theory, which states that “the digital facilitation provided by the teacher is to set up motivating collaborative and competitive transactions between the students, motivated also by the prospect of contributing to a product at the end of the process” (p. 166). The conversational framework looked at both formal and informal learning, where the informal part of the conversational framework claims that “for peer collaboration: learners will be motivated to improve their practice if they can share their outputs with peers, and they will be motivated to improve their practice and augment their conceptual understanding if they can reflect on their experience by discussing their outputs with peers” (p. 163).

As Laurillard (2013) found, informal learners select their own teacher, who may be a peer, or may not be a person; but in any case they define their own curriculum based on what they are interested in. The conversational framework sees informal learning and formal learning as complex learning environments, with learners using others in their peer group for negotiation of ideas, and their personal context as the source of goals, forms of action, and intrinsic feedback.

2.5.4.2 Social constructivism

Social constructivism can be traced to Vygotsky’s sociocultural theory (1978) and Bandura’s (1986) social cognitive theory, but Vygotsky’s and Bandura’s view on social interactions is different which has an effect on the definition of social constructivism for this study. Where Bandura saw the social aspect as something that could be done without any interaction with others, Vygotsky places interaction between people at the centre of his theory. Vygotsky’s sociocultural theory (1978) stated that higher mental functions emerge from social interactions and learning and mediation occurs by using tools and signs (text, speech), the presence of learners also creates a Zone of Proximal Development, a space where learners develop through mediating their new versus their old understanding of a topic. What is of interest for this study is Vygotsky’s emphasis on the learning processes which involve peer
interactions to challenge the learner to think at a higher level and cognitively develop to the next stage. This fits with the social learning paradigm on which FutureLearn is built, and with the socio-constructivist approach for this study.

Social constructivism is defined for this study as the assumption “that people create social reality or realities through individual and collective actions. Social constructivism studies what people at a particular time and place take as real, how they construct their views and actions” (Charmaz, 2014, p. 344).

Because FutureLearn has a social constructivist pedagogy underpinning its design, it is labelled as a social learning platform, by virtue of its ‘water-cooler’ style discussion areas, social filtering options (like and follow buttons), discussion steps, all provided alongside learning content (Ferguson & Sharples, 2014). First research outcomes showed that learners appreciate the opportunities afforded and the general social experience provided by FutureLearn (Ferguson & Sharples, 2014; Wintrup, Wakefield, Morris & Davis, 2015).

This section covered literature looking at self-directed learning in MOOCs, mobile and online learning. SDL literature is only just emerging for MOOCs, or specifically for the complexities that might influence SDL for participants engaging in FutureLearn courses. Additional research is needed in this area to ensure a deeper understanding of the challenges learners face in FutureLearn courses – and MOOCs in general - to ensure strong future learning environments that are enabled for mobile as well as non-mobile interactions between peers, resulting in conditions that will support SDL. “Understanding the nature of learners and their engagement is critical to the success of any online education provision, especially those where there is an expectation that the learner should self-motivate and self-direct their learning” (Milligan, Margaryan & Littlejohn, 2013, p. 157).
2.6 Conclusion of the literature review

This literature chapter covered research investigating FutureLearn courses and MOOCs in general, mobile and online learning, and compared learning concepts related to how learners adjust their learning, in specific contexts as well as in informal and lifelong learning. From the literature it became clear that a conceptual framework which describes informal self-directed learning of experienced adult learners is needed. This means an account must be made of the key impacting factors on the learning process. Previous research has looked into the learning experiences of workplace learners, and students in higher education engaging in MOOCs, but the most prevalent MOOC target group seems to be adult learners, which to my knowledge has not yet been fully investigated, in order to construct a conceptual framework of the FutureLearn MOOC learning experience. In order to investigate the learner experience it is important to look at the full scope of what and how the learner actually learns. This means that the learner in FutureLearn MOOCs will have to be seen as an active learning agent who chooses which course to take, what content to engage with and which peers to interact with. This has an effect on the research design. A learning experience involving FutureLearn MOOCs consists of pre-course decisions (e.g. selecting a FutureLearn course), it will need to establish the actual learning for the duration of the course (e.g. self-reported learning experiences to be documented by the learner), and it will be important to have some feedback from the learners post-course to get an account of how they look back on the learning experience. It is also important to understand how the learner adjusts their learning while being engaged in a FutureLearn course. This means an informed choice must be made between the current set of learning concepts that see the learner as an actor in the learning process. Looking at different learning concepts, the choice for my study pointed towards using self-directed learning, as this concept allows a more open perspective on the learning experience of an adult learner, it is not fixed on pre-set learning goals, yet it can embrace them, and it can be used within
the boundaries of an existing course which is open in nature, i.e. allowing learners to come in and learn as they please. The literature also gives rise to a need to investigate SDL for the new, contemporary learning platforms and FutureLearn courses seemed an ideal platform to investigate due to their novelty bringing together MOOC and collaborative learning features. In short, research is needed to generate a deeper understanding of the self-directed learning challenges learners face in FutureLearn courses – and MOOCs in general – and to ensure strong future learning environments that are built for adult learners using different devices to socially interact with peers.

2.7 Research questions following gaps in the literature review

The literature chapter revealed gaps relating to self-directed learning in FutureLearn courses. After analysing the literature, the following central research question was formulated:

What characterises the informal self-directed learning of experienced, adult online learners engaging in individual and/or social learning using any device to follow a FutureLearn MOOC?

The central research question is divided into four sub-questions:

1. Which individual characteristics influence the learning experience?
2. What are the technical and media elements influencing the learning experience?
3. How does individual and social learning affect the participants’ learning?
4. Which actions (if any) did the learners undertake to organise their learning?

Finding answers to these research questions is the main interest of the following chapters.
3. Research methods

The research methods chapter will start with the rationale for the chosen methodology, based on the research gap identified in the literature chapter. A visual overview of the major methodological steps is provided in figure 2 to enable the reader to get a quick overview of which steps were used for this study.

After having chosen a Grounded Theory (GT) approach, a more detailed account of the GT adopted for this study is given to provide a methodological background. As the research moved from the pilot to the main study, a slightly different approach in the Grounded Theory method was used, mainly due to the fact that I was becoming more aware of existing theory and literature. This shift in approach – moving from Glaser to Strauss & Corbin approach - is described in section 3.5.4 of the research methods chapter. After presenting the chosen the method, the chapter provides an overview of the planning, coding and analysis parts of this study.

Based on the literature chapter, the need to examine the learner experience in FutureLearn courses emerged. As the FutureLearn platform (described in detail in section 4.2 of the research design chapter) was built around mobile learning pedagogies, and integrated social learning elements, the research goals resulted in a search for complementary methods that would:

- fit the exploratory nature of this study,
- allow individual and social experiences to be shared and described,
- give room for an emerging theory to be formed.

This resulted in a search for a method that would fit an exploratory investigation, and additionally allow these findings to be used in or form the basis of a theoretical model, while adding to the body of knowledge of online education, specifically learning in FutureLearn MOOCs.
3.1 Rationale for choosing Grounded Theory

The main study investigates a new phenomenon: how experienced online learners self-direct their learning in FutureLearn courses. This makes it necessary to look for an approach that would allow exploratory research. Creswell (2007) wrote that “one of the chief reasons for conducting a qualitative study is that the study is exploratory” (p. 26) and he continued that “this usually means that not much
has been written about the topic or the population being studied, and the researcher seeks to listen to participants and build an understanding based on what is heard” (p. 26). This is the case for this research study, because at the time of the data collection for the main study the FutureLearn courses had only been rolled out for one year. Furthermore, FutureLearn is a platform under constant development. By understanding and investigating the learning that is happening in FutureLearn courses - as reported by the participants – future research can be planned to optimise the FutureLearn course experience, as well as other MOOCs.

If a phenomenon needs to be understood because little research has been done on it, then it merits a qualitative approach, as qualitative research is exploratory and is useful when the researcher does not know the important variables to examine (Creswell, 2009). The process of research involves emerging questions and procedures, data building from particulars to general themes, and the researcher making interpretations of the meaning of the data” (Creswell, 2009, p. 4). This stands in contrast with quantitative research where the investigator relies on numerical data. The researcher isolates variables and causally relates them to determine the magnitude and frequency of relationships. In addition, the researcher determines which variables to investigate and chooses instruments, which will yield highly reliable and valid scores. But for this study there are no variables to isolate yet, as no key factors have been isolated in correlation to learning with FutureLearn courses. Due to the exploratory necessity of this study, I chose to set up a mixed methods study, using quantitative data to guide the data analysis and an emphasis on qualitative data to deepen the understanding of the learning experience as recalled by the learner. But qualitative research covers a lot of ground. In order to find the best possible fit for this study, a choice had to be made after analysing different methods. In broad terms this study is part of interpretive social science as it emphasizes social action and socially constructed meaning. Because literature showed that little is known about the actual learning experience of adult learners in
FutureLearn courses, the starting point of the study had to be the empirical world. This is why this study takes an inductive direction, beginning with observing the empirical world, and then reflects on what is taking place while moving towards theoretical concepts.

Looking at the qualitative research designs that fit an inductive approach, I needed to select the best fit for a study that aims to get a deeper understanding of how adult learners self-direct their learning in FutureLearn courses. I looked at the five most influential qualitative methods: ethnography, case study, phenomenological research, narrative research and Grounded Theory (Creswell, 2009).

The narrative research approach was dismissed early on, as in most cases narrative research will study a limited number of participants to get an in-depth account of a specific topic which happens amidst and has a profound impact on their lives (Creswell, 2009). The learning experience in FutureLearn might have a serious impact on the lives of some learners (e.g. those who find relief in following an online course while having chemotherapy), but this study wants to examine the broader scope of how learners self-direct their learning as a FutureLearn participant. For this reason a larger set of participants is needed. Additionally, this study does not require to investigate the full impact on the lives of those learning from FutureLearn courses, only to get a an idea of how learners guide their learning in a FutureLearn course.

Ethnography is used most often for research into a cultural homogenous group and within a natural setting over a period of time. Most of the time the research process evolves in response to the lived realities encountered in the field while observing the participants (Creswell, 2009). This method was not adopted because the FutureLearn course environment was only a temporary, virtual setting for the learners. In addition, the learners would be difficult to observe as learners live scattered across different locations around the globe.
A case study could be of interest to this study, but after carefully considering the case study methodology, it was also dismissed, as a case study examines a bounded system (or systems) over time through detailed and in-depth data gathering coming from multiple sources (Creswell, 2009). It would be of interest to investigate a FutureLearn course, by looking at all the different aspects (e.g. learners, platform, facilitators,...) but in this case only the learners are of interest as they direct their learning, and this study wants to focus specifically on the learner experience through the eyes of the learners. Using a case study felt too object-oriented to answer a question that wants to unravel a learning experience as it is given meaning by the learners.

At the end there were two potential qualitative research approaches: a phenomenological approach or using Grounded Theory. Both strategies of inquiry provided guidance on investigating human beings in a specific setting. And both methods provided options for consciously integrating the researchers’ point of view into the actual experiences (i.e. memoing in Grounded Theory and bracketing within phenomenology). This was important as I had previous online learning experience after setting up online and mobile learning programs. This meant any study that I would undertake, should have instruments that would allow me to monitor possible personal assumptions on the subject, thus allowing a more reflective stance towards data emerging from the data analysis phase.

A phenomenological study would allow examining the meaning of their lived experiences for several individuals while encountering a phenomenon, in this case while being engaged in a FutureLearn course. The phenomenological approach looks for what participants have in common as they experience the phenomenon. This method reduces the individual experience to a description of the universal essence of a specific phenomenon, by studying a small number of subjects through prolonged engagement with the participants. But this common understanding of a phenomenon by the participants is not the purpose of this research. The purpose of this research is not only to add to the
body of knowledge of online learning, but to create a framework for further research embracing commonalities as well as differences. As FutureLearn and MOOCs are still in full development, a mere description of a phenomenon would be less useful than being able to generate an abstract analytical schema of a process described by the participants that reflects all of actual experience, not only the common factors. By constructing an analytical framework, the findings move beyond mere descriptions of a phenomenon, and provide a stepping stone for further research having laid down the foundations as a result of the exploratory study. In order to achieve such a framework, data must be analysed using multiple iterations to identify interrelationships of categories.

However, as Creswell (2009) mentioned, using a Grounded Theory approach evokes the need to select a purposeful, homogeneous sample of participants in order to build a sound theoretical framework. Creswell (2009) also adds that “in GT, the individuals may not be located at a single site; in fact, if they are dispersed, they can provide important contextual research. They need to be individuals who have participated in the process or action the researcher is studying in the GT” (p. 122). This openness of GT towards the dispersed location of participants fits the reality of global online learners.

### 3.2 Grounded Theory

Grounded Theory (GT) provides a flexible way of conducting research that prioritizes exploration of the given phenomenon in a predominantly inductive theory development paradigm (Birks et al., 2013). It also provides the needed flexibility of qualitative research which allows the researcher to follow up on leads that emerge from the data, an essential part in an exploratory study. The greatest advantage of GT is the logic of discovery, rather than that of verification in data analysis, which is essential to the delicate question of theory building in grounded research (Vaast & Walsham, 2011). Designing a predominantly qualitative research study also adds to a research gap within MOOC research. In their literature overview of empirical MOOC research, Veletsianos and Shepherdson (2016) emphasize the
importance and need for more qualitative research. They stated that “very few studies were informed by methods traditionally associated with qualitative research approaches (e.g., interviews, observations, and focus groups). Thus, even though results suggest that research on MOOCs focuses on student-related topics, learners’ voices were largely absent in the literature” (p. 17). In order to respond to the need for more qualitative research, including the voices of the learner, a research method must be chosen that lets data emerge from the voices of learners, hence a qualitative study using a specific Grounded Theory approach fitting this study is useful.

“Grounded Theory is a rigorous method of conducting research in which researchers construct conceptual frameworks or theories through building inductive theoretical analysis from data and subsequently checking their theoretical interpretations” (Charmaz, 2014, p. 343). Charmaz also emphasizes that this method favours: 1) analysis over description, 2) fresh categories over preconceived ideas and extant theories, and 3) systematically focused sequential data collection over large initial samples. As this study wants to use a fresh perspective investigating learning in MOOCs through the actual lens of the learners demanding an analysis that constitutes a bottom up approach, using a GT approach for this research study will help to come up with results that are not influenced by preconceived ideas and extant theories. In addition, the data collection must take place on several occasions during the MOOC journey of the learners, in order to fit with the need for a focused sequential data collection as suggested by Charmaz (2014).

Grounded Theory has gone through multiple changes since it was first described by Glaser and Strauss (1967). Figure 3 depicts a diagram of the different GT approaches based on Morse, Stern, Corbin, Bower, Charmaz and Clarke (2009), with added frames to point to the most relevant GT approached discussed in this section. In section 3.5 of the research methods chapter, I provide reasons for selecting
one GT approach above some of the more frequently used approaches and how this choice supports this study.

3.3 Rationale behind mixing quantitative and qualitative data

Starting from the research question, De Vaus (2001) suggests that a social scientist needs to look at what type of evidence is needed to answer the question in a convincing way in order to build a solid research design that will drive the next steps in the research forward. Building upon the research needs resulting from the research question, this study uses an exploratory mixed methods design, which is a procedure for collecting, analysing and “mixing” both quantitative and qualitative data at some stage of the research process within a single study, to understand a research problem more completely (Creswell, 2009). The rationale for mixing is that neither quantitative nor qualitative methods are sufficient by themselves to capture the learning experiences and trends of the study at hand. When
used in combination, quantitative and qualitative methods can complement each other and allow for more complete analysis (Tashakkori & Teddlie, 1998). In quantitative research, the investigator relies on numerical data. The researcher isolates variables, looks for causalities and relates them to determine the magnitude and frequency of relationships. This view into frequency and relationships seems important to the researcher as it will provide additional support for examining the full learning experience of adult participants engaging in individual and collaborative SDL using multiple devices in FutureLearn courses. For example, if learners indicate in a quantitative question – e.g. a multiple choice yes or no – that they have engaged in social learning, the results of that question can then be used as a starting point to see how many learners engage in social or individual learning in a quantified way, before analysing which reasons they have to do so. Without quantified numbers that define group preferences, any qualitative data might be less poignant as the qualitative data would only describe the testimonies of learning, not the frequency in which it takes place. Additionally, qualitative research is a “means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem. The process of research involves emerging questions and procedures, data building from particulars to general themes, and the researcher making interpretations of the meaning of the data” (Creswell, 2009, p. 4). Realizing the beneficial combination of using both quantified and qualified data, made me decide to use a mixed methods approach throughout the pilot and the main study.

3.4 Data collection

3.4.1 Planning the study

As mentioned in section 3.1 a Grounded Theory approach was chosen. As this study relates to the emerging field of MOOCs, it seemed necessary to search for an approach that would be exploratory, and would match the importance of context which comes along with learning while using multiple technologies (e.g. mobile devices) and MOOCs.
3.4.2 The practical realization of the study

This study consists of a pilot and a main study. Both the pilot and the main study investigated learners engaged in FutureLearn courses. In the case of the pilot study, the courses under investigation were two closed ‘alpha’ FutureLearn courses (i.e., courses by invitation only), each lasting two weeks. The FutureLearn courses of the main study consisted of three FutureLearn courses, all publicly available and described in full in section 6.2.1 of the main study chapter.

Both the pilot and the main study consisted of three phases:

- **Phase 1 - expectations**: gathering the expectations of the FutureLearn participants by collecting data through an online survey (to read the questions, see appendix 8) which was delivered to all study participants approximately a week before each FutureLearn course started.

- **Phase 2 – keeping learning logs** (to read a learning log template, see appendix 11): during the course the participants of this study were asked to keep learning logs every second week of the course. The learning logs probed for actual learning experiences.

- **Phase 3 – reflections**: semi-structured one-on-one interviews (for questions, see appendix 14) followed once the courses were finished. The interviews investigated accounts of SDL provided by the participants, and more specifically for the meaning behind these accounts to identify SDL actions, as well as the full spectrum of factors influencing SDL in FutureLearn courses.

This three step approach was chosen on purpose. Research that wants to gather data relating to a learning experience that comes from following a course needs to look at the learning as it unfolds during the course. However, if a learner enrols in an online course which is not part of a mandatory programme to them, the learner starts the learning experience prior to the course by selecting which course to follow based on expectations related to the course, and the experience also includes post-course reflections. This type of approach goes back to Schön (1984). Schön was credited with bringing reflective practice to professionals as an evaluative process related to professional development. He outlined two approaches called reflection-in-action and reflection-on-action. These two types of reflective practices ideally integrate to help an individual draw from past experience and a professional knowledge base to reflect on a situation currently occurring as well as reflect after the situation to
make sense of it and construct meaning. Thompson (2008) added another dimension to this practice called reflection-for-action, which is planning ahead and reflecting on what may happen, allowing for preparation and anticipation of a situation. These practices are identified as relevant to thinking/analysis and self-awareness. Schön (1984) identified the significance of constructing meaning after reflecting on past experience and a present situation. This whole approach of looking towards a learning experience covering pre-, during and post-course happens in the learner’s mind. The challenge with this study is to translate the expectations, ideas and reflections into documents or dialogues that are transmitted from the learner to the researcher, in order for me to investigate and understand their learning experience through their self-reported documents and without colouring the findings with my own online learning assumptions. This is where the GT approach comes in, and more specifically constructing a GT based on the guidelines and insights of Charmaz (2006, 2014).

3.4.3 Ethical framework

The principal ethics consideration is to ensure the maximum benefit of the research for the broader research community, the research institutes, as well as society as a whole, whilst minimising the risk of actual or potential harm to the research participants. Ethical procedures followed during this full study sought to protect all groups involved in research including participants, researchers and research teams throughout the lifecycle of the research, and they follow the Human Research Ethics Committee (HREC) guidelines that ensure ethical proceedings within The Open University (HREC, 2014). The research instruments and the planning of the pilot as well as the main study were sent to the HREC in order to obtain ethical approval for this study. The full research lifecycle including the planning stage, the anonymization of the data, the dissemination of results and the storing of information with full description was added. The HREC granted full permission to go ahead with the research (HREC
approving the pilot: HREC/2013/1465/deWaard/1, HREC approving main study: HREC/2014/1777/deWaard/1).

Through the informed consent, possible participants were made aware of the three research phases, the timing of each phase and the requested actions, as well as the dissemination process of the results. The participants were informed that their responses would be kept completely confidential. In addition, the participants were informed through the informed consent form that only myself as the principal researcher and my two academic supervisors would see all the collected data. The list of e-mail, learning logs and information data of the participants was stored anonymously and electronically in a password protected folder for the duration of 5 years; a hard copy was stored on a non-connected, stand-alone hard disk that is kept in a locked closet in a secured office at the premises of the Open University in the UK for the duration of the analysis. The raw data will be stored for the duration of the PhD research, i.e. until November 2019. All the participants were also made aware that any publication or dissemination would only consist of anonymized data. Finally, only those participants who signed the informed consent form became part of the participant group.

3.4.4 Research instruments

3.4.4.1 Online survey

An online survey was sent to all the MOOC participants who showed an interest to get background information on their online learning, social media and MOOC experience, and to get insight into their reasons for enrolling in the FutureLearn course of their choice. In the pilot study the results of the online survey were used purely to get background information and to investigate potential differences between groups of learners with different backgrounds. In the main study the online survey was also used to select only those participants with two years of prior online learning experience.
3.4.4.2 Learning logs

In order to collect accounts of the actual learning experience of the participants, they were asked to fill in semi-structured learning logs while they were engaged in FutureLearn courses. The decision to use using semi-structured learning logs and not free text diaries was to reduce the time needed to analyse the data from the learning logs, and to allow a more homogenous interpretation of the results and the descriptions written down by the participants (Symon, 2004).

During the pilot study two learning logs were provided to the research participants. One template needed to be filled in on a weekly basis, the second template was for gathering data concerning daily learning experiences. The reason for using two separate learning logs was to reduce the amount of work for the participants without losing data relevant to the topic under investigation by only probing overall learning perceptions once a week. However, from the feedback on the learning logs it became clear that using two different templates was confusing for the participants. As a result the learning logs were merged together, and in the main study only one learning log template was used (learning log template, see appendix 11).

The learning logs used for collecting SDL-related experiences built upon the learning diary templates produced by Vavoula (2005), and those templates have been altered to be appropriate for the FutureLearn platform. Concretely, the following additions were added to the mobile learning logs template as used by Vavoula (2005): information regarding SDL (e.g. learning episode), collaborative data gathering (e.g. with whom did you interact: peers, instructors, family members), social interactions directly related to social options in FutureLearn (e.g. collaborative note taking), individual learning options related to FutureLearn (e.g. marking a module as finished). The options related to time investment, location and mobile diversity were similar to those used in Vavoula’s template. Through
the use of learning logs, an opportunity is created to look closely to learners’ voices as legitimate evidence to understand the FutureLearn MOOC experience.

3.4.4.3 Semi-structured one-on-one interviews

While planning both the pilot study and the main study the type of interview was chosen. I considered focus group interviews and one-on-one interviews, but decided to choose one-on-one interviews after analysing the first data which indicated that certain learners were really not interested in social interaction with peers, some participants indicated an aversion to interact with others while others felt insecure to get into conversations where they would possibly have nothing to add. This would potentially mean that these more individually comfortable participants might not share their thoughts in a group interview. Furthermore, the focus group is a group depth interview; it runs on group dynamics and the group, not the constituent individuals. The one-on-one individual interview focuses on a single individual at a time allowing individual insights to be shared with the interviewer (DiCicco-Bloom & Crabtree, 2006), which seemed a better fit for this study. After having chosen the one-on-one interviews a selection needed to be made on using either open or semi-structured interviews. Semi-structured interviews make use of pre-set questions to start the interview, while picking up interview topics of interest based on what the individual interviewees provide during the interview (Mertens, 2014). The decision to use semi-structured interviews came from the need to allow a more in-depth understanding of some of the ideas or actions that were written in the learning logs. By using semi-structured interviews it was easier to stay in close contact with some of the emerging data from the learning logs and get access to the meaning behind the data from the learning logs.

17 of the semi-structured one-on-one interviews were recorded in Skype, while two one-on-one interviews were exchanged between myself and the research participants in written form using email conversations. These interviews focused on the overall learner experience and SDL in one of the
FutureLearn courses. The questions for the semi-structured one-on-one interviews are presented in appendix 14.

### 3.5 Grounded Theory for analysing the research

As mentioned in section 3.1, the analysis of this study needed to enable exploration, and it needed to allow enough flexibility allowing the data from the participants to give rise to theory. A conceptual framework that would allow other researchers and online facilitators to stimulate, design, or at least understand the major influencing factors of SDL in FutureLearn courses within a context broader than the courses themselves. First an overview is given of the data analysis software which was used for the main study. After that an overview of the chosen GT data analysis approach is given.

#### 3.5.1 DeDoose analysis software

All of the data that was collected was inserted in the DeDoose (dedoose.com) data analysis software. This software was used to analyse the main study. Figure 4 provides a screenshot of the DeDoose user interface. The DeDoose software is a cross-platform application for analysing qualitative and mixed methods research with text, photos, audio, videos and spreadsheet data. The DeDoose software was chosen based on two reasons: prior experience and good features. I had successfully used DeDoose in the past while being part of an international, multi-member research team that analysed data coming from tweets used during MobiMOOC in 2012. The software and its features were built by embedding the experiences and demands of active social-science researchers using psychological and anthropological research methods. In the beginning of 2015 they got Mimi Ito and the Digital Media and Learning team from the University of California involved to integrate new useful social science features into the program (e.g. flexible memoing features). The software also has a wide array of mixed
media options and it offers multiple interactive visualisations which add clarity during the different stages of analysing data.

Figure 4. Screenshot of DeDoose data analysis software

3.5.2 Data analysis from pilot to main study

Although a GT approach was used for both the pilot and the main study, there was a theoretical difference in GT nuance between both studies. The pilot study started out from Glaser’s GT (1992), and the main study started out from Strauss and Corbin’s GT (1990). Once the main study was rolled out, the constructing GT approach as described by Charmaz (2014) was used to analyse the data. Grounded Theory was selected to plan the study and the data analysis. Glaser and Strauss (1967) introduced Grounded Theory. They emphasized that the researcher should start from a blank canvas or an open mind to investigate new research. Although SDL in FutureLearn courses is a new research area, it is not without its influences coming from neighbouring fields of interest which affect the research of this study. Additionally, my background as a professional having been involved in online and mobile learning projects also risked influencing the interpretation of data. The pilot study was organized to embrace the idea of ‘an open mind’ from the researcher, as suggested by Glaser (1992), while the main study
follows the Strauss & Corbin (1990) approach to data analysis that takes theory into account while analysing data. At the time the main study was organized I was more aware of useful online learning theories influencing this study, which made it less possible to keep an open mind with regard to theory.

3.5.3 Grounded Theory method for framing the data analysis

In quantitative research, time is spent reviewing the literature and planning details of all stages of the research process, but in qualitative research – and specifically Grounded Theory (GT) - there is a need to start gathering data in order to formulate on-going plans and, perhaps, to propose new research questions. “Coding, in Grounded Theory, is similar to its use within the qualitative traditions, but it is also much more. In Grounded Theory, its level of development and specificity clearly distinguishes it from other qualitative methods” (Walker & Myrick, 2006, p. 550). In GT coding is “the fundamental analytic process used by the researcher” (Strauss & Corbin, 1990, p. 12). Walker and Myrick say “it is what transports researchers and their data from transcript to theory” (p. 550) as the relations between the different categories provide the basis for an emerging theory. As such “GT is an evolving method premised on the inductive generation of theory derived from data” (Walker & Myrick, 2006, p. 556). GT offers a lot of depth to a qualitative researcher due to its horizontal implementation across different fields, its scientific strength coming out of academic debates, and the models offered to GT researchers to select from.

Grounded Theory combines the depth and richness of qualitative interpretive traditions with the logic, rigor and systematic analysis inherent in quantitative survey research (Charmaz, 2006; Glaser & Strauss, 1967). In an early account by Glaser and Strauss (1967) they emphasized that “the goal was to discover a theory that had grab, would fit the data, and would work in the real world” (p. 548). This quest to understand the real world pushed GT forward. “Grounded Theory serves as a way to learn about the worlds we study and a method for developing theories to understand them” (Charmaz, 2006, p. 10).
Charmaz proposes that qualitative researchers “construct our grounded theories through our past and present involvements and interactions with people, perspectives, and research practices” (p. 10). The mention of constructing theory and relating it to interactions was crucial for selecting GT as a method, and Charmaz (2006) as a guide for using the method, as will be explained after first elaborating on the choice of using either the Glaser or the Strauss method for the pilot and the main study.

3.5.4 Glaser versus Strauss

GT was first mentioned in a joint publication by Glaser and Strauss (1967). Since then GT has been debated, researched, implemented and criticized by many. The most interesting debate comes from both its originators. Soon after their collaborative publication Glaser and Strauss each started to conceive his own view of GT with different methodologies, instruments and philosophies, resulting in academic debates. As such, GT harbours a variety of methods which are based upon its first principles described by Glaser and Strauss (1967), yet have evolved over time based on differences in opinion on validity, process and instruments. Because of this diversity within the GT, it is important to clarify which GT methodology was chosen for the pilot and the main study, and why. In the following section the rationale behind the chosen GT method will be described.

The debate between what Walker and Myrick (2006) called the Glaserian and Straussian versions of Grounded Theory, seems to be centered on the researcher’s role, activity, and level of intervention in relation to the procedures used within the data analysis process. In addition, the review of literature related to any research also gave rise to a debate between Glaser and Strauss, where Glaser proposes that the researcher should go in with an open mind and not be driven by theory or literature, and Strauss allows the researcher to bring in theories and concepts coming from literature.
3.5.4.1 The coding difference: constant comparing versus three-step method approach

The most distinctive difference in types of GT approaches lies in the data analysis, which is also at the core of the Glaser-Strauss debate according to Walker and Myrick (2006). Walker and Myrick define the GT analysis process as a simple and complex, methodical and creative, rigorous and laissez-faire process in which the researcher engages to generate theory from the data. While comparing the Glaser method to the Strauss method, Walker and Myrick describe the essence of Glaser’s method as follows:

Glaser (1992) has defined coding as “conceptualizing data by constant comparison of incident with incident, and incident with concept” (p. 38). He has focused on the constant comparative method as the method of coding data, suggesting that it involves two simple analytic procedures aimed at creating categories and their properties. In the first procedure, the analyst makes comparisons of incident to incident to generate categories and then compares new incidents to the categories. The second procedure, or the making of comparisons of incident to concept, requires the analyst to examine the data through the use of neutral questions such as, “What category does this incident indicate?” (Glaser, 1978, p. 57). These two procedures, together with the use of memos that document the analyst’s ideas as coding proceeds, and theoretical sorting, which organizes the data and the memos, are the essence of Glaser’s method (p. 551)

Starting from the Glaser approach appealed to me, because it provided an open view towards the data from the pilot study, it allowed ideas to come from the data as a first distinctive action before relating it to specific theory, and it allowed memos to intertwine with the findings.

Glaser’s (1992) critics asked: at what point, in employment of procedures, does the researcher actually step away from what does exist and begin imposing preconceived frameworks on the data? More specifically, should properties be dimensionalized during open coding, the first stage of the process, or is this best left for later, when the data can speak clearly to this issue and the dimensions can emerge
rather than be imposed? (Walker & Myrick, 2006, p. 552). This stands in contrast with the coding as proposed by Strauss, which is relying on a different coding paradigm. Strauss and Corbin (1990) suggest a three step process for coding: open, axial and selective coding. This is an important addition to the open coding process, where they have defined open coding as the “analytic process through which concepts are identified and their properties and dimensions are discovered in the data” (Strauss & Corbin, 1990, p. 101). Walker and Myrick (2006) see the reference to dimensions as the key difference: “Strauss and Corbin believe that dimensionalizing a category’s properties (i.e., the dimension ‘short to long’ for the property of distance) is a core task. To develop a category, and the relationships between categories, the analyst must develop the category in terms of its properties and the dimensions of the properties” (p. 552).

However, I agree with the critique of Glaser (1992) formulated on adding dimensions: “once this form of forced coding starts, the Grounded Theory is usually lost, because the analyst is led far away from relevance” (p. 47). In order not to influence the exploratory nature of the study from the start, it was clear that the Glaser method with its decreased risk of losing relevant data due to assumptions, needed to be used for the pilot study. Once an initial exploration of the new phenomenon had been made and certain key findings were proven (e.g. the fact that SDL took place in FutureLearn courses, influencing factors of SDL, overarching categories that have an impact on SDL), the Strauss and Corbin (1990) approach could be followed. By postponing the act of relating dimensions to the codes until the main study, the researcher hoped that the iterations of the coding process would allow a more open comparison and analysis of the data.

3.5.4.2 To read or not to read literature extensively

Another difference between the GT approach used for the pilot study and the main study was the use of existing literature, theory and frameworks. For the pilot study I followed Glaser’s option to allow
themes to emerge from data without the analysis being coloured too intensely by theories from surrounding fields of interest. In the case of the pilot study there was only a small and limited literature relating to MOOC learning experience, and no literature related to FutureLearn as the platform was just launched. But although I did strive for an open mind related to theories surrounding the field, I did have personal assumptions that were assimilated over the years as an online and mobile learning practitioner, and which had been coloured by underlying theories. This impossibility to attain a blank mind as a researcher is also a challenge of the Glaser method. One cannot make a mind blank, there is always an assumption.

For the pilot study, the best GT option would be one that allowed my experiences to be made transparent through the research process by means of memoing, in order to make explicit those choices or coding that came forward from those past experiences, which in turn resulted in first findings. “Glaser found that prior understandings should be based on the general problem area and reading very wide to alert or sensitise one to a wide range of possibilities; learning not to know is crucial to maintaining sensitivity to data” (Heath & Cowley, 2004, p. 141). This approach fitted the pilot study, as there are multiple educational fields and resulting theories that might influence the topic investigated in the pilot study. However, it was crucial to keep an open mind to feel the sensitive emergences that came from the pilot study data. A more focused reading would only occur once an emergent theory was developed to allow the literature to be used as additional data (Hickey, 1997), in this case during the main study analysis.

3.5.4.3 Additional coding tools

Glaser has identified many theoretical codes and theoretical coding families that can emerge in Grounded Theory: 18 in *Theoretical Sensitivity* (Glaser, 1978), 9 in *Doing Grounded Theory* (Glaser, 1998), and 23 in *Theoretical Coding* (Glaser, 2005). However, Glaser has been adamant that there are
potentially many more theoretical codes that might emerge in GT research; therefore, the theoretical codes do not comprise an exhaustive list (Hernandez, 2009, par. 4). During the pilot study, no theoretical codes were used as a way to reflect on potential deeper meaning for emerging categories, as I felt that this would risk fixing emerging data in confined spaces of meaning. I concur with Strauss & Corbin (1998) who noted that it is better to avoid restricting conditions when analysing a topic and enable a conditional matrix that allows conditions between categories to progressively emerge. Setting up a conditional matrix was useful for this study, as it allowed this deeper level of understanding to take place. The relationships between the categories emerging from the data were also key to constructing a theory or a framework that would visualize the relationship of all SDL factors as learners engaged in FutureLearn courses. As such a visual representation that depicts a simplified version of the findings is added to section 7.6 of the findings chapter.

3.5.5 Rationale for using Charmaz’s constructivist GT approach

Charmaz (2006, 2014) builds further on the GT approaches of Glaser, as well as Strauss and Corbin. In her application of GT, she suggests constructing a GT based upon data iterations which relate to the GT of Strauss and Corbin (1998), and also to keeping an open mind while coding as mentioned by Glaser (1998). “Theoretical sensitivity is a multidimensional concept that includes the researcher’s level of insight into the research area, how attuned they are to the nuances and complexity of the participant’s words and actions, their ability to reconstruct meaning from the data generated with the participant, and a capacity to separate the pertinent from that which isn’t” (Mills, Francis & Bonner, 2008, p. 28). This leads to Charmaz, who proposes a more constructivist GT approach because the “data do not provide a window on reality. Rather, the ‘discovered’ reality arises from the interactive process and its temporal, cultural, and structural contexts” (Charmaz, 2000, p. 524). I felt that learning is influenced heavily by cultural and structural contexts, pedagogical elements and infrastructural options, and as
such finding a methodology that parallels this reality felt like the best option to use for exploring this study and its data. Charmaz (2006) emphasizes the emergence of multiple meanings from GT. “For constructivist, grounded theorists Charmaz’s work provides guidance in making meaning from the data, and rendering participants’ experiences into readable theoretical interpretations” (Mills, Francis & Bonner, 2008, p. 32). Charmaz gives a more active role to the interpretation by the researcher, making the researcher a part of the co-construction of experience and meaning. This relates to Strauss and Corbin (1998): “...analysis is the interplay between researchers and data. It is both science and art” (p. 13).

3.5.6 Charmaz’s guidelines followed during the data analysis of the study

Charmaz’s (2006, 2014) guidelines on constructing GT were used to plan the data analysis of this investigation, both for the pilot and the main study. She proposes to gather rich data, use memoing throughout a study, and look for shared meaning and validity when interpreting the data.

3.5.6.1 Gathering rich data: choosing an approach for data-gathering

Charmaz (2006) recommends placing the rich - detailed and full - data in their relevant situational and social contexts. In order to ensure this, these data that were collected were used in full detail (i.e. using full answers) and tagged (e.g. learning log, pre-course) for their origin before the data analysis was started. This was important to follow shifts within the learner group from learning expectations, across learning experiences to learning reflections. A word cloud consisting of different codes that emerged during the data analysis phase is shown in figure 5.
“Gathering rich data provides solid material for building a significant analysis” (Charmaz, 2006, p. 14).

The method for data analysis must be seen as a tool (Charmaz, 2006), and it is how the researcher uses that tool or tools that matters. However, how you collect data affects which phenomena will be seen, and some research problems might indicate the need to use several combined or sequential approaches (Charmaz, 2006). As a researcher I acknowledge that there is a subjective part in the results coming out of this project, due to choices based on a selective view of myself: which methods are chosen, which data is kept as evidence for certain learning experiences, what meaning I think is behind the shared data and so on. It is by making these choices/rationales as clear as possible throughout this study that I hoped to create an objective account of the subjective choices.

3.5.6.2 Shared meaning and validity

An interesting consideration is that data shared by the participants have a subjective side to them as mentioned by Charmaz (2014), where people construct texts for specific purposes and they do so within
social, economic, historical, cultural, and situational contexts (p. 35). Prior (2003) mentioned that texts [or any data] do not stand as objective facts although they often represent what their authors assumed were objective parts. Before information is shared, the person sharing it makes decisions on what is important, relevant, comfortable for sharing or not. Additionally, it cannot be assumed that the recipient of a piece of information constructs the same interpretation as the sender. There will always be a difference in understanding. To limit personal interpretations, it is important to establish a way to attempt to reconcile these differences and to move towards shared meaning. In the main study this shared meaning was sought by providing the first findings to the learners that took part in the study, allowing those who volunteered to provide feedback on the draft results to adjust possible meanings towards a shared meaning. The fact that the experiences come from different people, yet within a similar learning context, helps to get close to a shared experience, or a consistent interpretation of the shared meaning. In the end only two participants from the main study provided feedback on the birdseye view of the first findings. Their feedback on the chosen categories and findings was positive, with side remarks on the differences between their own learning experience and those that were described in the findings (e.g. one participant reflected on the individual and social learning preferences and he mentioned explicitly how much he learned from interacting with others, but that he had to learn how to do it).

3.5.6.3 Memoing

During the planning phase of both the pilot and the main study I kept notes to keep track of possible assumptions with regard to this study by memoing. The memoing allowed a transparent, and vigilant, view on my own perceptions on SDL in MOOCs, as it allowed a self-reflective process to become apparent, providing more transparency to the actual interpretation of the data (Creswell, 2005). This memoing process was planned from the start and was performed throughout the research. In the first
instance, the memos described possible assumptions I might have regarding any of the data. Once the first data iterations were taking place, the memoing became instrumental to describe potential causalities between different categories (see figure 6).

Figure 6. Screenshot of the memos that were written during data iterations in DeDoose

**Reflective memoing**

During the pilot and the main study, I first kept a paper notebook which I later replaced by typing memo’s directly in DeDoose as I was analysing the data. During the study, I added notes related to my research assumptions, how I felt conducting the research, and how I interpreted it. In my memo’s I tried to keep on top of ideas that could be interpreted based on prior knowledge (e.g. mobile learning assumptions). I also tried to avoid emotional interpretation of the data as this could steer me away from neutrality towards the data (e.g. people having explicit opinions about social learning), clarify personal value systems which might hinder an objective interpretation of the data (e.g. I believe that technology supports learning more than it hinders it), and identify potential conflict in interpreting the data based on assumed gatekeepers’ interests (e.g. facilitators and the negative evaluation of their content or guidance as interpreted by the learners).
Memoing examples

In order to clarify what a memo consists of, I am sharing two specific examples. A short list of the most frequently mentioned assumption topics by myself are listed here with brief descriptive examples to clarify the description and contextualise the memoing category:

- My personal mobile learning experiences and how these influence my own SDL (e.g. prior research done by myself showed the impact of mobile access on learner interactions in a MOOC forum; so this idea of positive impact related to using mobile devices for collaborative MOOC action needed to be set aside in order to keep an open mind when searching for codes related to social learning or using different devices within FutureLearn).
- The barriers that learners must overcome in order to learn online (e.g. because of my previous eLearning experiences, both as a learner and organiser, I realized I had to be aware of forgetting the potential ‘obvious’ and as such ‘invisible’ online learning assumptions I had: for instance, how not all learners have access to a professional learning network).
- Experiences regarding individual and/or collaborative learning, more specifically the perception of how they benefit SDL (e.g. while building the research instruments I needed to rethink the variety of collaborative and individual learning to include outside course collaborations, course participation, outside content searches to link to content, passive/active individual learning, ensuring a wide view on collaborative/individual learning).
- How an ideal MOOC platform should be to influence mobile SDL (e.g. due to having organised MOOCs of the connectivist type in the past, I had an opinion on the FutureLearn delivered MOOC. These sentiments of ‘best design’, ‘best peer interactions’ needed to be set aside to view all the learning opportunities FutureLearn offered in a more objective way).

Below are two full memoing examples written during the instrument preparation phase:

(from notes April 2013, example of personal, mobile learning experiences)

Personal experience: it feels like a wonderful excuse to use my Android smartphone as an indicator on whether I can follow a course or not. Meaning whether I am willing to put in the time needed for the course. If I cannot connect to the content I want to in due time (very subjective), I simply stop trying.

Projection/research interpretation: it might be that lack of smooth access to content has a demotivating effect on learners, or for those in doubt of moving on with their learning. Digital skills might have a bearing on motivation.
SDL cannot be confined to direct links to learning, can it? To me SDL is a result from external pressures as well. Distinction between adults and adolescents must be made though. Parents and peers as pressure points for adolescents, professional, family, social (broader than peers) and spare time pressures for adults. On top of direct learning actions. Activity theory comes to mind, but all things human are a result of the sum of actions proceeding a particular moment in time. What would I perceive as the proof of an external element meaningfully bending actions taken? Let’s start with looking at data, gather the external pressures and whether these end participation. Ending participation due to external factors seems like a real threshold influencing participation. Once that is found in the data of some participants, it might indicate that the factor as a whole influences learning to a lesser or larger extend.

3.5.7 Coding process

This study used elicited data (research participants sharing written, digitally delivered, and audio data) from online surveys (closed and open ended questions), learning logs, and audio/text interviews. These elicited data share some of the advantages and disadvantages of surveys, interviews and documents. The participants share what they feel comfortable with, which inevitably keeps out what they find consciously or unconsciously personal or irrelevant for the research. Additionally this data collection relies on participants’ prior writing and speaking skills and practices (Charmaz, 2006).

From the data gathered, an analytical sense of their meanings and actions is built up (Charmaz, 2006). “Qualitative coding, the process of defining what the data are about, is our first analytic step. Coding means naming segments of data with a label that simultaneously categorizes, summarizes, and accounts for each piece of data” (Charmaz, 2006, p. 43). Charmaz continues: “coding is the first step in moving beyond concrete statements in the data to making analytical interpretations” (p. 43).
Consistent with Grounded Theory emphasis on emergence, questions about these codes arise from reading the data (Charmaz, 2006). As Charmaz (2006) wrote: coding is the pivotal link between collecting data and developing an emergent theory to explain these data” (p. 46).

In order to allow this emergence to take place, a strong immersion into the collected data was necessary. And as the data analysis moved forward in search for a saturated emergence of concepts, multiple coding iterations and constant immersion in the data took place.

### 3.5.7.1 The three coding cycles

For this study 3 different coding cycles were used based on Charmaz’s constructivist GT, each of the coding cycles consisting of several iterations.

- **Initial coding:** quickly screening all the data to get a feel of possible big subjects mentioned by the data.
- **Line-by-line coding,** a strategy which prompts the researcher to study the data closely and begin conceptualization of the ideas (Charmaz, 2006)
- **Focused coding,** which permits the researcher to separate, sort and synthesize large amounts of data (Charmaz, 2006)

The iterations were undertaken until saturation was reached and no new emerging data could be found.

*Initial coding*

Exploring whatever theoretical possibilities, we can discern in the data, initial coding should stick closely to the data (Charmaz, 2006, p. 47), while also answering the following questions:

- What are these data a study of?
- What do the data suggest?
- From whose point of view?
- What theoretical category does this specific datum indicate?

Initial Grounded Theory coding prompts the researcher to see areas in which data are lacking, and realizing that the data has gaps is part of the analytical process (Charmaz, 2006). An interesting
approach for initial coding is provided by Glaser (1978) who suggests using gerunds while doing the initial coding action. GT researchers may speak about theoretical coding (a gerund or verb denoting the process of finding theoretical codes through emergence) as the process they use to find a theoretical code (a noun denoting the actual type of relationship between two or more substantive codes or between the core category and all other substantive codes).

In the first stages of coding I used gerunds derived from the actual verbs used in the data (e.g. caring – when referring to learners who mentioned they had to care for family members or friends). This use of gerunds preserved the fluidity of the experience, allowing new ways to look at the data, but it was at times difficult – especially when the data were referring to non-human interaction. I did find that using gerunds makes the actions much more ‘human’, as humans are in many cases the actors in online learning. Nevertheless, using gerunds for theoretical coding and nouns to describe substantive codes was at times confusing, and it was distracting because it led to misassumptions due to turning data into specific active verbs or nouns depending on the thought process at that moment, and probably also due to the language barrier of having to use English as a second language. While this approach was used in the pilot study, it was not taken up in the main study due to its conflicting results.

An additional strategy provided by Charmaz (2006) - and kept in mind here - was to compare incidents of the same order (e.g. references to prior engagements were mentioned frequently, but were also very diverse) between the data to enhance analytical thinking about the shared information. This coding strategy became more natural in the process than the use of gerunds. This might be due to language realities, or to a preference for free association by myself, or simply because relational links are easier remembered. In order to get a better understanding of the different reoccurring categories that were touched, the next level iteration was planned: line-by-line coding.
Line-by-line coding

After the first initial coding, a second coding approach was used consisting of line-by-line coding of the written texts (open ended questions, interviews, and learning logs), where each comment was read and analysed for potential codes: e.g. “With my previous MOOC [prior experience], I got into a routine [self-directed learning strategy] of when I would watch videos and complete the work each week as it had a coherent structure [prior content delivery experience]”.

The line-by-line coding prompted me to remain open to the data and to see nuances in it (Charmaz, 2006). As a guideline while coding the following set of strategies were followed (Charmaz, 2006, p. 50):

- Breaking the data up into their component parts or properties. The data were coded during reading iterations performed by myself to find meaningful codes that described the data shared by the research participants.
- Defining the actions on which they rest when possible. Some of the codes consisted of gerunds initially to indicate action and relate the codes as closely as possible to the actual data (e.g. ‘getting behind’ as a gerund code for ‘once I got behind’).
- Crystallizing the significance of the points. By triangulating similar codes, I searched for a higher level of significance in the codes. Although the above-mentioned gerunds allowed me to stay close to the shared data, once multiple iterations were done the gerunds that seemed similar to me were combined and put under an overarching, descriptive code. The initial code ‘giving up’, was organised under ‘falling behind’.
- Comparing data with similar data strands emerging in other categories. Horizontal screening of all textual data resulted in codes that were present in different categories, and which were reoccurring for each data set linked to specific sub-questions (e.g. motivation, learning goals).
- Identifying gaps in the data (e.g. learning log data that left room for interpretation was later taken up during the one-on-one interviews)

Glaser (1992) has written “Using the constant comparison method gets the analyst to the desired conceptual power quickly, with ease and joy. Categories emerge upon comparison and properties emerge upon more comparison. And that is all there is to it” (p. 42). This prompted me to go through the data in multiple iterations, allowing my mind to create codes from the data. However, this was not always a joyful experience, more a necessary task that at times felt joyful. Starting from a quick iteration intended to capture a birds-eye interpretation, each following iteration resulted in more detailed
coding. The line-by-line coding had multiple iterations, until the categories were saturated, meaning that no strong new categories could be identified by myself while going through the data once more. I also needed multiple iterations to grasp underlying relations, unspoken actions or thoughts that emerged due to reoccurring vague directions (e.g. the casual approach to FutureLearn courses as opposed to other more formal (online) learning).

*Focused coding*

The focused codes are more directed, selective, and conceptual than the first phases according to Glaser (1978). Focused coding also uses the most significant and/or frequent earlier codes to sift through the data. After having established some strong analytic directions through the initial line-by-line coding, I began focused coding to synthesize and explain larger segments of data in order to find patterns, underlying relationships or issues that directed towards underlying themes. Although the first issues were already coded during the line-by-line phase, the issues and coding related to these issues became more in-depth, more focused during this phase. Where the line-by-line coding moved the codes from initial coding towards issues still closely related to the codes, the focused coding provided issues that were of a higher order, taking the codes to a higher level to bring the data closer to a conceptual understanding of learning experience of adult participants engaging in individual and collaborative self-directed learning using multiple devices in a FutureLearn course. For example: “I have been discussing what I learned on the course with my partner and sharing the ideas with him which I find a useful way to learn interactively outside the course [issue: trusted discussion with people external to course – external course collaboration and reflection]”. This issue transformed into a realization that collaborative learning is not confined to the course participants, but reaches out to all the people in the learner network (or those the learner is willing to connect to for learning purposes).
The reason this study uses focused coding and not selective coding is related to the findings that emerged from the data. Selective coding is, according to Strauss and Corbin (1998), the “process of integrating and refining the theory” (p. 143). To accomplish this final task, the analyst selects a core category and then relates all other categories to the core as well as to the other categories. In selective coding “the categories are developed in terms of their properties, dimensions, and relationships, and the integration occurs at more abstract level of analysis” (Strauss & Corbin, 1990, p. 556), in that perspective equal to focused coding. But focused coding allowed the Grounded Theory to have equally important elements at the core of the theory, whereas selective coding would push forward one central element. In the case of the main study and its results for looking at SDL in FutureLearn courses, there were multiple dynamics influencing SDL. This made focused coding a more suitable approach to construct a Grounded Theory for this study.

3.5.7.2 Additional considerations during coding process

In addition to carefully investigating emerging categories coming from the data, the data analysis process was scrutinized for validity by writing memos, using comparative methods, and reducing problems by following GT expert guidelines.

Memo writing

As mentioned in section 3.5.6.3, writing memos through the research process kept me involved in the analysis and helped to increase the level of abstraction of my ideas. The memos were used for multiple purposes. It allowed me to keep track of the emerging ideas that came out of the data during an iteration (e.g. memo 20140108 “This is the fourth time a learner indicates they found support for their learning while talking to non-course participants. Maybe take along the idea of external peers? When or why do learners decide to reflect with others and how close or far are they willing to find peers that can answer or help with their course challenges?”), providing an archive of ideas and data relationships
that could be used for each new iteration to see whether the initial presumed categories emerging from the data, actually stood the test of time and investigating scrutiny. Based on the memos, categories emerged describing certain data sets (e.g. motivation/emotion describing those moments when learners got renewed or restricted energy for learning). These codes stood out due to their frequency and relevance throughout other data linked to sub-questions, and as a result these memo based categories became theoretical categories (e.g. the learner as intermediator, willing to reach out to peers or filter or acquire new knowledge).

**Using comparative methods**

Glaser and Strauss (1967) emphasize that no matter which data is used for coding, ‘constant comparative methods’ must be used to establish analytic distinctions and thus make comparisons at each level of analytical work. This includes writing down codes that define another view of the process, action or belief than the research participants, as my own observations and ideas do matter. This resulted in deleting all the codes and categories at one point in the pilot study, supposing my prior knowledge had skewed my data analysis. By starting anew and using the little theoretical and practical experience gained in the previous data analysis cycle, I enhanced the coding process due to the newly found expertise in the method. After going through the coding once more, I felt that the results coming out of this second full analysis were as close as I could get to a GT interpretation of the learning experiences as shared by the participants. This second time around going through all the data also made it clear to me that there were parallels between my first and second analysis, assuring me that either the data analysis approach was already strong during the first take, or that the subjective knowledge and ideas had slipped through into the conclusions the second time around. Either way, one full analysis cycle all the way up to data saturation would probably be enough to obtain findings for the main study. In order to obtain the best possible result, memoing had to be conducted throughout the
data analysis, including critically assessing chosen categories, for although this takes more time in terms of writing the memos, it also keeps track of potentially meaningful argumentations:

“Memo20140123 on the category of Personal Traits. Although I think that personal traits are allowed to interfere with the learning by the learner (laziness, general grumpiness with the passing of years), I am not sure whether those personal traits are indeed part of the persona or part of the course identity of the learner. It might be that the course and consequent invoked (de)motivation result in these traits, whereas it might well be that the person indicating the trait ‘lazy’ would not be that lazy in other courses? On another note, what someone defines as ‘grumpiness’, could be defined by others reflecting on that personal trait as ‘realistic’. So the description of personal traits might not capture the whole picture. “

Additionally, Charmaz underlines the importance of being critical of your own research, and that the combination of initial coding with line-by-line coding allows the researcher to ask questions about the data, and be critical and analytical about the data. This constant questioning and comparing of emerging ideas, found categories, and related issues was part of the integral study.

Reducing assumption problems in coding

Preconceptions regarding the research topic can permeate an analysis without the researcher’s awareness (Charmaz, 2006). Every researcher holds preconceptions that influence, but may not determine, what we research or how we make sense of it (Charmaz, 2006). One of the actions to reduce unconscious assumptions was already discussed in the memo writing section, but more options are available. In order to avoid forcing data into preconceived codes and categories some strategies were followed as suggested by Charmaz (2014):
• Achieving intimate familiarity with the studied phenomenon is a prerequisite. This moves a researcher beyond taking the same things for granted that your respondents assume. I followed the FutureLearn courses passively, allowing me to have an idea of which content was provided, and which interactions were taking place without changing the dynamics (that could happen if I had engaged with the courses actively).

• Taking a reflexive stance toward challenges. For this study, I reflected on the challenges met (e.g. social learning challenges met by the learners which permeated the data indicating a preference for individual learning).

• I also wrote down a list of possible differences between online learning, mobile learning and MOOC learning in order to find special learning characteristics that might only pertain to SDL in FutureLearn courses (e.g. contextualized learning in mobile learning settings).

With regard to Charmaz’s (2014) remark on being careful about applying a language of intention, motivation, or strategies unless the data support the assertions, the coding was done by consciously, taking into account the following coding remarks made by Charmaz (2006, p. 69):

• How does my coding reflect the described experience?
• Do my analytic constructions begin from this point?
• Have I created clear, evident connections between the data and my codes?
• Have I guarded against rewriting the studied experience into a lifeless language to fit academic jargon?

These questions were also useful to ensure a valid use of GT for this study, which is described in section 9.5 of the conclusion chapter.

3.5.8 Allowing multiple realities to be embraced by final theory

The focus on the aim of GT is important and well described by Heath and Cowley (2004): “the aim is not to discover the theory, but a theory that aids understanding and action in the area under investigation” (p. 149). As such the qualitative analysis which is performed can have multiple designs, but it is the transparency and comprehensibility of the result which is of real importance. This resonates with Mead’s (1934) concept of sociality which says that a phenomenon can be several things at once. Thus, Grounded Theory’s aim - as described by Heath and Cowley (2004) - is “to explore basic social processes and to understand the multiplicity of interactions that produces variation in that process” (p. 86).
This aim is crucial to me, as investigating SDL in FutureLearn courses embraces a vast number of interactions and factors of influence. By using a methodology like GT which allows room for multiplicity, the theory reached at the end of the full study will more likely illuminate the multiple realities of individual and collaborative SDL in FutureLearn courses by learners using multiple devices. This multiplicity inevitably brings along complexity, which did create anxiety when writing up the study findings. Useful advice is however provided by Heath and Cowley (2004) for novice researchers: set aside the ‘doing it right’ anxiety, adhere to the principle of constant comparison, theoretical sampling and emergence, and discover which approach helps best to achieve the balance between interpretation and data that produces a Grounded Theory.

3.5.9 Validating a Grounded Theory

In this last section, a list of questions are used to allow the validity of the Grounded Theory to be answered. For no matter which GT approach is followed, it is of scientific interest to validate the set of concepts grounded in the data and which make up the theory. Strauss and Corbin (1998) offer seven criteria which allow the emerging theory to be validated, here listed in abbreviated form (pp. 17-19).

- **Criterion #1**: Are concepts generated? If concepts are drawn from common usage (such as, “uncertainty”) but are not put to technical use, they are not parts of a Grounded Theory, for they are not actually grounded in the data themselves.
- **Criterion #2**: Are the concepts systematically related? The key to scientific research is systematic conceptualization through explicit conceptual linkages.
- **Criterion #3**: Are there many conceptual linkages and are the categories well developed? Do the categories have conceptual density? A Grounded Theory should tightly relate categories to one another and subcategories in terms of the basic paradigm features-conditions, context, actions/interactions (including strategies) and consequences.
- **Criterion #4**: Is there much variation built into the theory? A Grounded Theory should be judged in terms of the range of variations and the specificity with which they are analyzed in relation to the phenomena that are their source.
- **Criterion #5**: Are the broader conditions that affect the phenomenon under study built into its explanation? Any Grounded Theory publication that omits the broader conditions or fails to
explicate their specific connections to the phenomena under investigation falls short in empirical grounding.

- Criterion #6: Has "process" been taken into account? Identifying and specifying change or movement in the form of process is important to Grounded Theory research. Process may be described in terms of stages or phases and as fluidity or movement of action/interaction over time in response to prevailing conditions.
- Criterion #7: Do the theoretical findings seem significant and to what extent? The question of significance is generally viewed in terms of a theory's relative importance for stimulating further studies and explaining a range of phenomena.

This methods chapter provided an overview of the method used and approaches throughout the study, covering both the pilot and the main study providing rationales for the choices that were made during the study (see section 9.5). The planning of the research, the overall data collection and analysis were described in order to give some procedural background to the upcoming chapters describing the actual study in more detail.
4. Research Design

The research design chapter will recapture research questions and use them as a starting point to elaborate on different rationales behind choosing FutureLearn as a research environment, and clarifying the choice of using a specific target population for this study.

4.1 Research questions

The literature chapter revealed gaps relating to self-directed learning in FutureLearn courses. After analysing the literature, the following central research question was formulated:

What characterises the informal self-directed learning of experienced, adult online learners engaging in individual and/or social learning using any device to follow a FutureLearn MOOC?

The central research question is divided into four sub-questions:

5. Which individual characteristics influence the learning experience?
6. What are the technical and media elements influencing the learning experience?
7. How does individual and social learning affect the participants’ learning?
8. Which actions (if any) did the learners undertake to organise their learning?

4.2 Research environment: FutureLearn

FutureLearn was used as the research environment of this study. The choice of FutureLearn as a platform for this research is based on the pedagogically and technologically innovative approaches implemented within this particular MOOC platform. FutureLearn is a UK-based MOOC initiative, which supports social learning based on the conversational model of Pask (1978) and Laurillard (2013), which places conversation and social learning inside of the MOOC platform (Brown, Costello, Donlon, & Giolla-Mhichil, 2015; Ferguson, Clow, Beale, Cooper, Morris, Bayne, & Woodgate, 2015; Sharples, 2016;
León, Cobos, Dickens, White, & Davis, 2016). The FutureLearn platform is also built on evidence-based online and mobile pedagogies (Sharples, 2013).

FutureLearn was developed using a Mobile First, Responsive Web Design. This means that FutureLearn is optimised for any web-enabled device. By building the platform using Responsive Web Design meant that every learner experiences the same website, regardless of the device (FutureLearn blog, 2013).

As part of a long-term marketing strategy the MOOCs that are part of the FutureLearn platform are called FutureLearn courses to emphasize their specific approach and brand. This study uses ‘FutureLearn courses’ as well as ‘FutureLearn MOOCs’ as a description of the MOOCs that are under investigation in this study, and are offered through the FutureLearn platform.

At the start of this study, the FutureLearn platform was still in a state of development after its conception in December 2012. One of the founding partners and subsidiaries of FutureLearn is The Open University, and as such an opportunity arose to investigate SDL in FutureLearn courses as part of a PhD study at The Open University being at the centre of the FutureLearn development.

Once the study matured in its scope, the FutureLearn platform seemed to be a good choice as a research environment. Three of the four sub-questions focus on specific topics that need to be investigated in order to find answers to the central research question demand specific conditions that need to be in place in the research environment. The FutureLearn environment was considered an ideal research environment in terms of its relevance with regard to three of the four sub-questions:

1. FutureLearn courses were offered for a pre-set number of weeks and aimed at cohort learning, however the content of the course, as well as its interactions remained open for a non-limited length of time after the course had finished as well. This enabled participant’s to be more flexible in their learning, as timing was more flexible. This flexibility in time might help when looking at learning influences arising from daily life.

2. FutureLearn courses are also designed to be accessed by multiple devices (mobiles, tablets, computers), providing a basis for potentially investigating the effects of these devices on the learning process. In addition, FutureLearn offers multiple media and social technologies that all have a potential to influence SDL.
3. FutureLearn offers individual learning actions (e.g. watching video, reading text) as well as collaborative or social learning opportunities (e.g. conversational commenting on media, discussion with peers) which provides a window into SDL preferences related to individual or collaborative online learning.

The fourth sub-question, looking at ‘Which actions (if any) did the learners undertake to adapt their learning?’ is a more general question that is answered by the participants. Although the answers to this question are influenced by the learning environment, it does not require a specific research environment.

4.2.1 Overview of the FutureLearn course structure

An overview of the structure of a FutureLearn MOOC can be seen in figure 7. Each course is made up of weekly units of learning. These weekly units consist of a set of learning blocks, and each learning block can contain a set of multiple learning elements that make up a consistent learning block.

Figure 7. An overview of a FutureLearn MOOC structure
Once the learner enters their FutureLearn course, they get an overview of the weekly units with dates indicating when that weekly content will become available. Each weekly unit provides a quick progress bar beneath each weekly unit, indicating the learner’s progress through the course (see figure 8).

Figure 8. Weekly unit overview with progress bars under each unit

When the learner enters the course she or he gets a brief status of where they are in the course, what they have done, and what is still to do. Figure 9 provides an example of the visual overview the learner gets when entering a weekly unit. In this case it is a screenshot of week three of the Science of Medicines course.
Figure 9. Visual overview of the learning elements within a weekly unit

4.2.2 FutureLearn summer 2013 (pilot)

In the summer of 2013 the FutureLearn platform was developed to such a degree that trial courses were planned. From 27 August 2013 to 10 September 2013 the FutureLearn platform launched two closed ‘alpha’ courses: ‘The secret Power of Brands’ organised by the University of East Anglia, and ‘New Ecology’ organised by The Open University. These MOOCs provided two weeks of content and interactions to the registered participants.

4.2.2.1 Platform features

The general look and feel of the platform still had to be finalized. In figure 10 a screenshot is shared of the FutureLearn platform home screen (March, 2013).
FutureLearn will bring together a range of free, open, online courses from leading UK universities, in the same place and under the same brand.

Figure 10. Screenshot of the FutureLearn home screen March 2013

The FutureLearn platform was developed for mobile use. This ubiquitous approach of the platform made it possible to access the content of the courses through a variety of devices: smartphone, tablet, desktop and laptop. Figure 11 shows screenshots on different devices of FutureLearn course prototype.

Figure 11. Screenshots of multiple devices using a course prototype
The following social features were available to the learners engaged in these trial courses:

- activity feed with conversational comments
- Building a profile page
- ‘Mark as done’ button for learning blocks that make up a course. A learning block can be a video, quiz, discussion or text.
- ‘Follow’ button to follow specific educators or learners

All of the platform features were open to evaluation from the learners that took part in these two closed ‘alpha’ courses. Based on the feedback from learners the platform was adjusted wherever possible to address the issues raised by the testing audience. Based on the feedback provided by participants who took the ‘alpha’ courses, a first public FutureLearn platform version was set up. During the first year, the FutureLearn platform was in a designated ‘beta’ phase. The word ‘beta’ was added in the corner of the home screen of the FutureLearn course, pointing to the fact that FutureLearn was still in a developing phase so changes could occur rapidly in this first year (see figure 12). Although in ‘beta’ version, the FutureLearn platform was fully functioning.

4.2.3 FutureLearn autumn 2014 (main study)

In the autumn of 2014 the main study was planned. The first courses that would be part of this investigation were rolled out in September 2014 (while FutureLearn was still in ‘beta’ version). Around mid-October 2014 the ‘beta’ was taken out of the FutureLearn homepage (Walton, 2014). This indicated that the FutureLearn developers and leads felt the FutureLearn platform had developed into a mature MOOC platform.
The learners participating in the three courses had access to the following social learning features:

- FutureLearn profile page which allows the learner to provide personal information (e.g. picture, location, interests).
- The commenting option that can be accessed through the commenting button ( )
- The like button to mark comments or discussions of interest (Like)
- Filtering options for comments: ‘Everyone’, ‘Following’, ‘Most liked’, ‘My comments’, as shown in figure 13

![FutureLearn screenshot of the commenting options](image)

The above features were not present during the alpha trial courses (pilot), where the activity feed was less structured.
4.3 Rationale for selecting target population

4.3.1 Selecting experienced online learners

Learners must learn how to learn in MOOCs (Milligan, Littlejohn & Margaryan, 2013). This means there is a difference between those learners with previous online learning experience and those who are new to it. A choice needs to be made to either look at these new MOOC learners, or to select participants who already have prior experience in learning online. For this study I chose to select participants with at least 3 years of online experience. First time learning might blur the actual learning experience based on the adjustments learners must make in order to get familiar with the course and the online learning environment.

FutureLearn is a platform which invests in social and mobile learning. This makes social and mobile learning a factor to take into consideration when planning a study on the learning experience. While looking at what could be used as a boundary for the concept of ‘experienced’ online learning, a couple of previous research findings were considered. Research revealed that “while most indicators of online learning quality and effectiveness increase significantly as students take subsequent online courses, much of this increase occurs between the first and second online course” (Arbaugh, 2004, p. 177). A mixed research examining the impact of mobile access on learner interaction within MobiMOOC (a MOOC on the subject of mobile learning) showed that social interactions (i.e. commenting in discussion forums, posting and answering questions, using social media) within a MOOC increased considerably when learners had more than one year of online learning experience (de Waard, 2013). Morris, Hotchkiss and Swinnerton (2015) found that learners with previous experience of participating in online courses were more likely to complete the MOOC courses. This meant that experienced online learners were likely to provide self-directed learning actions throughout the duration of the course. Especially when looking at the outcome from Milligan, Littlejohn and Margaryan’s (2013) study on the
Change11 MOOC, it is clear that participants with prior online learning experience are often actively engaged in MOOCs. Active engagement is needed in order to get a better understanding of social and mobile learning actions within FutureLearn courses. If people new to online learning were involved in the study, the study’s focus would be more likely to shift to “what are the distinctions between first time learners and experienced learners when looking at their learning experience”, as getting familiar with technology and online interactions takes up a considerable amount of time. This distinction between experienced and novel online learners was also part of the findings coming out of the pilot study. The pilot revealed that learners who were new to online learning made a lot of comments on the learning platform, also about the fact of having to interact with people who were only present online, and on the novelty of having to schedule daily life and learning. Although all of these factors are relevant to learning, this study did not want to provide an account of how learners who are new to online learning in MOOCs come to terms with the FutureLearn course environment. With this study I wanted to get a deeper understanding of how experienced online learners learn in FutureLearn courses, for previous research concluded that the greater the online learning experience of learners, the stronger their intention to interact with the course community (Arbaugh, 2004; Arbaugh & Duray, 2002; Liu, Chen, Sun, Wible & Kuo, 2010).

For this study ‘experienced’ online learning also included social media expertise, as well as having more than one year of experience in learning from internet sources as an autodidact. Including social media as a valid ground for expertise in online learning was based on results from de Waard (2013) investigating participation of learners engaged in a mobile learning MOOC indicating social media expertise was prevalent in all learners having completed that mobile MOOC and who were part of the study group. A similar finding was mentioned by Cross (2013) who found that “a greater proportion (78%) of those completing the course rated their knowledge and understanding of Web 2.0 tools as
moderate to expert than those who started the course (43%)” (p. 18). In addition, when investigating
social media use for information gathering purposes, Kim, Sin and Tsai (2014) revealed that almost half
of their 800 student participants used social media sites for information seeking purposes, with social
media sites being: wikis, user reviews, media-sharing sites, social Q&A sites, and social network sites.
Social media experience and use for learning has been investigated for informal learning purposes for
both personal topics (Fox & Ralston, 2016) as well as health related topics (Tennant et al., 2015) where
the informal learning was initiated and supported by reading through social media information.
Including more than one year of autodidact learning using internet resources was also considered valid
proof of online learning experience based on findings from Wan, Wang and Haggerty (2008) who
reported “findings revealed that experience with information seeking and communication via ICT
helped individuals develop virtual competence, which in turn allowed them to learn effectively and feel
satisfied with their experience” (p. 519). This coincides with findings from Cross (2013) indicating that
“students who spend more time on the Web-based course and/or who have prior experience with
Web-based courses are more likely to be satisfied with the experience and take more ownership of the
learning process, thereby increasing their own learning” (p. 540). And owning learning is a necessary
element for this study, as self-directed learning is about owning and guiding your own learning progress.

4.3.2 Rationale for choosing adult learners

Adult learners are an important part of the MOOC participant group (Fini, 2009; Kop, 2012). The reason
for focusing on adult learners is because of the assumption that adult learners might have similar
challenges in balancing life commitments (family/work/personal time), that they might be more
inclined to follow informal courses purely based on their own interests, and that they have access to
technology that they themselves selected and obtained and feel familiar with.
Some possible assumptions with regard to adult learners and self-directed learners need to be set aside in order to clarify the choice of adult learners. I do not assume that adult learners would be better in SDL and I concur with the critique mentioned by Merriam (2001) that

“some adults are highly dependent on a teacher for structure, while some children are independent, self-directed learners. The same is true for motivation; adults may be externally motivated to learn, as in attending training sessions to keep their job, for example, while children may be motivated by curiosity or the internal pleasure of learning. Even the most obvious assumption that adults have more and deeper life experiences may or may not function positively in a learning situation.” (p. 5).

Merriam also mentioned that “between 1970 and 1980 Knowles moved from an andragogy versus pedagogy position to representing them on a continuum ranging from teacher-directed to student-directed learning (Merriam, 2001, p. 6). This is of interest to this study as MOOCs, or specifically FutureLearn will be more learner-driven by embedding social learning to increase learner interactions (Sharples, 2013). This viewpoint was also put forward by Houle (1996) who said that andragogy remains the most learner-centred of all patterns of adult educational programming”, adding to it that educators "should involve learners in as many aspects of their education as possible and in the creation of a climate in which they can most fruitfully learn" (p. 30). Creating an engaging mobile, accessible, open, online learning environment that is supportive for SDL might have an effect on the on-going motivation, as well as on favourable learning outcomes of adult learners participating in FutureLearn courses.

4.3.3 From pilot to main, from closed alpha to open beta

This study had the benefit of being able to investigate the FutureLearn platform as it was launched. When the pilot of this study was planned, the first FutureLearn courses were being organised for closed ‘alpha’ testing. In August 2013 FutureLearn just started up two closed ‘alpha’ courses or trial
FutureLearn courses. Participants were able to enrol in these courses by invitation only. Based on these first two ‘alpha’ courses the FutureLearn platform could be tested, and the first learner experiences could be monitored or observed. These trial FutureLearn courses offered the opportunity to test the pilot study and to evaluate the research design as it was first conceived. The trial FutureLearn courses made it possible to explore whether SDL was taking place in FutureLearn courses, and which elements of daily life, technology, and collaborative or individual learning seemed to emerge from these first two trial FutureLearn courses. The results of the pilot study produced research findings, as well as lessons learned that could be used as recommendations, or guidelines for the main study.

A full description of the pilot study with findings and resulting changes for the main study is given in the pilot study chapter. The most important difference in terms of research design between the pilot study and the main study is related to prior online learning experiences of the target population. In the pilot study the target group consisted of a mixed group of participants, where participants could be new to MOOC learning, or might have had previous experience in online learning. This mixed target group was not deliberately mixed, but the findings showed that learners with online learning experience were more actively involved in learning in FutureLearn courses. The main study only included participants with more than one year of online learning experience.
5. Pilot study

5.1 Goal of the pilot study

The goal of the pilot study was to come to a deeper understanding of the self-reported learner experiences of adult learners engaging in individual and collaborative SDL using multiple devices in a MOOC. I hoped to derive factors that have an impact on SDL from the participants engaged in two closed alpha FutureLearn courses. The focus of the pilot study was on the learner experiences of the learner audience related to their learning adaptations, learning influences, and individual and collaborative learner dynamics that influence SDL in FutureLearn MOOC learning.

5.2 Research questions pilot study

The pilot study investigated the following central research question:

- What are the learning experiences of adult participants engaging in individual and collaborative self-directed learning using multiple devices in a MOOC?

Research sub-questions related to different sections that represent possible experiences of significance to the participants engaged in a MOOC.

- What are the elements of daily life affecting SDL?
- What are the technical aspects influencing SDL for MOOC participants?
- How do the MOOC participants perceive the effect of individual or collaborative learning on their SDL?
- Which actions (if any) did the MOOC participants undertake to adapt their SDL?

The research questions investigated in this pilot study differed from the research questions of the main study. These differences are described in detail in the concluding section of the pilot study chapter, section 5.5.
5.3 Research design

5.3.1 Learning environment

The UK MOOC initiative FutureLearn has developed rapidly from 2013 onward and is now rolling out courses for a broad public. When the pilot study was organised, the FutureLearn platform had just released two closed alpha FutureLearn courses. These two courses were the first courses to invite people from outside FutureLearn, in order to test these two trial FutureLearn MOOCs. FutureLearn was chosen as a platform for this pilot study due to its mobile accessibility, as well as social learning features that are at the core of the FutureLearn platform (Sharples, 2013).

5.3.2 Target population and sample

![Figure 14. Overview of the procedure to select the pilot's target population](image)

The target population of the pilot study consisted of people that indicated an interest in following sample courses from FutureLearn (see figure 14). They could express their interest in these courses by registering for the FutureLearn courses or answering social media, radio broadcasts or newspaper article calls for registration. This resulted in more than 1000 people being asked by FutureLearn to access the closed alpha courses of FutureLearn, which were rolled out from 27 August 2013 to 10 September 2013. These were two closed alpha courses (The secret Power of Brands organised by the
University of East Anglia, and New Ecology organised by The Open University), each of them providing two weeks of content and interactions to the participants.

The participants of this pilot study were selected from a cohort of potential research volunteers. A question was added to FutureLearn’s pre-course online survey, which asked people to indicate whether they would be willing to be part of a research study involving learning logs. I made a purposeful sample by contacting 59 FutureLearn course participants via email and asking them if they would still be willing to be involved in the study (see appendix 1). This sample was purposefully chosen on the basis of the answers that the participants had given in the online survey that was sent to them prior to the start of the course. It took into account diversity of mobile devices, diversity in social media expertise, diversity in views on the importance of collaborative learning, and diverse MOOC or/and online learning experience. This means that the profile of this target population was different from the target population of the main study, as it mixed learners with no to many years of prior online learning expertise.

From those 59 FutureLearn learners who were contacted, eleven participants signed the informed consent form (see appendix 2), nine participants were actively participating by delivering learning logs, and eight participants took part in the interviews. Polkingthorne (1989) suggests 5 – 25 people to get a good solid study sample. For each of the three separate phases in the pilot study detailed information was provided to the research participants, guiding them through what was expected.

5.3.3 Data collection

This pilot study uses elicited data (research participants sharing written, digitally delivered, and interview data) retrieved from three data collecting phases:

1. Phase 1 learner expectations (pre-course): online surveys (closed and open ended questions),
2. Phase 2 learner experiences (during the course): one daily learning log (see appendix 3 for a filled in daily log example) and one weekly learning log (see appendix 4 for a filled in weekly log
example). In the learning logs the participants share their learning ideas and approaches (closed and open ended questions).

3. Phase 3 learner reflections (post-course): semi-structured one-on-one interviews with those participants who shared their learning experiences through the learning logs.

These elicited data share some of the advantages and disadvantages of surveys, interviews and documents. The participants share what they feel comfortable with, which inevitably keeps out what they find consciously or unconsciously personal or irrelevant for the research. Additionally this data collection relies on participants’ prior writing and speaking skills and practices (Charmaz, 2014).

5.3.4 Data analysis

The pilot study used a mixed method approach, where the quantitative data from the closed questions in the online surveys and the learning logs, were used as indicators for meaning. This was followed by analysing the qualitative data from the open questions in the learning logs and semi-structured one-on-one interviews to get a more in-depth analysis of the learning experiences of the research participants while they were engaged in the FutureLearn courses. The data analysis followed Glaser’s (1978) GT approach, in keeping an open mind while analysing the data in order to let the categories emerge from the data without the data being manipulated by theoretical frameworks or theories. For the coding procedure the pilot study relied on Charmaz (2014) to construct a Grounded Theory.

5.3.4.1 Coding procedure

The data analysis followed the grounded theory coding methods as suggested by Charmaz (2006), and explained in more detail in section 3.5.7. Charmaz states that qualitative coding is the first analytic step, where coding provides names for segments of data “with a label that simultaneously categorizes, summarizes, and accounts for each piece of data” (Charmaz, 2006, p. 43). This way the coding is the first step in moving beyond concrete statements in the data and make them of analytical importance. Consistent with grounded theory emphasis on emergence, questions about these codes arise from
reading the data (Charmaz, 2006). The qualitative data went through three coding phases: initial coding, line-by-line coding, and finally focused coding.

5.3.4.2 Initial coding

For the initial coding a birds-eye view of all the gathered data was taken and written down in first impressions. One of the first overall findings coming out of the initial coding process was that the pilot study had less mobile device related data than anticipated. After the learning logs came in, it became clear that although the research participants were chosen in part for their self-suggested mobile use during the course, they only scarcely used their mobile phones to access the course. Nevertheless some indicators were there to follow-up on that particular part of the pilot investigation.

Another big strand of data could be related to technical issues encountered by the learner, due to the FutureLearn platform being under development. These general technical remarks were filtered out from learning-related technical remarks.

It quickly became clear that most of the research sub-questions were being answered by the responses gathered from the research participants. There were clear links to the research questions (accounts of daily life interferences, collaborations, learning strategies), but many of the answers provided by the research participants harboured codes relating to different potential categories. In order to get a better understanding of the different reoccurring categories, the next level iteration was planned using line-by-line coding.

5.3.4.3 Line-by-line coding

After the first initial coding, a second coding iteration was undertaken consisting of line-by-line coding of the written texts (open ended questions, audio interviews and learning logs). Where each comment was read and analysed for potential codes: e.g. “With my previous MOOC [prior experience], I got into
a routine [self-directed learning strategy] of when I would watch videos and complete the work each week as it had a coherent structure [prior content delivery experience]”.

The line-by-line coding prompted me to remain open to the data and to see nuances in it (Charmaz, 2014). Starting from a quick iteration intended to capture a birds-eye interpretation, each following iteration resulted in more detailed coding. As such, the line-by-line coding had multiple iterations, until the categories were saturated and no strong new categories could be identified.

5.3.4.4 Focused coding

The focused codes are more directed, selective, and conceptual than the first phases (Glaser, 1978). Focused coding also uses the most significant and/or frequent earlier codes to sift through the data. After having established some strong analytic directions through the initial line-by-line coding, the focused coding began to synthesize and explain larger segments of data in order to find patterns, underlying relationships or issues that directed towards underlying themes that resulted in research findings provided in chapter 7.

5.4 Discussion and findings

The discussion and findings section will first answer all the sub-questions before combining all the findings to answer the central research question. In the tables supporting the findings coming out of this pilot study have percentages. These percentages were calculated based on the counts from the online survey and then turned into percentages in order to be able to compare different target groups, e.g. those learners without MOOC experience with learners with more than three years of prior MOOC experiences.
5.4.1 What are the elements of daily life affecting SDL?

Starting from the learner expectations, the online survey question related to daily influences was divided into sub-sections looking for potential discrepancies between learners with different MOOC experiences:

- MOOC newbies (learners who had never followed a MOOC before),
- MOOC experienced learners (learners who had followed at least one MOOC),
- MOOC 3+ experienced (learners who had followed at least three MOOC courses)

This spectrum of learners was chosen to capture potential SDL differences for each of these groups.

From the participants who filled in the pre-course survey, 84% indicated to be MOOC newbies, and 16% had prior MOOC learning experience. In order to get an idea of which elements of their daily lives had interfered with their learning previously, a general information question was added to the online survey. Table 1 provides an overview of the percentages per type of element that the learners thought would interfere with their learning in relation to their years of MOOC experience (multiple answers possible).

<table>
<thead>
<tr>
<th>Elements of daily life</th>
<th>All (n = 591)</th>
<th>MOOC newbie (n = 500)</th>
<th>MOOC experienced learners (n = 91)</th>
<th>MOOC 3+ experienced (n = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>My work</td>
<td>51 %</td>
<td>48 %</td>
<td>69 %</td>
<td>67 %</td>
</tr>
<tr>
<td>My family</td>
<td>42 %</td>
<td>41 %</td>
<td>43 %</td>
<td>37 %</td>
</tr>
<tr>
<td>Hobbies and sports</td>
<td>20 %</td>
<td>20 %</td>
<td>24 %</td>
<td>26 %</td>
</tr>
<tr>
<td>Lack of digital skills</td>
<td>8 %</td>
<td>9 %</td>
<td>3 %</td>
<td>7 %</td>
</tr>
<tr>
<td>Lack of internet connectivity</td>
<td>7 %</td>
<td>7 %</td>
<td>7 %</td>
<td>11 %</td>
</tr>
<tr>
<td>Poor health</td>
<td>7 %</td>
<td>6 %</td>
<td>9 %</td>
<td>19 %</td>
</tr>
<tr>
<td>Lack of learning experience</td>
<td>3 %</td>
<td>3 %</td>
<td>3 %</td>
<td>4 %</td>
</tr>
<tr>
<td>Nothing</td>
<td>20 %</td>
<td>22 %</td>
<td>10 %</td>
<td>7 %</td>
</tr>
</tbody>
</table>

Table 1. Pre-course online survey data from both courses. Answers to “What do you think might interfere with your learning?”
The data in table 1 suggest that more experienced MOOC and online learners anticipate more interference with their learning coming from a wide variety of factors related to daily life.

Looking at the indicator ‘nothing’ it becomes clear that more experienced online learners do expect daily life to influence their learning in FutureLearn MOOCs. Another point of interest was health related issues that interfered with SDL. Although there can be no doubt that health does influence learning, it is at this point uncertain whether health is a strong influencer as mentioned by the MOOC 3+ learners group, or whether more learners with health issues were following these first two FutureLearn MOOCs because of the learner freedom it allows (e.g. asynchronous options, return to course at later date). The latter idea comes from one of the interviewees who mentioned “Following MOOCs takes my mind off my chemotherapy”, where she refers to the fact that MOOCs are asynchronous, and as such “MOOC allow me to be more flexible in planning my learning on a day to day basis”. This phenomena could be of interest to investigate in future research.

5.4.1.1 Emerging categories for daily life from learning logs and interviews

*Time/planning:* time management and planning was a recurring and frequently mentioned category. It covered both interferences coming from other commitments, as well as planning learning itself. However, looking for a deeper meaning of that concept, there were multiple factors that emphasized the available time learners could put aside for MOOC learning. Time constraints could come from professional as well as personal interferences, and they could be related to unforeseen events, as well as events that already had the potential of becoming an interfering factor with MOOC learning. Planning also happened in the grey area between professional and personal time for learning which raised some ethical concerns: e.g. “I was doing the initial registering and watching the first few videos in my work hours and was concerned this may be cheeky taking time at work”.
Personal traits. Personal traits are allowed to interfere with the learning (e.g. “laziness”, “general grumpiness with the passing of years”). These personal characteristics are seen as interfering/stimulating factors for interrupting or continuing learning. The pilot study reported more interrupters than stimulators as examples for personal traits. This could have been caused by the language in the questions which was more focused on possible interference, then support of learning.

While looking at the deeper meaning of the data that was shared on personal traits, participants did share that their personal characteristics – or those personality traits they imagined they had – interfered with their learning. An example from one of the interviewees: “I started to feel guilty for not engaging with the course [personal goal setting/expectations] and could easily see how this guilt made me less likely to re-engage through procrastination and avoidance”.

Leisure/casual learning. Registering for a MOOC comes on top of planned activities or out of curiosity. Example from one of the interviewees: “Currently studying counselling and welding at the same time as well as trying to learn a new job and do up an old house”. When investigating the deeper meaning of this frequently mentioned casualness towards MOOC learning, the participants mentioned that MOOC learning sometimes replaced other leisure time activities. When questioned on the topic during interviews, learners mentioned that the fact that MOOCs were free, and the fact that it did not add to their professional development as main reasons to stop learning at the point they were no longer interested.

Health as driver. While this category was first put under leisure/casual learning, it was moved to became a stand-alone higher category due to the life-affecting aspect of health on daily life that cannot be called leisurely or casual. Health influences eagerness to register for a MOOC, but not always with the aim to participate in all actions or certification, more to find meaning and solace during difficult
times (e.g. “currently off work on long term sickness - so a nice diversion”). This category harboured people who faced health problems themselves, as well as those who were caring for others.

*Personal learner identity.* The personal self-perception of the learning identity influences the learners’ personal learning expectations. This can come from an identity focusing on age, prior learning success or failure, and self-image, e.g. for prior learning and identity: “Lack of recent learning in a constructive way”. An interesting addition to the personal identity came from older learners. The fact that MOOC learning can be done without a professional need might be more straightforward for older MOOC participants, as they are less likely to need the course content for their professional development. On the other hand older learners did mention age-related self-conscious barriers (“My age of 85. My short term memory is not what it was!!”)

5.4.1.2 Findings from sub-question 1 related to daily life

Most of the data pointed towards previously known factors influencing learning: prior knowledge, experience, time management related to professional as well as personal engagements. Looking at the deeper meaning of the daily factors that influence informal MOOC learning, it becomes clear it is a very complex system. This is not only due to language, learning concept understanding, but also to the wide variety of learners and their learning experiences. When analysing the data, I also found the question itself to be one-directional, for it might be that MOOC learning is also affecting daily life, e.g. by leading to conversations in the family.

The category of “leisure learning” was of keen interest, as this makes MOOC learning stand out in relation to other learning. MOOC participants do not need to follow the full course, or even take the assignments, they can simply dip-in and jump-out. Nevertheless this learning à la carte is subject to influencing factors coming from daily life.
Technology as part of daily life works as a barrier for some learners, or as a challenge that can be overcome to others, as well as a benefit for those using access to connect with the outside world. To some, technical adversity is no barrier to participating in the course, while others find it a reason to quit the course altogether. Personal motivation might be a reason for deciding to solve problems or stop taking action, but this motivation seems to be a combination of personal character/traits, personal learning goals, ad hoc family situations, learner identity, and/or previous technological learning experiences.

5.4.2 What are the technical aspects influencing SDL for MOOC participants?

Online learning brings along a wide range of technological factors that can influence learning. When looking at the experiences with specific technologies, the data showed that more experienced MOOC participants had more experience in using social media and in using smartphones or tablets.

<table>
<thead>
<tr>
<th>Social media experience in years versus MOOC experiences (in %)</th>
<th>All (n=626)</th>
<th>MOOC newbie (n=528)</th>
<th>MOOC experienced (n=98)</th>
<th>MOOC experienced 3+ (n=30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>27 %</td>
<td>30 %</td>
<td>21 %</td>
<td>13 %</td>
</tr>
<tr>
<td>1 year or less</td>
<td>9 %</td>
<td>9 %</td>
<td>9 %</td>
<td>7 %</td>
</tr>
<tr>
<td>3 years or less</td>
<td>19 %</td>
<td>20 %</td>
<td>11 %</td>
<td>3 %</td>
</tr>
<tr>
<td>5 years or less</td>
<td>15 %</td>
<td>16 %</td>
<td>7 %</td>
<td>14 %</td>
</tr>
<tr>
<td>More than 5 years</td>
<td>30 %</td>
<td>25 %</td>
<td>52 %</td>
<td>63 %</td>
</tr>
</tbody>
</table>

Table 2. Cross-tabulation: social media experience versus MOOC experience

Table 2 gives a cross-tabulated overview comparing years of social media experience to years MOOC experience. The table shows that MOOC experienced learners also had more experience with using social media. This might be related to personal interest in technology, due to hearing about MOOC courses through social media, or due to the fact that those learners are more knowledgeable of new MOOC initiatives which allows them to register for such courses.
### Table 3. Cross-tabulation: devices used for learning per type of online learning experience

Table 3 shows the percentages of the learners using a specific type of device and compared to their years of MOOC experience (multiple answers given). The table suggests that people with MOOC experience, also made more frequent use of mobile devices (be it smartphone or tablet). Again this might be related to either their personal interest, or financial resources, or other elements.

### Cross-tabulation: social media experience versus device use (in %)

Table 4 offers a cross-tabulated overview comparing years of social media experience to prior experiences of using a specific device for learning. The results from table 4 show that people with more social media use, seem to have more experience using mobile devices for learning (smartphone and tablet).

Some of the technical remarks were related to the media offered in the course, the user interface, or related to the alpha stage the courses were in (e.g. what learners were able to do or not within the
FutureLearn environment using the media within the course). In the pre-course survey the learners were asked to indicate which course tools or media within the FutureLearn course they think would be important to their learning (see table 5).

<table>
<thead>
<tr>
<th>Which of the elements do you think will be most important for your learning? (multiple answers possible)</th>
<th>All (n = 624)</th>
<th>MOOC newbie (n = 528)</th>
<th>MOOC experienced (n = 96)</th>
<th>MOOC 3+ experienced (n = 28)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relevant course content</td>
<td>88 %</td>
<td>88 %</td>
<td>82 %</td>
<td>89 %</td>
</tr>
<tr>
<td>Feedback from the educator</td>
<td>57 %</td>
<td>58 %</td>
<td>50 %</td>
<td>68 %</td>
</tr>
<tr>
<td>A simple user experience</td>
<td>56 %</td>
<td>57 %</td>
<td>54 %</td>
<td>57 %</td>
</tr>
<tr>
<td>Signposting what to do next</td>
<td>48 %</td>
<td>47 %</td>
<td>53 %</td>
<td>68 %</td>
</tr>
<tr>
<td>Ability to access the course on multiple devices</td>
<td>28 %</td>
<td>28 %</td>
<td>28 %</td>
<td>39 %</td>
</tr>
<tr>
<td>Social interactions with other learners</td>
<td>16 %</td>
<td>15 %</td>
<td>21 %</td>
<td>18 %</td>
</tr>
</tbody>
</table>

Table 5. Answers to the question “which of the elements do you think will be most important for your learning”

Table 5 compares which elements the learners think will be important for their learning and compares them to their years of prior MOOC experience (multiple answers possible). A difference emerged when comparing the answers from MOOC newbies to those learners having learned in at least three MOOCs. The data indicated that learners with three or more years of MOOC experience were more interested in course tools to organise learning within a course (e.g. signposting), in accessing the course with different devices, and in getting feedback from educators. The latter being more related to social learning than technological aspects of learning.

5.4.2.1 Emerging categories for technical aspects of the learner experience

Technology as driver (good/bad). This category described the willingness of the learner to face and overcome technological adversity, e.g. “Trying to get a proper run on the videos [getting to grips with content]. Managed to get the videos up and running on the laptop, no joy on the desk top” versus “I gave up early on [personal motivation due to difficulty of access] as struggled to access some parts due to format and slowness of the site”. Technological challenges seem to lead to different results
depending on the learner and their learning context, specifically the influencing factors on learning, and the learners’ current learning willingness or capacity. Other learners mentioned technological advantages: “I really enjoy being able to connect whenever and wherever I want”.

Location for learning. Location for learning is not only about access in a location (e.g. “I was travelling”), but about comfort related to a location (e.g. “The pc is in the study = quiet working space with desk”). Location potentially brings learning opportunities: sitting in a quiet room, or travelling. But it requires the technology to be responsive, so that you can focus on the learning and not on the technology. (e.g. “ergonomics [of tablet] works well on the couch after a day at the desk” versus “Not all features were available on iPad e.g. the feedback section” which led the person to return to make more conscious decisions on whether to use one or the other device). Location in relation to devices offers opportunities, but the technology might not always fit in with that location, in that case technology and location present barriers as well as opportunities.

Tech ownership/preference. Some learners clearly expressed a device preference, which led them to use that device for learning, e.g. “I am a Mac user”. In some cases owning a particular device led those learners to test the course with this ‘new’ device for learning purposes. In case of FutureLearn and its alpha courses, it seemed that this was more due to curiousness to see what the experience was to learn with other devices (e.g. “Problems viewing content on a smartphone”, “I thought I would use my iPad so I could comment on how the course worked using this resource to see how easy it would be to study future courses on this device”).

Course tools and media. Learners referred to specific course tools and media that were part of the FutureLearn platform (e.g. “I really liked the ‘mark as done’-button, it made signposting much easier”, “Although I like adding notes to videos, I wasn’t able to find comments from others on what I had
written. Maybe nobody reacted?”). The learners mentioned these options in relation to their learning, indicating that these FutureLearn options are explored and analysed for their impact on learning.

5.4.2.2 Findings related to technical aspects of learning

Technology influences SDL, either by its potential to find solutions for learning challenges, or by its use as perceived and experienced by the learner. At the time of the closed alpha courses the FutureLearn courses were not yet fully seamless to mobile users. The available technology is inevitably related to the ownership of a device, and the willingness to explore potential learning uses with this device. The learners were also experimenting with all the course tools and media offered in the FutureLearn courses. However, these factors and the experiences of using devices and course tools within a new course result in either opportunities or barriers created by that technology as perceived by the learner.

5.4.3. How do the MOOC participants perceive the effect of individual or collaborative learning on their SDL?

The FutureLearn platform was still rolling out its roadmap during August/September 2013 as mentioned in the FutureLearn platform section 4.2. The closed alpha courses of this pilot study had a specific selection of collaborative actions: conversational dialogue and discussion comments.

<table>
<thead>
<tr>
<th>Importance of interacting with other learners (in %)</th>
<th>All (n = 626)</th>
<th>MOOC newbie (n = 528)</th>
<th>MOOC experienced (n = 98)</th>
<th>MOOC 3+ experienced (n = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not important</td>
<td>19 %</td>
<td>18 %</td>
<td>20 %</td>
<td>17 %</td>
</tr>
<tr>
<td>Slightly important</td>
<td>31 %</td>
<td>31 %</td>
<td>34 %</td>
<td>33 %</td>
</tr>
<tr>
<td>Moderately important</td>
<td>37 %</td>
<td>39 %</td>
<td>31 %</td>
<td>30 %</td>
</tr>
<tr>
<td>Very important</td>
<td>13 %</td>
<td>12 %</td>
<td>15 %</td>
<td>20 %</td>
</tr>
<tr>
<td></td>
<td>100 % (n=626)</td>
<td>100 % (n=528)</td>
<td>100 % (n=98)</td>
<td>100 % (n=30)</td>
</tr>
</tbody>
</table>

Table 6. Data from learners from both courses answering “How important is it for you to learn by interacting with other learners?” in the pre-course survey.
Table 6 shows that most learners in the pre-course survey found interacting with others is slightly to moderately important. The MOOC 3+ learners indicated more frequently that they saw interaction with others as very important. This might be related to prior MOOC experiences, having experienced the benefits of collaborative learning, but it might also be related to leisure learning and a preference to enter into dialogue.

An interesting aspect was that collaboration, and specifically learning from others was not limited to other course participants or tutors. The percentages from all the collected weekly learning logs and investigating whether learners were interacting with others, showed that there were interactions taking place not only between peers, but also the course team, as well as with people outside of the course.

<table>
<thead>
<tr>
<th>Who did you interact with for this part of your learning (weekly learning logs, n = 16, in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nobody</td>
</tr>
<tr>
<td>One or more facilitators/tutors</td>
</tr>
<tr>
<td>Other course participants</td>
</tr>
<tr>
<td>Peers outside of the course</td>
</tr>
</tbody>
</table>

Table 7. Data from weekly learning logs from learners involved in both courses, answering “who did you interact with for this part of your learning?”

Table 7 suggests that the majority of learners did interact with other people. Most interactions were with other course participants or people outside the course. This result highlights interactions with people outside of the course as an element to investigate in the main study. When asked during interviews the peers external to the course were colleagues, friends, and family. The interviewees mentioned that choosing the external peers to discuss the course content with was not based on the peers’ experience, but rather on their face-to-face presence and their trust or respect in terms of those peers’ thinking capacities, e.g. “I like the chance to test my thinking out but can also do this by discussing what I have learned with my partner, friends and colleagues too”. An interviewee also
mentioned the need to develop a capacity for connecting with people you do not see: “How do you interact with other students, can’t bump into them on campus, can’t go for coffee and a chat?”.

The lack of face to face help was also mentioned by one of the interviewees as a reason not to find help at all: “no one around to help me physically or academically so had to deal with the course on my own per se”. Group size was also mentioned as a barrier for participation: “There were too many people on the course for meaningful discussion to take place, so I ended up not participating”.

5.4.3.1 Emerging categories for individual and collaborative aspects of the learner experience

Interactions with peers. Some learners mentioned they adjusted their learning while engaging with others (e.g. “Found out how other participants made notes”). There is evidence that points toward the beneficial effect of collaborative learning. The interaction between learners and peers that are external to the course is of interest and will be investigated more in-depth in the main study.

Interaction expectations. Interactions that influenced learning came from non-course peers (e.g. “I have been discussing what I learned on the course with my partner and sharing the ideas with him which I find a useful way to learn interactively outside the course”). A subcategory was where the tutors and the course team acted as motivators. Interactions with the course team or its tutors also resulted in a positive learning dynamic for some (e.g. “an email from the course leader thanking people for participation and saying the materials are still available for us to complete encouraged me”), while others perceived it as more of a hindrance to their learning due to the course team not being as responsive as the learner hoped they would be, e.g. “Mailed the course team for helping me with signing in, but still no reply”.

Self-confidence in group. Although this characteristic also touches factors of daily life (specifically personal traits, e.g. “[This is] not a model of learning which I easily engage with. Sorry”), it also has a
bearing on interactions, and whether people are willing to interact, e.g. “the group is too big for me to feel i can usefully contribute to discussion”. This self-confidence consists of two factors: a technological factor (confidence in using technology to either interact or access the course) and the human factor (either a personal trait or indicated by a moment or event during the course when the learner decides they are willing to start interacting with peers).

**New virtual interactions.** As the course offers different ways for learners to interact, this results in the learners themselves having to learn how to collaborate with these new technologies (e.g. “Not a fan of ‘social networking site’ type stuff but gave it a bit of a go here and found I did learn from it - so that was a pleasant surprise”). The novelty of the interactions also resulted in a change in the learners’ interactions: e.g. “I have decided not to worry too much about the discussions and skim them if they seem interesting but not to feel guilty if I don’t participate”. The learner data also suggested that prior experiences in interactions for learning set their state of mind on the subject of interacting in an online course, e.g. “If there were more social interaction [referring to backchannels], it would be easy to create a sub- and counter-discussion to balance out (as I have experienced in previous MOOCs I took)”.

**Reflective individual learning.** Apart from quizzes being made on an individual basis, reflection was mentioned for individual learning. (e.g. “I did a little more skim reading of discussion than I might have done otherwise and did more mental rather than actually responding to questions.”).

### 5.4.3.2 Findings from how MOOC participants perceive the effect of individual or collaborative learning on their SDL

There are indications that collaborating with peers has beneficial effects on learning. It would be of interest to research the shifts that happen in both individual learning and collaborative learning (either with course peers, or with outside peers) and see how this affects MOOC learning. For instance: did the conversations on the course shared with family members have an effect on the family perception of
the course and the actual learning or time invested that a learner had to plan for? Or to look at the percentage of interactions with different groups and whether they changed over time. For example: what does it mean to interact with outsiders, is it a shared learning experience, or is it you reporting back from the course, or does it result in extra learning? The same needs to be investigated with regard to the individual and collaborative learning that might shift as the course is developing and the learners become more accustomed with what is possible, and how one can interact with others in a course, which might also be related to trust in either themselves or others to share ideas for some learners.

The individual learning aspect was available in a direct form e.g. videos and quizzes, but it was also possible for the learners to reflect individually on what was learned. However, the instruments used in the pilot study did not capture this individual learning satisfactorily, which left room for future research.

5.4.4 Which actions (if any) did the MOOC participants undertake to adapt their SDL?

Most of the data related to this sub-question was provided through answers gathered during the learning log and interview phase of the pilot study, as learning adaptations were happening as the course was experienced, or were noticed while reflecting upon the learning after the MOOC was taken.

The actions to adapt learning during the closed alpha courses varied from human support (e.g. contacting course people, asking peers, where the learner had not previously done this), through ways to embed what was seen as relevant to their own professional or personal needs, to finding technical tools to support their learning (e.g. creating a backchannel for learning, inner reflection on the subject of the course, setting up a timeline for learning). However, the extent to which a learner was reaching out to either humans or technology to bridge their learning gap was not measured or gathered as this idea only came to mind after the data analysis.
5.4.4.1 Emerging categories for learning adaptations.

**Balance known/new.** This category of adaptations looked at how learners moved from what they knew to incorporate what was new in the FutureLearn MOOCs, e.g. “difficulty in dealing with a lot of unstructured comments”. It included exploring new technologies for their learning options (e.g. remark on conversational discussions that are part of a flow in FutureLearn courses: “I changed the way I thought of the discussions – not as ‘discussions’ to contribute to in a logical and more controlled way, but as triggers for thought to dip in and out of and skim randomly”). These adaptations were sometimes based on individually found or constructed adaptations, e.g. “With my previous MOOC, I got into a routine [adapted learning strategy] of when I would watch videos and complete the work each week as it had a coherent structure so I could plan ahead [SDL planning]. I don’t yet feel I am into the same rhythm with this course or know what the weekly format is (number of videos, discussions, assignments etc.), [adapting to new course delivery] so feel like I am grabbing time here and there”. But there are also adaptations that occur as a result from interactions with peers, e.g. “The comments from participants are thoughtful and also help me to develop my understanding and put it into practice with examples”.

**Technology as facilitator.** This type of learning adaptation is related to the sub-question on technology, e.g. “started to use the comments/notes function in the course”. But for this sub-question the focus is on making a learning adaptation, not on the technology influencing learning, e.g. “I was able to open two windows with the course on one and Internet searching on the other”.

**Changing learning pace.** This includes dedicating time or adapting a learning approach, e.g. “I felt I had fallen behind with the course as the first week was almost over but I hadn’t completed all of the activities. I put aside some time on my day off to finish week 1”. It might be of interest to see whether this extra time, or change in learning pace is being influenced by outside factors, for instance an
increase in workload (with resulting higher learning pace), or a renegotiation of learning time with family members.

5.4.4.2 Findings from how MOOC participants adapted their learning

Some FutureLearn MOOC participants did adapt their learning by adjusting their time investment, by learning to use new tools, or by revisiting earlier learning experiences and adjusting them to the MOOC reality of that particular course.

5.5 Conclusion and resulting adaptations

The pilot study shows that different learners react in different ways on the challenges and opportunities they meet during FutureLearn MOOC learning. These challenges and opportunities can come from technology, daily life, and individual or collaborative learning. The resulting learner actions and adaptations they make seem to be the result of a multitude of influences and characteristics. What is interesting however, is that prior online learning experience has an effect on choosing to interact with peers and on using multiple devices. Due to the social and mobile framework of FutureLearn, I decided to select learners with more than one year of prior online learning experience for the main study. This could provide a more in-depth look into how and why people engage in social learning with peers while enrolled in FutureLearn MOOCs.

The research questions investigated in this pilot study are not completely the same as the research questions of the main study. When the pilot study was organised I assumed that daily life was an important factor to investigate in relation to the self-directed learning taking place in a FutureLearn course. The findings revealed that personal characteristics and organising learning seemed to have a bigger impact than specific elements from daily life. The sub-question investigating technological elements was in first instance added to the research question to investigate the mobile learning potential of the course. However, the data from the learners showed that course tools and media were
also influencing the technological component influencing learning. Therefore, this sub-question was expanded to include media as well, referring to tools and media available in FutureLearn. The individual and collaborative learning inside FutureLearn MOOCs sub-question seemed relevant and providing enough scope to investigate the social learning aspects of FutureLearn influencing learning.

The main study also needed to examine how learners adapt their learning during the FutureLearn MOOCs. The closed alpha MOOCs were only two weeks long, which did not offer enough room for many learning adaptations to take place. The learner seems to explore the new learning environment based on what he or she is familiar with. All learning-related actions are a result of multiple factors that either drive or refrain the action from being taken, but which factors have the most impact on the self-directed learning in FutureLearn courses? With this renewed focus on the subject some changes were made to organise the main study, including how many learning logs the participants were asked to fill in. The participants of the pilot study were asked to fill in a daily learning log for each day they engaged in the course. In addition they were asked to fill in a weekly log for each week of the course. This demanded quite some time from the participants (feedback via email communication and during the interviews). It also resulted in some participants simply crossing off the daily and weekly logs without adding extra information. As a result I decided to adapt the questions from the daily and weekly log into one single learning log. In order to limit the time demand on the participants, they were only asked to fill in two learning logs every other week, for the duration of the course.
6. Main study

This chapter introduces the main study, by describing the different phases of the study, the data collection procedures, providing a brief overview on the three FutureLearn courses used as a learning environment for this study, and the target population.

6.1 Methods overview

This main study gathered Self-Directed Learning (SDL) experiences from experienced, online learners while they were enrolled in a FutureLearn course. The research consisted of three phases, leading up to conclusions on SDL in FutureLearn courses.

- Phase 1 – expectations: gathering expectations of the participants enrolled in FutureLearn course via an online survey
- Phase 2 – experiences: collecting learning logs in which the participants were asked to describe two learning episodes every other week for the duration of the course
- Phase 3 – reflections: interviewing the participants taking part in the study via semi-structured interviews looking into the differences between their expectations and actual perceptions on their SDL as they were participating in the FutureLearn course

The FutureLearn research participants are research volunteers enrolled in one of three specific FutureLearn courses who responded to a call to take part in this study. From all of the participants who indicated they would be interested to take part in this research, all the participants with more than one year of online learning experience were selected.

6.2 Data collection

Data collection consists of three phases, each using different research instruments: an online survey, learning log templates and semi-structured one-on-one interviews as described in the Methods chapter, section 3.4.1.
6.2.1 Three FutureLearn courses

Three FutureLearn courses were selected as the learning and research environment of this study. The courses were chosen based on:

- the course availability, which needed to be situated around the last months of 2014 given the time frame of my full PhD planning,
- their topic diversity, providing insight into the learning experience on a variety of FutureLearn courses, potentially finding differences in learning depending on the course,
- the willingness of the course facilitators to have a researcher from The Open University use some of their learners as research participants.

Table 8 gives an overview of the three courses that were the basis for collecting participant data for this study. The student investment time of each course was an estimate given by the course facilitators.

<table>
<thead>
<tr>
<th>Course title</th>
<th>Organised by</th>
<th>Starting date (dd/mm/yyyy)</th>
<th>Number of weeks</th>
<th>Student investment time (hours per week)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Science of Medicines</td>
<td>Monash University, Australia</td>
<td>1/09/2014</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Decision Making in an Increasingly Complex and Uncertain World</td>
<td>University of Groningen, the Netherlands</td>
<td>15/09/2014</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td><a href="https://www.FutureLearn.com/courses/complexity-and-uncertainty">https://www.FutureLearn.com/courses/complexity-and-uncertainty</a></td>
<td>University of Groningen, the Netherlands</td>
<td>15/09/2014</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Basic Science: Understanding Experiments</td>
<td>The Open University, United Kingdom</td>
<td>22/09/2014</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td><a href="https://www.FutureLearn.com/courses/science-experiments">https://www.FutureLearn.com/courses/science-experiments</a></td>
<td>The Open University, United Kingdom</td>
<td>22/09/2014</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 8. Quick overview of three FutureLearn courses from the main study

The facilitators of each of these courses allowed me to embed an email request in their welcome mail, highlighted this study, providing basic background information and include a call to participate in this research. The email request consisted of a paragraph which was part of the first email sent out to all the learners who enrolled in each of the FutureLearn courses (see appendix 5).
6.2.2 Target population

The target population for this study was selected by a number of steps, including recruiting volunteers for this study and selecting the participants based on their prior online learning experience.

6.2.2.1 Recruitment procedures

The participants of this study were made aware of the study through a paragraph that was added to the “Welcome to Week 1”-mail (see appendix 5) sent by the course organisers. This mail was sent to all the learners who had enrolled in one of the three courses. The mail contained a paragraph describing the main study, and the fact that experienced, online learners were sought to participate in this study. Within the mail a link was provided directing the learners to the informed consent form (see appendix 6). Learners who wanted to volunteer for this research could directly use this link to indicate that they were willing to become a research participant.

The informed consent form described:

- the study itself,
- the actions expected of the participants
- details for more information requests
- contact details of the researcher
- withdrawal procedures

In the consent form a clear distinction was made between the FutureLearn course and this study, and that a successful conclusion of the FutureLearn course was by no means dependent on volunteering for this research. As soon as the informed consent was signed, those learners who volunteered for the research became research participants. An overview of the procedure to select the participants can be seen in figure 15.
6.2.3.2 Research instruments

*Online survey*

Once the participants signed the informed consent form, they were sent an invitation email (see appendix 7) to fill in the online survey (see appendix 9 for a filled in online survey example). The answers to the online survey questions provided the basis for selecting research participants that could be considered experienced online learners (= learners that had prior online learning experience, either in formal or in informal – self-taught – contexts). Participants indicating they had more than one year of online experience (which meant at least two years of online learning experience) where withheld for this study. The online survey used the online survey tool ‘formsite.com’, and not SurveyMonkey the software which was used during the pilot study. The Formsite software offers online forms and web surveys built by Vroman Systems inc. The software is used by multiple universities (e.g. Harvard, Stanford, Yale) and technology oriented corporations (e.g. Oracle, Accenture), which supports the quality of their product. I had a positive experience introducing and using Formsite in my previous job at the Institute of Tropical Medicine in Belgium. Although SurveyMonkey is used more frequently, I felt that Formsite’s data visualisations and result filtering options outperformed those of SurveyMonkey.
All volunteers that had consented to be part of this research would be kept informed on whether or not they have been selected to be research participants. All participants confirmed they were 18 years or older at the start of the research.

**Learning log**

Once the participant had filled in and signed the online survey, and the criteria of the main study were checked (learners above 18 years old, having at least 2 years of experience in online learning), they were sent a learning log (see appendix 11). The learning log consisted of various closed and open questions. The learning log template needed to be filled in twice every other week, starting on week 2 of the course. The learning log template was sent to the participants in Week 1 of the course, enabling them to be fully informed by the time they needed to fill it in starting from Week 2. The template was accompanied with detailed information on how to fill in the template and with contact information of the researcher enabling direct support in filling in the learning log.

**One-on-one semi-structured interviews**

Only those participants who had submitted at least one learning log were contacted to give an interview. The semi-structured one-on-one interviews were recorded and afterwards transcribed for data analysis. All interviews, except two, were recorded using Skype as a meeting tool, and the integrated Skype Messenger tool for recording the interviews. Two participants asked to use an email communication for their interview. The questions for the semi-structured interviews can be read in appendix 14.

**6.2.3.3 Adaptations to the learning log and its communication**

All communication (except for the one-on-one interviews) between the research participants and myself happened through emails. As the main study started, I decided to adapt some of the previously planned communications based on emerging insights from learning log communications:
• I made specific learning logs for each separate FutureLearn course, to enable specific dates to be used in the descriptions, and as such make the learning log seem more personalized to the actual FutureLearn course that the participants were following.

• I filled in an example learning log, to be used by the participants to get a better understanding of what was expected of them (see appendix 12). To allow the learning logs to describe actual course actions, two example learning logs were made: one representing the more theoretical courses (SOM and DMCW), and one representing the hands-on course (BSE).

• I sent out learning log reminders to the participants on Week 2, Week 4, and for the two long courses on Week 6 of the course. In these mails the participants were reminded of the fact that they had volunteered to be research participants, and where they could fill in the learning logs. An example learning log was sent for additional information.

• From week 4 I used two different mails to communicate with the participants depending on whether they had sent in one or more learning logs already. One mail was brief and thanked the participants for already submitting a learning log. The other mail recaptured the actions necessary for the study, and emphasized the importance of their input for the research.

After using a more personalized communication, more learning logs were sent in than before the personalized approach.

6.2.3 Data corpus and sample size

The data corpus of the main study:

• A pre-course survey following the signed informed consent sent back by the participants: 115 participants took the survey, all participants were selected to be part of the study, but not all of them started sending back learning logs.

• Participants who sent back Learning logs: 56 participants (4 SOM, 15 BSE, 37 DMCW participants).

• Total amount of learning logs kept: 147 learning logs (15 SOM, 41 BSE, 91 DMCW; ranging from one to five learning log submitted by a single learner).

• Semi-structured one-on-one interviews: 19 participants (1 SOM, 4 BSE, 14 DMCW).

With regard for rigor in qualitative research, the evidentiary adequacy in this study is reached by the data that has been collected during the main study. In terms of sample size, a minimum of 12 participants is considered as an acceptable, robust and appropriate sample size for a qualitative study (Guest, Bunce, & Johnson, 2006).
6.2.3.1 Learning log frequency of participants per 2 weeks and per course

<table>
<thead>
<tr>
<th></th>
<th>Number of learning logs week 1 and 2 (n=participants having submitted at least one learning log)</th>
<th>Number of learning logs week 3 and 4</th>
<th>Number of learning logs week 5 and 6</th>
<th>Total learning logs (total number of participants)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOM</td>
<td>4 (n=3)</td>
<td>6 (n=3)</td>
<td>5 (n=2)</td>
<td>15 (n=4)</td>
</tr>
<tr>
<td>BSE</td>
<td>19 (n=13)</td>
<td>22 (n=14)</td>
<td>N/A (BSE lasted only 4 weeks)</td>
<td>41 (n=15)</td>
</tr>
<tr>
<td>DMCW</td>
<td>31 (n=22)</td>
<td>28 (n=22)</td>
<td>32 (n=24)</td>
<td>91 (n=37)</td>
</tr>
</tbody>
</table>

Table 9. Learning logs received per two weeks from n number of participants per course

The learning log frequency per two weeks (table 9) shows participant persistency through their course.

The persistency is consistent with Charmaz’s (2014) emphasis on the importance on retrieving data from participants at different points in time. This adds to the validation and rigour of this study in terms of consistently having retrieved participant data throughout the duration of the study.

6.2.3.2 Study sample size compared to learners per FutureLearn course

Table 10 shows the main study learners per course, compared to the research participant ratio. These numbers were the exact numbers according to participation based on data taken at two weeks after each course’s end date.
### Table 10. Comparing learners per FutureLearn course to participant sample

Looking at the main study course numbers for each of the courses, one can see that the proportion of participants taking part in this study is only a small fraction of the active learners on each course. This is in part due to the fact that only volunteering learners were considered as research participants, and to the fact that from all the learners who volunteered to be part of the study only those with online learning experience were selected.
7. Research findings

The research findings emerged while analysing documents from 56 experienced, adult online learners engaging in individual and/or social self-directed learning in FutureLearn courses. The data were collected at three different stages: an online survey (pre-course), self-reported learning logs (during the course), and semi-structured one-on-one interviews (post-course).

The findings address the central research question: “what characterises the informal self-directed learning of experienced, adult online learners engaging in individual and/or social learning using any device to follow a FutureLearn MOOC?” The central question was split into four sub-questions, each related to an aspect of the learning experience:

- Which individual characteristics influence the learning experience?
- What are the technical and media elements influencing the learning experience?
- How does individual and social learning affect the participants’ learning?
- Which actions (if any) did the learners undertake to organise their learning?

The findings are organised in six parts, based on the results from the analysis which followed iterations of open coding resulting in main categories that were used to theoretically saturate the core concepts which emerged from the data. The first four parts address each of the sub-questions, after which a fifth section is added covering unexpected findings. The unexpected findings combine results that emerged from the data analysis which did not directly answer any of the sub-questions, but are relevant to the central research question. In the last section the findings are combined to provide an answer to the central research question.

To ensure participant anonymity and data transparency, the data from all participants were coded as provided in table 11 below.
Participant identifier: #DMCW/I/222

<table>
<thead>
<tr>
<th>Description of each element of the participant’s identifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>#Course, i.e. Science of Medicines (SOM), Basic Science –</td>
</tr>
<tr>
<td>Understanding Experiments (BSE), Decision Making in an</td>
</tr>
<tr>
<td>Increasingly Complex World (DMCW)</td>
</tr>
<tr>
<td>/LL</td>
</tr>
<tr>
<td>/222</td>
</tr>
</tbody>
</table>

Table 11. Learner data coding description

To support and illustrate the findings in the following six sections, I selected and added relevant excerpts from the participant data corpus. The selection of quotes was made based on their representative quality and to offer a rich illustration of the findings.

7.1 Which individual characteristics influence the learning experience?

This section looks at the individual characteristics that are mentioned most frequently by the participants in relation to their impact on the learning experience. In this study the term ‘individual characteristic’ was chosen to identify character traits of the learner, for example: self-confidence, perseverance. The character traits were self-identified by the learner, as well as traits identified by the me based on what the learner shared in their data.

Two main categories emerged from the data as individual characteristics that have a profound influence on the learning experience:

- Motivation (choosing a course, personal and professional motivation to complete a learning episode, motivation in leisure learning)
- Key personal traits and emotions influencing the learning process (perseverance, self-confidence)

Each of these two categories, their context and interpretation is described in the following section.

### 7.1.1 Motivation

The line-by-line coding of the data corpus revealed multiple learner excerpts pointing towards the idea of motivation as an important influence on the learning process. In the literature chapter it was already mentioned that motivation can influence what, when, and how we learn (Schunk, 1995). Motivation is part of every learning process, but in this study motivation is specifically viewed as part of the informal nature of FutureLearn MOOCs. Motivation is stimulated or limited within FutureLearn MOOCs by: choosing the course, professional versus personal motivation, and leisure learning. In motivation a distinction is made between intrinsic and extrinsic motivation based on the different reasons or goals that give rise to an action. “Intrinsic motivation, which refers to doing something because it is inherently interesting or enjoyable, and extrinsic motivation, which refers to doing something because it leads to a separable outcome” (Ryan & Deci, 2000, p. 55). In this study the learners’ motivation is mostly intrinsic, considering the emotional connections and the personal interest that is shared in the data.

#### 7.1.1.1 Choosing a course.

There are multiple FutureLearn MOOCs available to the public. At the time of this study, the FutureLearn courses were still new, and MOOCs were not used as part of continued professional development. The FutureLearn MOOCs were not mandatory for any of the participants of this study. Therefore, the learners chose and registered for specific FutureLearn courses following their own preferences. This choice is based on a personal decision. It can be based on a need for information which is not yet part of the person’s existing knowledge, on a need for personal or professional development, or simply satisfying an interest in a new topic. As a result the learning intention for a
FutureLearn course comes from the learner, and the decision is based on their personal and/or professional interests related to perceived needs. This open choice makes registering for a FutureLearn course part of the learner’s informal learning journey, driven by their own motivation. Due to the informal nature of FutureLearn MOOCs motivation for learning comes from within the learner and is therefore intrinsic.

**Motivation as mentioned pre-course.** As motivation came up as a strong coding category during the analysis, I took another look at the online survey that was provided to the learners at the start of the course. In this survey, one question investigated the learners’ reason for registering for that particular course. Motivation overall, as well as the percentages for motivation per course are provided in Table 12 (n=115, multiple answers possible).

<table>
<thead>
<tr>
<th>Motivation</th>
<th>All courses</th>
<th>SOM</th>
<th>BSE</th>
<th>DMCW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional interest</td>
<td>38 %</td>
<td>38 %</td>
<td>15 %</td>
<td>42 %</td>
</tr>
<tr>
<td>Personal interest</td>
<td>61 %</td>
<td>61 %</td>
<td>85 %</td>
<td>57 %</td>
</tr>
<tr>
<td>Other</td>
<td>1 %</td>
<td>-</td>
<td>-</td>
<td>1 %</td>
</tr>
</tbody>
</table>

Table 12. Looking at personal or professional interest for joining the FutureLearn courses

61% of the participants indicated they had a specific personal interest in the course. An interesting difference can be seen between the Basic Science: Understanding Experiments (BSE) course and the other two courses. The personal interest for the BSE course is significantly higher than the other two courses. From the learning logs and the interviews it became clear that the BSE course also appealed to a large group of learners who were primarily interested in enhancing the family’s knowledge of scientific experiments. Parents would use this course to learn about experiments with their children, or to help their children develop science skills.

From all the participants 38% had a professional interest in their chosen FutureLearn MOOC. When interviewed, the learners with a professional interest in the course all indicated they had decided for
themselves that following a work-related MOOC might increase their own professional knowledge. During the post-course interviews learners who had a personal as well as a professional interest clarified this overlap by mentioning that they loved their job and that their job was based on a personal interest (e.g. #DMCW/LL/133: “programming is my hobby, life and work”). 1% of the participants were interested in following a FutureLearn course in order to explore the course format and the FutureLearn platform, the content was less important. If multiple courses were offered, all on the same topic but by different institutes, the learner’s decision to choose a course was also influenced by the reputation of the organising university or institute, for example: “the OU has a tremendous reputation in delivering high quality learning material” (#SOM/I/500).

Motivation as mentioned in learning logs and interviews. When coding the learning logs and post-course interviews, they revealed that the professional or personal motivation vary per course (see table 13).

<table>
<thead>
<tr>
<th>FutureLearn course</th>
<th>Percentage of motivational excerpts from the learning log data referring to personal motivation</th>
<th>Percentage of motivational excerpts from the learning log data referring to professional motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMCW</td>
<td>40 %</td>
<td>65 %</td>
</tr>
<tr>
<td>BSE</td>
<td>29 %</td>
<td>15 %</td>
</tr>
<tr>
<td>SOM</td>
<td>31 %</td>
<td>20 %</td>
</tr>
</tbody>
</table>

Table 13. Percentage of motivational excerpts from learning logs referring to either personal or professional motivation per course

The biggest difference in motivation based on coding the excerpts was in the DMCW and BSE course (see table 13). Where the DMCW course is mentioned more frequently in relation to the participants professional motivation, and the BSE course had more learners referring to it based on their personal interest. Comparing the content of the excerpts of both courses, the DMCW participants refer to the immediate integration of the course content into their professional work and/or colleagues: “what I learned from the course is now a constant feature in my recent rapports with my colleagues”
While the BSE excerpts more frequently refer to family and supporting learning within the family unit: “As a scientific dad and a geek, experiments and nature exploration are the ideal form of play with my children. We have a lot of fun together” (#BSE/LL/125).

### 7.1.1.2 Personal and professional motivation for completing a learning episode

When looking at the learner log data on completing a learning episode (see table 14), there was a distinction between those who had a personal motivation to follow the course, versus those learners who indicated a more professional motivation. The learning episodes were more frequently finished within their particular course weeks by the professionally motivated learners (74%), while the personally motivated learners intended to pick up the learning activities of that week later in the course (62%). The interviews with the learners confirmed that those with a professional motivation were putting more effort into finishing the learning episodes they started, if that learning episode was perceived as immediately useful within their professional context.

<table>
<thead>
<tr>
<th>Learning episode completion or not compared to motivation</th>
<th>Personal motivation</th>
<th>Professional motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I completed this learning episode</td>
<td>38 %</td>
<td>74 %</td>
</tr>
<tr>
<td>I have not completed this learning episode, but I will complete it later</td>
<td>62 %</td>
<td>26 %</td>
</tr>
</tbody>
</table>

Table 14. Motivation in relation to completing a learning episode

In the self-reported learning logs the participants indicated that 79% of their learning episodes were successful. Success is described as being task-related, as well as a personal feeling of success either made explicit by an emotional remark, or indicated directly as successful by the participant. Success does not mean that the task or course activity is done according to the expectation of the course organiser, simply as being successful as perceived by the participants. In the BSE course success was mainly related to the actual experiments being done in relation to a positive motivation, e.g. #BSE/LL/140: “I really enjoy performing the experiments to see what will happen”. But even in the BSE
course, the learners used their own terms for learning success, relating their success to their own learning goals, e.g. #BSE/LL/137: “my objective is just to learn something new, or in this case, to view an ordinary action (cooking a potato to destruction) in a new way... so for today, I achieved my objective”. Depending on the type of person, success can also coincide with actively taking up all the course activities. Participant #DMCW/I/222 said that “having completed all the tasks in the course gave me a satisfied feeling”, while #BSE/I/118 focused more on the learning process itself that gave a sense of learning success: “I see it as a way to keep my mind functioning and my knowledge expanding as I grow older. And, because it’s fun!”

7.1.1.3 Motivation in leisure learning or edutainment

Edutainment or leisure learning, is an action interpreted here as a voluntary, very loose form of informal learning, where the learning is solely a pleasurable pastime. Learning based on the pleasure of looking at something new, comes out as a particular form of motivation, e.g. “Well, I do not really call this learning. It is more like reading a book or watching a film. You have to pay attention or you do not understand, but otherwise just sit back and enjoy it.” (#DMCW/LL/147). But for one learner the BSE course interest also referred to the past, #BSE/I/118: “I last took science classes in high school in the ’50s and ’60s and I don’t particularly remember them as fun, so what I gained was enjoyment”. The data relating to learning based on loose interest, also revealed curiosity as motivators to keep on going with the course. Although the registration for the course was based on personal interests, the continuation of a particular FutureLearn course is often linked to enthusiasm or some sort of curiosity: “I find it useful to just learn on impulse, follow my curiosity” and “I sometimes have these learning episodes when I am ‘all over the place’ without any planning. I find these often the most enjoyable” (#DMCW/LL/150).
Overall, intrinsic motivation seems to have a profound effect on learning within FutureLearn MOOCs. Intrinsic motivation makes the learner decide which course they want to follow, based upon their own interest. The usefulness of the course content in terms of their professional and/or personal interest also increases the learners’ motivation, especially in terms of completing a learning episode. Once the course is rolled out, the content and information provided in the course can also alter motivation depending on the proximity of the course to the professional or personal context of the learner. FutureLearn MOOCs are also taken purely for leisure purposes, in those cases motivation comes from curiosity and time to spare to continue with the course. Overall, the data shows that self-directed learning within FutureLearn courses is driven or held back by intrinsic motivation, ignited by the course content and personal interpretation of the usefulness of the course for the learner’s benefit. This makes intrinsic motivation an important inhibitor or enabler of self-directed learning in FutureLearn courses.

7.1.2 Key personal traits and emotions influencing the learning process

This section focuses on two personal traits related to individual characteristics that emerged most frequently during the line-by-line data analysis: perseverance and self-confidence. Although the data analysis started with coding all words that might refer to personal traits (e.g. social by nature, curiosity, individualistic), comments referring to perseverance or self-confidence were mentioned by 31 participants. While investigating personal traits during the data analysis of learning logs, the occurrence of emotional language used by the participants to describe the learning process became apparent. The interviews and the self-reported learning logs show that informal learning in FutureLearn courses frequently results in sharing what is learned through the use of emotional language.

7.1.2.1 Perseverance

While analysing the personal traits it was noted that perseverance was mentioned by 16 participants. Some learners referred to it in relation to ‘learning to perfection’, where learners indicated that they
had to reflect on whether or not to learn all the details of a course (specifically some sections of the Decision Making course, which at times included a lot of extra links for those interested). Participants indicated their need to grasp all that they felt needed to be done and this was supported by their emotions: “I only deem it fit to quit after I have learned all there is to learn on the subject matter. I hate failure, especially, in achieving a learning objective.” (#DMCW/I/220). Perseverance was also linked to a general view on learning and how learning should be undertaken, e.g. “first I need to understand before moving on” (#DMCW/LL/152).

But the act of persevering can also be limited to one particular topic. In those cases perseverance was linked by the learner to a specific personal learning interest, e.g. “I persevered to understand what was important for me to know and left the rest. So nobody motivated me and I am not motivated to understand what is irrelevant to my health and wellbeing.” #SOM/LL/113. Although learners refer to the pleasure of learning, they also mention the pleasure of learning in relation to the difficulty of content, providing a deep sense of accomplishment after persevering: “I found that this course did not require a high level of mental effort. I was not struggling to solve complicated logical puzzles, or understand hidden relationships. And because I did not put so much in, I did not get so much out of it” (#DMCW/I/107). Learners can be extra stimulated by unforeseen context or content, the satisfaction of having learned (which seems to be related to a perceived complexity in the material that is provided), and the affinity they feel when going through the course. Participant #SOM/LL/109 wrote “I’m finding the course more and more interesting as it goes on which is motivating me to spend more time on it”, and when asked during the interview why she felt compelled to spend more time in the course, she referred to its professional use.
7.1.2.2 Self-confidence

Self-confidence was mentioned explicitly by 15 participants. The data related to self-confidence ranged from the learner’s views on their own learning: “I've found that my brain wasn't so stiff and still opened for some new knowledge” (#DMCW/I/167), learning within the course itself: “First I felt stupid but then I reminded myself that that is why we do experiments, to test our hypothesis and not just make assumptions” (#BSE/LL/132), and including doubts on the participant being a research participant “I'm not at all sure I am the sort of person who should be filling out this form as I want to write the same every time” (#SOM/LL/107). But self-confidence was most frequently referred to in terms of daring or doubting to engage in social learning.

Self-confidence impacting social learning.

Although self-confidence also relates to social learning, which is a sub-question that will be further explored in section 7.3, the references to self-confidence are integrated in this section of individual characteristics as well, as self-confidence is part of the personal traits of the learner. Self-confidence plays a role in triggering social learning action. Hovering between individual and social learning are those learners that seem to be willing to interact with others, yet do not always feel certain enough (yet) to do so. Sometimes this uncertainty stems from a practical element: “Connecting with others was a bit more difficult this time, because it was in English and I’m not a native speaker in English” (#DMCW/I/222), at other times it is related to a personal sense of esteem or pride. One learner showed a strong emotional response when asked whether they engaged in social learning: “I wouldn't dream of asking anyone to help me. This is not life or death and does not involve money so I just get on with it myself” (#SOM/LL/113). Mostly learners who did share moments of uncertainty to enter into dialogue with others in the course, shared feelings of low self-confidence or uncertainty: “I prefer looking up info on my own but sometimes it is more efficient to just ask and not worry about looking stupid”
Social learning can also have a positive effect on self-confidence: “I found it helped to discuss what I had learned with someone. It helped me to realise when I hadn't really understood or couldn't fully remember things. This is something I have avoided doing until now but it really does help” (#SOM/LL/101). Nevertheless, for some uncertainty was still present: “I commented when I felt I had something useful to say or to illuminate my own understanding of a concept (sometimes hoping that someone else would help me by confirming or contradicting what I had suggested).” (#DMCW/LL/114).

Emotional language and learning

In both learning logs and interviews the participants used emotional language to support their self-reported learning experience. The emerging data suggested that content and facilitators can inspire the learner, e.g. “I enjoyed learning, especially the content of the first few weeks and both the content that Jennifer presented and her enthusiasm in the second half of the MOOC were great.” (#DMCW/I/222). But content and facilitators can also trigger critique. One participant felt the urge to correct the facilitators. In this excerpt the learner added comments to improve the course definitions due to his perceived lack of clarity provided in the course: “I provided material to other students because I am knowledgeable in the particular field that was badly done by the lecturer. There are many motivated students on the course that were asking questions and I didn't want them to miss out because of some poor material.” (#DMCW/LL/170).

When the content of the course aligned with personal expectations or needs, it added to the pleasure of learning, e.g. “As I have heard of this experiment but never performed it I wanted to carry it out myself. Also the idea of being able to visualize the stuff of life is very appealing!” (#BSE/LL/103). The timeliness in terms of content and tools was appreciated by learners wanting to stay on top of their field, e.g. “It was enjoyable, informative and having access to very up-to-date information was very stimulating” (#DMCW/I/179). The complexity of certain parts of the FutureLearn courses also resulted
in renewed frustration about their own situation: “I found this module more than any of the others really frustrating because it is such a complex illness, involving psychology as well as medicine. I wanted to shout at someone” (#SOM/LL/102). Emotional language was also used when learners decided to stop learning at that moment in time: “so I reckoned that I was not in the mood for learning and so I gave up” (#DMCW/LL/140).

Personal traits and emotions play a role in the FutureLearn MOOC learning experience. Specific personal traits such as self-confidence and perseverance let the learners self-direct their learning towards specific learning actions (engaging with content or peers). While emotions colour the learning experience, they can deter or stimulate learners from learning. Although findings related to personal traits overlap with other types of learning, the FutureLearn experience differs from formal types of learning due to its more informal nature. This means the learner decides how to react on her or his emotion. In formal education emotions and personal traits will be present, but in most cases it is not within the learner’s power to let these emotions guide or stop the learning. In the FutureLearn experience the learner has the power to either stop their learning, or look at specific content of their learning. There is more room for the learner to act upon his or her emotions, or to satisfy specific personal traits (e.g. learn everything in detail, only focus on stimulating content). In the FutureLearn MOOC environment the learner has more agency to self-direct their learning.

7.1.3 Findings on individual characteristics

Motivation and personal traits play a key role in the self-directed learning of FutureLearn participants. The informal nature of the FutureLearn courses under investigation makes the participation of the learner more susceptible to influences coming from her or his motivation, as well as their character. This provides the learner with an increased amount of learner agency. Motivational factors include professional or personal interests, and these interests co-determine which courses the learner chooses
to follow and how they will act when facing complex content. The emotional responses inspired or deterred learners from specific actions, and because of the informality of the FutureLearn courses, learners could react to their emotions and change their learning according to these emotions.

### 7.2 What are the technical and media elements influencing the learning experience?

Technology is a necessary component of online learning, as learners need technology to access the learning material. While analysing the data the following three key categories related to technology emerged as influencing the learning experience:

- Devices used
- FutureLearn course elements
- Learning new tools suggested in courses

Each of these categories is described in the following paragraphs, accompanied by a selection of quotes derived from the learning logs and interviews with the FutureLearn participants.

#### 7.2.1 Devices used

FutureLearn courses are only accessible online, although some of the resources (e.g. videos, transcripts, and texts) can be downloaded to be used offline as well. This means that all learners must have access to the FutureLearn platform with a web-enabled device in order to learn. From the start the FutureLearn developers have chosen to deliver courses on a mobile enabled platform to allow learners ubiquitous access to the course with any device at their disposal. Table 15 gives an overview of which devices were used to access the course.

<table>
<thead>
<tr>
<th>Devices</th>
<th>Smartphone</th>
<th>Tablet</th>
<th>Laptop</th>
<th>Desktop</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentages</td>
<td>13 %</td>
<td>12 %</td>
<td>45 %</td>
<td>26 %</td>
<td>4 %</td>
</tr>
</tbody>
</table>

Table 15. Devices used by the learners to access the course (n=147)
The other devices comprised smart-TVs and a hybrid device. Depending on the demand of the course resources (e.g. processor demanding tools, or visually complex tools) different devices were chosen, where the more demanding parts of the course were mostly accessed via laptop or desktop. Learners indicated that they worked with a preferred device, but that they also used different devices or device features depending on the circumstances, e.g. “I used the calculator on my phone to do the maths” (#DMCW/LL/153)” and “I used desktop at home, this was most comfortable to pay maximum attention to the subject. Sometimes I used tablet in my car on my way somewhere, but for some simple parts (videos and short articles)” (DMCW/I/167), “We used the tablet when we were performing the experiments in the kitchen” (#BSE/I/111).

The learners indicated that they used a laptop or desktop most of the time based on their own comfort, the processor strength, and their familiarity with the device. However, depending on the context learners did switch to other devices, mostly mobile devices as these allowed them to engage with the course either from a different location than their preferred learning space (e.g. car, kitchen, public transport). “I used mainly my laptop. Tablet in bed and smartphone outside.” (#DMCW/I/148).

Although FutureLearn is built for mobile and ubiquitous access, participants did mention instances where they could not connect to the course content in a satisfactory way. These instances were either related to applications that did not work fluently (e.g. specific browsers that did not support a tool), or specific visualization techniques, e.g. “I had difficulty viewing the molecular animations on my iMac” (#SOM/LL/109). During the interviews 93% of the participants mentioned that the basic content delivered through the FutureLearn courses was easily accessible on all the devices they used, and this was seen as having a positive impact on their learning experience. This positively supports the decision of FutureLearn to invest in a mobile, ubiquitous online learning environment.
7.2.2 FutureLearn course elements

The FutureLearn platform uses different features to create the course environment (see section 4.2). In the learning logs participants often referred to their use of FutureLearn features. In some cases they also referred to a selective use of media, indicating a critical evaluation of what they felt they needed to learn or interact with: “Answers were only relevant when doing the quiz and I completed only those parts that involved the material I had already covered” (#BSE/LL/106). Videos were mentioned as easy learning material, e.g. “Learning by good examples in videos is better than having something explained by a lecturer” (#DMCW/LL/165). Experienced learners understand the benefits related to specific media: e.g. the benefits of captioned videos: pausing, reflecting, having another look, looking at the behaviours in the video (real cases, possibly authentic settings). Learners indicated they watched the same videos at different moments in their learning episode to increase their understanding of the content: “there might be a paragraph on the media availability to better understand a subject, versus the one time option in a classroom” (#DMCW/LL/163).

The conversational commenting option within FutureLearn did trigger one learner to rethink his own commenting. “I have invested some time in answering questions that other students have. However, the FutureLearn platform is badly organised for discussion (no tagging, just sequential comments rather than a forum with topics so people can keep related questions together or search for answers, no chance to reply to a reply etc.) and I probably won’t bother in the future. “ (#DMCW/LL/171). This remark makes the prior online learning familiarity or experience visible, since this learner had been using ways to mark specific users and/or comments in other MOOC platforms, and was thrown by the difference in discussion tool affordances, in this case the conversational comment implementation. Experienced online learners already have familiar practices based on previous learning experiences. By gradually building solutions for working with the online tools the experienced online learner creates a
practice that enables learning with the old and new technology. The new features of a platform can disrupt this familiar practice, or it can open up new found opportunities, such as this positive reference to FutureLearn’s feature ‘mark as done’ button: “To finish the course and not leave any areas undone. I like to see the pink colour and not the blue for undone” (#DMCW/LL/114).

7.2.3 Learning new tools suggested in courses

Aside from the FutureLearn course elements as described in section 4.2, learners also shared remarks on specific tools that were part of a specific FutureLearn course. In the case of the Decision Making in a Complex World course, the facilitators referred to tools that are used to demystify complexity in networks. In the DMCW course there were two particular tools that were new to all participants and got them enthused. One tool was called Lightbeam (for Firefox browser). This tool was highlighted in the learning logs by 11% of the DMCW learners, although it was not a mandatory tool to explore. From the learning logs it became clear that the tool triggered interest because of its personal as well as professional potential. Lightbeam is a tool to visualize who is following your own writing or any electronic actions on the web. This tool triggered interest as it satisfied the curiosity of the learners, making the invisible visible. "I learned how to detect who was monitoring my online activities" (#DMCW/LL/126). The other tool that was mentioned by 34% of the participants was NetLogo. This tool had an immediate professional use, and was suggested as part of the course exercises. “ABM for example is very interesting and could be applicable to some modelling we are looking to do at work. However, there will need to be more information searching on NetLogo to determine if it is something I can use” (#DMCW/LL/135). Where Lightbeam provoked a higher personal interest, NetLogo aroused an immediate professional implementation interest. In this case, the professional quality of the tool, in combination with its use in specific course exercises made learners test out the NetLogo tool. But in both cases the participants were eager to learn these new tools, even though it required extra effort:
“I am going to play around with NetLogo and the Repast Complexity to experiment with different business models” (#DMCW/LL/160).

### 7.2.4 Findings on technology influencing learning

Technology plays an unavoidable role in learning within FutureLearn courses. Learners have to connect to the course through an internet-enabled device, and then learn to navigate through the content using the course tools as well as topic specific tools provided in the course. The experienced, adult online learners in this study navigate through courses using their preferred device/s. The learners indicated that they used a laptop or desktop most of the time based on their own comfort, the processor strength, and their familiarity with the device. Depending on the context, learners switched to mobile devices allowing them to study from a different location or at moments suiting their own agenda. Experienced online learners were aware of media affordances of the known FutureLearn course elements and how to use these media for learning purposes. Learners compare new course features within the FutureLearn platform with those from prior online courses or tools. The new features of a platform can disrupt the learner’s familiar practice, or it can open up new found opportunities. Once they have used a new tool they reflect upon its usefulness before considering implementing it in their own settings. When faced with new tools, the experienced learners will decide whether or not they will test out new tools based upon the perceived usefulness of those tools (which can be either professional or personal). Whether it concerns choosing the learning device, using new platform elements, or testing out new tools, it is the learner who self-directs their learning and who decides which parts of the technology might be beneficial to their learning at present, as well as for the future (e.g. considering the benefits of learning new tools). Admittedly, this learners’ choice is confined to the boundaries set by the course designers as well as the technical limitations or affordances of the FutureLearn platform.
7.3 How does individual and/or social learning affect the participants’ learning?

This section presents and interprets the data regarding individual and social learning, starting with the individual learning experiences, and moving to the social learning experiences. The main categories that emerged were:

- Individual learning actions
- Social learning: connecting and sharing
- Social learning actions

Each of these is described in the following paragraphs, accompanied by illustrative quotes selected by the researcher from learning logs by and interviews with the participants.

7.3.1 Individual learning actions

63% of the learners completed the learning episodes by themselves, learning individually and subsequently addressed as individual learners in this section. Individual learners use a variety of learning actions, such as: viewing and reading course media, reflecting on content, looking for answers on the internet, linking to prior knowledge. Although not actively engaged in any discussions, or in the commenting sections of the FutureLearn courses, the individual learners did testify that they looked at those particular FutureLearn spaces to find answers to their course related questions: “If I have not understood something I will read or listen to it a couple of time. Alternatively, I will take a look on the forum to see if there have been any useful comments” (#DMCW/LL/125). They engaged in lurking, or deliberately looking for answers in social spaces without engaging in these social spaces, e.g. “I did the whole course individually although I did read other students inputs which in many cases answered any questions I might have posed” (#BSE/I/109). Lurking seemed to be a deliberate action, following unresolved questions, “I really only look to see what others have written if I don’t know the answer”
In case of the Basic Science: Understanding Experiments course, lurking was followed by reflection before taking action by experimenting, “I like to see how other people proceed with a learning experience. I didn't contact anyone really, just read the comments. I then decide how I will respond to the challenge” (#BSE/LL/137).

Learners indicated not wanting to interact with others based on the time it would take (and which they were not willing to invest in) and their own personal preference, “I live by myself so tend to solve my own problems by myself” (#SOM/LL/102). In order to find solutions by themselves, the individual learners also include resources outside of the course: “[I] like to try to figure it out on my own when possible unless I am really stuck. Then I might look at the forum or online via a search engine or in my reference books” (#BSE/LL/132). One learner indicated his field-tested individual approach which comprised a series of individual learner actions:

“Working through whatever comes and however it comes bearing high levels of concentration and making a lot of short breaks for the concentration to regenerate. If I come into trouble to understand something (what was not the case in this course until now), the solution-chain for this trouble has the following order: (1) Wikipedia (2) other texts, articles, or YouTube videos searched for via google. If my problem is either solved now or not very relevant it stops here. If the problem is not solved but quite relevant for me it goes on to (3) amazon -> soft- or hardcopy of a book I assume to best fit my purpose” (#DMCW/LL/134).

Individual learners find learning solutions by looking at online and offline options to increase what they perceive as learning success in FutureLearn courses. They rely on previously made learning actions they feel familiar with, and might lurk to reflect upon their own individual learning.
7.3.2 Social learning: connecting and sharing

Social learning is a natural learning phenomenon, as people use dialogue to increase their understanding. With the birth of MOOCs, social learning has become more present in international online learning, as learners from across the world now have another way to reach out to one another in order to find answers. FutureLearn was consciously built around the conversational framework by Pask (1978) and Laurillard (2013), putting socio-constructive learning at its centre. In FutureLearn courses learning can happen inside or outside of the course, depending on the choices made by the learner. 37% of all participants indicated they connected and/or shared their learning with others (course participants, family, friends, partner, and professional colleagues).

7.3.2.1 Looking for answers versus experience sharing

When investigating who learners turned to while learning, this study made a distinction between who participants turn to while looking for answers, and who they share their course experiences with. It turned out that learners turned to people inside and outside the FutureLearn course to find answers, as well as share their experiences with, but in varying degrees.

In this section only the quantitative data from BSE and the DMCW course were considered, as there were only 4 SOM participants engaging in social learning activities, while most of the SOM learners were individual learners (in many cases related to personal health interests which prevented them from engaging in social interactions). The quantitative results coming from the SOM participants were too far from the norm, so the SOM quantitative data were subsequently not considered while comparing courses on the topic of social learning. The SOM participants’ qualitative data were still relevant, due to their descriptive value on social learning practice.

<table>
<thead>
<tr>
<th>Mostly inside course (in %)</th>
<th>Mostly outside course (in %)</th>
</tr>
</thead>
</table>

151
FutureLearn course experiences

Table 16 provides an overview of whom learners interacted with, either to look for answers or share their course experiences with. These data come from the learning logs per course asking learners who they interact with, and cross-tabulated with the two options of either looking for answers or sharing experiences. Most interactions, whether to look for answers or share experiences, involved engaging with course peers. When comparing interactions that happen with people mostly situated inside of the course, versus interactions with people mostly located outside the course, the percentages of interactions inside and outside the course show that people tend to connect to others outside of the course quite frequently. 49% of the participants from the BSE course connected with people inside of the course, but remarkably 45% of them were also looking for answers with people outside of the course. For the participants from the DMCW course, the percentages were 62% connecting with people inside the course, and 31% outside of the course. In case of sharing experiences, the interactions with others outside of the course outnumber the interactions inside of the course.

The course facilitators were mainly contacted in order to find answers to learner’s questions, and they were barely contacted when it came to sharing experiences. Facilitators were seen as part of the formal side of the course. This meant that facilitators were contacted to solve specific difficulties with learning.
episodes, but also for technical reasons, e.g. “I would only contact Course Facilitators something didn’t work (like videos)” (#DMCW/LL/152).

There seemed to be specific triggers to enter into social learning interactions inside or outside the course while looking for answers, e.g. “seeing parallels with my partners work problems”, #DMCW/LL/154, people close by or familiar (e.g. “My friends and cousins mostly help me”, #DMCW/LL/178), and the professional network was used consciously by the learners for their content expertise, e.g. “Subject Knowledge from their work in financial services industry” (#DMCW/LL/106).

In order to find answers learners consider who would be able to help them, indicating an overlap of interests or contexts within their personal relationships: with friends “I will contact people that I know, my friends, who are experts in a certain field. Sometimes I would write an email to an expert that I do not know personal” (#DMCW/LL/132), and partners: “The [theoretical] principals are very useful in a number of ways. For my partner it answers a number of questions of what is happening in her work too” (#DMCW/LL/131). Friends were more frequently interacted with to share the FutureLearn experience, rather than contacting them to find answers. Learners also simply shared what they are doing with others, without necessarily wanting to solve questions. Although less learning goal oriented, the sharing does have a learning effect, adding to the grounding of the course content: “I will explain what I have learned to my partner in future as a way of consolidating my learning” (#SOM/LL/101), or using a casual conversation to deepen the knowledge through reflection: “I had difficulties retaining the information. I completed the amount of studying I would in the time allotted and later was able to hold a discussion with friends relating to the subject” (#SOM/LL/108).

Learners were not only looking for answers, they also shared their own knowledge. The resulting social learning happened inside as well as outside of the FutureLearn course. In responding to comments learners considered where their additions would be helpful: “I picked up the course where I had left off
yesterday, and started by looking at the comments left on my posts (mostly comments on other people's posts to start with), and responded to those where I felt that I had something to say” (#DMCW/LL/149). Whether learners were looking for answers, or sharing the learning experience for informal purposes, the act of engaging in social learning was part of the personal views of the learners and their willingness to interact with others. Participant #DMCW/LL/190 described this beautifully: “all fingers are not equal, what I do not know, other people will know it”.

### 7.3.2.2 Social learning in BSE versus DMCW course

When comparing the BSE with the DMCW course, there are distinct differences in social learning involving family and partners (see table 17). This difference could be related to the target audience registered in these types of courses. Learners following the BSE course were both individual learners interested in the content, as well as families using the course content for home-schooling purposes. The DMCW course was more related to professional and personal interests.

<table>
<thead>
<tr>
<th>Looking for answers or sharing with people</th>
<th>Basic Understanding (%)</th>
<th>Science: Experiments</th>
<th>Decision Making in an Increasingly Complex World (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Looking for answers: family</td>
<td>19</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Sharing with family</td>
<td>30</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Looking for answers: partner</td>
<td>11</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Sharing with partner</td>
<td>7</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Table 17. Differences in looking for answers or sharing information (BSE & DMCW course)

The BSE school interest influenced the social learning statistics in one specific area, namely that sharing and solving questions was much more prevalent with family compared to the other two courses, and had an impact on interactions to solve questions and share with their partner.

Within the BSE course the family was an important part (19%) to find answers for those using the course for home-schooling or school related purposes, compared to the DMCW course (5%). This was due to the fact that part of the family would be involved in the course to understand the steps and goals of
the experiments. The discussions on the content of the course therefore happened outside of the course, as it did not need to be shared with the other peers in order to get answers:

“I took a few minutes to ask my children what yeast is. They said it was fungi or microbes. My younger daughter was disgusted a little bit. Then we discussed the use of yeast in food processing: for bread, cheese, wine and beer. I quickly explained what fermentation is. The yeast are feeding on sugar and they turned it into carbon dioxide, water and also alcohol. I made a parallel with the respiration of humans. Then we formulated our hypotheses” (#BSE/LL/117).

The results from experiments were then compared to other people’s experiments. The partners were also more closely involved in order to find answers to the questions raised during the BSE course (11%) compared to the DMCW course (8%). This was also related to the partner being part of the family unit which was the main learning unit for those learners using the BSE course as a school related course. Within a FutureLearn course the tasks, or the experiments, might not all happen in synchronous moments, which makes it more of a challenge to find the right answers while performing and trying to understand the experiments. In the experiment course some uncertainty regarding the correct procedure of the experiments crept in:

“Preparing the material during the week, I had also some concerns about the fact that one of my key laboratory partners (Sophie, 9 years old) was allergic to kiwi fruit. Then I convinced myself that there was no problem, since Sophie will not ingest it, maybe not even touch it. But, I was curious to know if any fruit is good. Will I get a good result from any fruit? Should the pulp of the fruit be soft, juicy or the juice less acid than lemon or apple? Is there any other criteria’s? On the forum I've found that strawberry, banana and onion could be good fruit replacement” (#BSE/LL/105).
There was an additional distance which needed to be bridged with the more practical elements of the BSE course: the teacher was not present to provide immediate feedback on the process, and course peers seemed more distant in terms of asking feedback due to the short period of time the course was running (short in order to build trusting connections). This made getting immediate feedback more difficult in this more task related BSE course. In more theoretical MOOCs, the quizzes can provide immediate feedback, and that way possible misinterpretation of content is more easily monitored by the learner, it does not as often involve an entire process of steps before knowing whether something works or not.

The willingness to share the experiences of the actual experiments with peers was shaped by the individual characteristics of the learner, for example those learners who share experiences, hoping others will benefit from it: “The interest to reach out to fellow peers on the course, as I was convinced they may have interesting insights to share. By posing my questions, I was hoping to interest some of them to overcome any shyness and uncertainty, and post their response” (#DMCW/LL/124).

### 7.3.3 Social learning actions

Social learning involves learners interacting with each other, either online or in real life. There are those learners who only reach out to others if they do not find a solution to their answers after thoroughly perusing both the course and the internet, while there are other learners who enter into social learning quite quickly, either posing questions, answering them, or both. The analysis of the social learning testimonies given by the learners reveal different actions instigating social learning or engaging with it.

#### 7.3.3.1 Choosing who to interact with

In a classroom, be it digital or face-to-face, the first few weeks provide the learners a basis to realise who they need to talk to in order to find answers. In a FutureLearn course learners need to decide who they want to connect to within a short timeframe, i.e. within the first week. FutureLearn offers the
option to ‘follow’ other learners or indicate which comments you ‘like’, both options being used by
learners to facilitate their learning, but because of the size of the learner group this selection procedure
does not always feel exactly right as the following learner testifies:

“The comments in a MOOC of this size are really difficult to keep track of. I have
done other distance learning courses with max 30-40 participants, and after several
years, I have kept contact with some of these people. The course included group
assignments, and live video sessions facilitated by students. It is a bit a shame with
such a large MOOC that it is not possible to create closer connections with people,
or even to select accurately whom I would like to "follow". I am afraid that if I filter
comments by whom I "follow", I will miss out on the few people whose comments
are neither "liked" nor "followed" but which I might find very deep and meaningful”
(#DMCW/LL/124).

What is clear, is that learners who engage in social learning are actively searching for ways to optimise
their social learning experience. In order to achieve the best possible social learning option, they build
on their familiar practices, and test out new course options.

7.3.3.2 Reflective actions

Reflecting on the content was a recurring action in the learning logs, ranging from individual reflecting
to openly social reflecting. One descriptive remark referred to a conversation with a partner: “Shared
what I had learned about pain mechanisms and pain medications with my partner - he wasn't really
interested but it helped me to remember and mentally organise the knowledge. Will try to do this in
future” (#SOM/LL/105). Additional reflection also occurs during and after discussions:

“To my surprise, two of my comments received many likes and a number of
responses, as well as two new followers. One of the comments I made was about
cognitive bias in which I suggested that cognitive bias may be an emergent property. This evoked a range of responses. I could only answer one of them immediately. But I had to think about the other comments a lot. I had made the comment 'on a hunch' without clarifying for myself what that exactly meant” (#DMCW/LL/150).

Reflective actions are an essential part of learning, and due to the social learning availability within FutureLearn courses extra reflections are triggered coming from the social interactions. These additional reflections might be triggered by previously unknown peers, or known people in the social circle of the learner (e.g. partner, family).

7.3.3.3 Cohort learning

FutureLearn courses have a clear starting point, thus offering the opportunity to move forward in a cohort of learners. Cohort learning can provide a group feeling for learners: “When I was learning things in the same week as most I found posting on the comments sections on pages and reading replies helped my understanding. I decided to do this when I read the first 30 or so comments and found useful information in them that made sense to me” (#DMCW/I/107). Cohort learning also drives learners forward due to its social learning benefits: “I wanted to complete the 2nd week of the course before next week so that I am not behind, as otherwise you are not part of the discussions” (#DMCW/LL/164). This cohort learning opportunity was also broadened to include a local face-to-face study group by one of the learners. She formed a “discussion group of myself and 3 work colleagues that is meeting to talk about the course and also Coursera Model Thinking. “(#DMCW/LL/104). For the more socially oriented learners this cohort learning is seen as a benefit, but for some learners cohort learning was not important: “For FutureLearn, finishing the class on time isn't really a concern because I have no intention of paying for a certificate. They usually leave the classes and the quizzes online for a long time, so I can do the quizzes to satisfy my own goals” (#BSE/I/118). Although not everyone learns
in the designated timeframe as set out by the FutureLearn course organiser, cohort learning adds to a group feeling, as well as to the participants learning experience.

7.3.3.4 Language

Language was mentioned as a social learning challenge by three participants. They explicitly pointed towards the added difficulty of connecting with others: “Connecting with others was a bit more difficult this time [as opposed to previously taken online courses], because it was in English and I’m not a native speaker in English” (#DMCW/I/222). If a course used field-specific jargon, there were two language levels that the learner had to manage: the language of tuition and a new set of field specific jargon that could either overlap with their own language jargon, or actually be completely new, e.g. “shook my brains and upgraded my English with new terminology. And also I wanted to understand if I’m still teachable for new knowledges” (#DMCW/LL/184). Each of the three participants also indicated that they were hesitant to write long answers or comments into the social learning options of the FutureLearn courses: “not to be perceived as stupid or unknowledgeable” (#BSE/I/104). Because FutureLearn attracts international learners, it is easy to assume not all learners have similar language proficiency, and as a result not all learners feel as confident when entering social learning as this comprises entering into conversations with others.

7.3.4 Findings on individual and social learning

The majority of learning within FutureLearn courses happened individually. In order to fully understand the course material and/or to fulfil personal learning needs, the individual learner moves in and out of the course to find answers. Although not actively engaged in any discussions, or in the commenting sections of the FutureLearn courses, the individual learners engaged in lurking, or deliberately looking for answers in social spaces without engaging in these social spaces. Whether or not an individual learner decides to enter into social learning depends on the perceived time investment needed, their
personal preference to be either social or not and its perceived benefit, as well as their willingness to contribute. Once social learning is part of the learning process, different social actions are undertaken to achieve additional learning success which was not (yet) attained by a learner’s individual learning. Learners look for answers in- and outside FutureLearn courses, they also share their experiences with peers in- and outside of the course. The act of looking for answers or sharing of information with others is also influenced by the nature of the course. FutureLearn courses that can be used for home-schooling purposes showed a different social dynamic (more family oriented) than courses that provided a professional or personal interest. Social learning inside FutureLearn courses happens on a larger scale compared to classic eLearning courses, as the social group within FutureLearn courses can be as large as thousands of learners taking a course simultaneously. Although the social group of peers in online courses increased dramatically, the research data revealed that learning is still directed by the learner, for example the learner decides who to interact with. Because of the increased amount of learners inside the courses, more reflective triggers are available.

7.4 Which actions (if any) did the learners undertake to organise their learning?

The FutureLearn participants self-directed their learning based on the following main categories related to organising learning:

- Scheduling
- Taking notes
- Personal goal setting

Each of these main categories is described in the following paragraphs, accompanied by illustrative quotes from the learner logs and interviews.
7.4.1 Scheduling

FutureLearn MOOCs have a starting date on which the course officially opens for the public, but overall the open and mainly asynchronous nature of FutureLearn courses provides learning flexibility to the learner. This option to structure learning in a more flexible way leaves room to the participant for self-directing their learning and organising it based on their own agenda and needs.

7.4.1.1 Available time

One reoccurring influence on organising the learning experience in FutureLearn courses is time. The learner mediates the time they are willing and able to put into the course throughout the duration of the course, and will re-evaluate that time investment depending on new factors (e.g. workload increase, relevance of content). When less time is available, they look for solutions that permit them to follow the course despite the new time restrictions: “work has been very busy and so the course has taken a bit of a back seat. Previously, if learning episodes have been difficult I will sometimes just move on an accept I may not understand or complete that particular challenge” (#DMCW/LL/125). As the prior example shows, this mediation of time versus benefit also builds upon prior experiences. FutureLearn courses are generally more compact in terms of content and timing compared to classic eLearning courses, which has an effect on the time investment: “I have done other OU courses e.g. Ethics and the difference is the length of time and the depth of study. I really only do these FutureLearn courses as a means of disciplining myself and at the end of the day you always learn something” (#SOM/I/500).

7.4.1.2 Time investment in social learning

Learners referred to the time investment of social learning or time they were willing to dedicate to discussions: “The discussions are sometimes so long as to be unreadable (200+ comments). One thing I have learnt is that reading everything is impossible.” (#DMCW/LL/124). Social learning depends on
the learner’s willingness to invest time. Time seems to limit or increase willingness to collaborate: “When I am away lots of work builds up, and I have a queue of tasks awaiting my attention. I watched the videos, including the two external links, and completed the quiz. However I did not read any of the comments from the other learners, nor did I contribute to the discussions” (#DMCW/LL/100). Considering whether or not to invest time also takes place in relation to additional information provided by course peers, especially regarding additional links to resources. This extra material would be either disregarded by peers or seen as a worthwhile investment: “Other participants sometimes provide links to other writings on a topic. If time permits these are very useful.” (#DMCW/LL/152). The time available results in a rational decision made by the learner on which parts of the course she or he will follow, “Time management has enabled me to prioritise my learning into depth of meaningfulness” (#BSE/I/134). Time is an intricate feature of learning, as learning often comes on top of other tasks related to daily life (e.g. raising children, work). This means that learners often renegotiate the time they are willing to spend on the course. The willingness to dedicate time stands in close relation to the usefulness of the content as perceived by the learner.

7.4.1.3 Keeping notes

Keeping notes was a frequent action to organise learning, and it occurred in all three courses. 70% of the participants indicated that they kept a personal learning record, either digitally or on paper or a mix of both. All of the interviewed participants indicated that once they had begun with keeping notes, they had not stopped using this technique. What did change was the sort of notes they were keeping, some skipped between tools, others used different types of note taking depending on the type of course (MOOC or eLearning) they were taking: “For the important information from the course I either create mind maps for quick reference, or write brief notes. This enables me to go back through the information to firm up my understanding” (#DMCW/LL/125).
Keeping learning logs also had an effect on the learning process. Three participants pointed out that they had to keep a learning log, and in two cases the learning log task stimulated the learning process: “I have to admit that having to fill out this log prompted me to do this week’s work on time” (#BSE/LL/113). The third learner said that keeping a learning log did have an effect on the learning process, which prompt her to only fill in her learning logs after she had learned, in order not to be distracted from the actual learning process.

From all the participants taking notes, 48% of the learners indicated that they used some sort of personal notebook (which in one course – Basic Science – was provided by the facilitator to all learners as an ‘activity booklet’). Learners who did take notes during learning, used the following tools or instruments described in table 18.

<table>
<thead>
<tr>
<th>Results (n = 147)</th>
<th>(in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The activity booklet provided by the course (Basic Science: Understanding Experiments)</td>
<td>10</td>
</tr>
<tr>
<td>A paper notebook</td>
<td>38</td>
</tr>
<tr>
<td>A blog</td>
<td>1</td>
</tr>
<tr>
<td>An e-portfolio</td>
<td>4</td>
</tr>
<tr>
<td>I do not keep a record of what I learn</td>
<td>30</td>
</tr>
<tr>
<td>Other</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 18. Keeping a personal notebook

The ‘other’ options for keeping a personal notebook comprised specific online tools: Evernote, OneNote, audio recordings, digital notes (Word), and Notepad. In the interviews the learners indicated that they used those types of tools because the tools had been useful to them in the past, and because they were familiar with using them. The notes were kept to highlight useful content, to reflect upon more complex material, and to be able to recall content later on. In the case of the Basic Science: Understanding Experiments course, the suggested activity booklet to accompany the experiments of the learners was used by 33% of the participants, while 50% used their own notebook. For the BSE course only one person did not keep a notebook of some kind; when interviewed they mentioned that
“I only tried to revive my memories related to this subject and to get a heads up concerning small, easily at home conductible experiments. I did not feel the need to take notes” (#BSE/I/111).

Keeping notes emerged as a very common way to self-direct and organise learning. The way learners keep notes is related to their previous familiarity with certain note keeping tools.

7.4.2 Personal goal setting

Although the reasons to register and be active in a FutureLearn course can originate in both personal and professional motivations. Some learners are motivated to enrol in specific courses based on personal learning goals. The informal character of FutureLearn courses allows learners to look for and set out personal learning goals when registering for courses, as learners can access the content and interact based on their own preferences or needs. The personal goals can be related to personal and professional interests.

Looking at the nature of the learning goals, some learners only referred to the course at hand as a form of continued professional development, e.g. “[I want to] understand what entrepreneurship is and reflect on how it might apply to my work (director in a local authority)” (#DMCW/LL/111), or a way to further their personal goals, e.g. “The main impact is that I’m now putting together my PhD proposal on Network models, thanks to the course” (#DMCW/I/220). Two participants mentioned they intentionally registered for multiple MOOCs (across different platforms) to increase their future careers. Following different MOOCs also proved to be supportive and useful for FutureLearn participants: “I have been doing another MOOC Discovering Business in Society and the exciting learning is that material can be mutually supportive e.g. a shared Ted talk Niall Fergusson” (#DMCW/LL/146). Following multiple courses seems to provide parallel knowledge which reinforces learning: “I learned about another tool for social network analysis in another MOOC on Coursera, and that it may be a better idea (although tedious and time consuming) to model the specific network I
want to analyse by hand, also from the same MOOC” (#DMCW/LL/150). Experienced learners also keep on top of their learning interests by other out-course content that adds to attaining their learning goals: “I have started using Khan Academy to brush up my maths skills” (#BSE/LL/130). In total 9% of the participants referred to studying other courses on top of the investigated FutureLearn course based on their quest to obtain personal learning goals.

7.4.2.1 Range of personal learning goals

The learning goals set by the participants vary from specific, personal goals (“prepare for my Bsc which starts in 2015”, #BSE/LL/126), to a more general interest (“start thinking like a scientist”, #BSE/LL/136), and include specific time related content actions (“I wanted to finish this week's work, videos, quiz etc. before going away”, #SOM/LL/105). Twelve learners indicated not having specific learning goals. The idea of having a clear learning goal or not was often aligned with learner testimonies on their approach to learning. There are those participants that have a clear learning plan, and those that ‘take it as it comes’ (in terms of timing, sections covered, learning interactions undertaken). However, when looking at the learning goals the learners set for themselves, 83% of the answers paralleled the course objectives. This included the participants who said they take the liberty of learning whatever strikes them as interesting, but still they follow the pre-defined learning journey as set by the course designer.

Six participants who indicated they did not have predefined learning goal, did refer in their learning log entries to learning goals which were in line with a professional need to understand a concept of the course, e.g. injecting morphine for pain relief, set up their own lesson plan based on experiments from the course, or to get a deeper understanding of an economic principle. Informal learning goals can be as broad or as narrow as the learner wants them to be, e.g. “To further my understanding around society and those who live within it” (#DMCW/LL/101) is a broad learning goal. If a course task allows the learner to use specific information or tools that apply to their own context, the goal of the learner
becomes more specific and relates more closely to their own reality: “[In this learning episode] I wanted to complete my case study according to the outlines, while applying it to my own setting” (#DMCW/LL/102).

7.4.2.2 Selecting content

The way learners select different content is part of their personal learning goals (based on learning needs they self-define), but also based on prior online learning experiences. Although experienced learners have acquired familiarity with certain aspects of online learning, the specific FutureLearn course format does lead learners to review prior learning procedures in order to make their learning more efficient: “at first I made a lot of notes during the video instructions, I noticed most of the articles after the video give me enough insight to drop making notes during the video instruction” (#DMCW/LL/127). The fact that learners select specific weeks or sections of a FutureLearn course has an effect on the way they use all the media in those sections. One learner selected quiz questions: “I completed only those quizzes that involved the material I had already covered.” (#BSE/LL/106). Another learner solved a quiz question by first discussing it with peers: “One of the quiz questions was difficult and I felt I could not find the response in the course. So I asked the question in the discussion forum, and the professor answered, as did also a bunch of students” (#DMCW/LL/124). FutureLearn facilitators sometimes include assignments which the learner can embed into their own context or learning goals: “it is definitely a great learning strategy to construct an essay in response to a question based on my professional reality. It is very functional.” (#DMCW/I/148).

Whether a learner decides to put an extra effort into understanding specific content, depends on the perceived benefit of the content in view of their own learning goal: “If I really don't understand something, I decide whether this is something I really need to know, in which case I will research further, read material again, post on the forum or ask an appropriate person” (#DMCW/LL/162).
content is selected based on a learning goal, the learner structures the learning depending on the available time: “Breaking down learning into smaller parts over a period of time enables me to complete the workload and increase my effectiveness at managing multiple learning goals” (#BSE/I/115). The learning goals of the learner self-direct them to select and structure specific content from the course to obtain their own goals, which are not necessarily paralleling the goals of the course facilitator/s.

7.4.2.3 Curated content benefit

FutureLearn courses offer curated quality content, selected by the course organisers. The content is selected and organised by people who are experts in a particular field and supported by their institutions. Since the emergence of the World Wide Web learners searched for answers using the internet and all sorts of resources available to answer his or her informal, open, online learning needs. Depending on the success of these quests the learner obtained a sense of accomplishment, having reached their previously set learning goal. However, open searches for information are time intensive as the right information needs to be found and selected, with the emergence of MOOCs finding relevant content has become easier. This reality was reflected in the learning logs: “I wouldn't really know where to start on the internet to investigate the metronomes as an illustration of emergence. It’s quicker and simpler to ask others on the course” (#DMCW/LL/121). The fact that the course content is curated, does not prevent learners from searching for additional information outside of the course. 31% of learners searched for additional information on the internet, and 21% of the learners searched for additional information in non-digital resources such as books, libraries, or notes from prior courses. Because the information in FutureLearn MOOCs is curated, the content is consistent with the thinking of the course content experts. This consistency gives a feeling of trust, which can be brought out of balance by new, external course content made by others: "I followed a couple of the external links
suggested in the discussions, but generally stopped if I felt that it was taking too much time or I was straying too far from the main syllabus” (#DMCW/LL/120). Learners do realize the benefit of FutureLearn courses as curated content to benefit their self-directed learning process. One participant described it concisely during her interview:

“A lot of information is available online, but it can be difficult to find, and even more difficult to evaluate when found. An online course provides the material in an easy-to-follow way, with support and encouragement. Coming from a university whose reputation might be at stake, we can assume the information is good. The course also helps us to pace our study with designated work for each week. Without this there is a tendency to rush in, spend too long all at once and then give up” (#DMCW/I/107).

The positive impact on the decision to take a MOOC based on the reputation of the institute providing the MOOC was also noted by White and Davis (2014). White and Davis (2014) based their study on 258 questionnaires from learners who participated in University of Southampton’s first MOOC “Web Science: how the web is changing the world”. The curated content that is made available through FutureLearn courses provides the learners with a time saving opportunity that is considered high quality, and where they can find content that fits their learning goals more easily than before the rise of the MOOCs.

7.4.2.4 Building (on) personal learning actions

Organising learning as well as selecting content and tasks provided, seems to be part of a bigger self-directed learning action. Experienced adult learners have constructed these self-directed actions while building on prior learning experiences. The learning actions often relate to familiar learning practices undertaken by the learner and which were perceived as useful: “This is the sixth FutureLearn course
that I have undertaken. In two I was learning new skills and I had to work very hard, practice repeatedly and ask for help for educators and other learners. This learning is still with me” (#DMCW/LL/128). 11% of the participants also referred to specific learning actions they rely on, illustrating that these actions have become part of their conscious learning process: “I have not changed my learning strategy. It is field-tested and proven :) In an nutshell, it is very simple: working through whatever comes and however it comes bearing high levels of concentration and making a lot of short brakes for the concentration to regenerate” (#DMCW/LL/134).

Personal learning actions can refer to prior knowledge of the learner: “The formula reminded me of Archimedes. I like to make connections to prior learning and to see how I can further my learning” (#BSE/LL/132). They can refer to pedagogically related learning actions such as reflection: “I think that reflection is the only way to learn... I would think about what I had done, how it felt, what it meant, how it related to other things that I know or can do. It is only during this exploration that I feel I am truly learning” (#DMCW/I/107). Experienced online learners develop learning actions that move from individual to social learning, and from in-course to out-course actions to find answers for understanding the content in the course, as described in the following excerpt:

“I studied the first topic for this week, Emergence. There were a number of videos which I watched, some provided by our educators, others were external links. Some additional links were provided by other learners but I did not follow these. After each video there was a discussion topic. I sorted the posts on 'most liked', and read about the first ten to fifteen each time. I replied to some posts and also posted some comments but these were short and rather superficial. I also clicked the like button on a number of posts that I thought were particularly relevant. There was also a quiz which confirmed that I understood the material” (#DMCW/LL/128).
Although these learning actions are familiar to the learner, participants did mention smaller adaptations to the learning process: “In general I no longer print all the course material as I did it when starting with courses on FL. However if it is necessary to have a printout available (e.g. programming courses) I still print them. Due to the fact that the course and the material will be still available after the course end I only store the links to additional online material or interesting links which have been provided by fellow learners during discussions” (#BSE/LL/121). Personal learning actions are built upon prior learning experiences, but adjusted depending on the learning goals of the learner, as well as the content provided in the course platform.

The quest to achieve personal learning goals can vary from simple one-step learning goals where what is learned is immediately relevant to a specific learning goal, to more elaborate ways to reach a personal learning goal, e.g.: "[From the discussions] I already realised last week that in my subject (history), understanding the networks is critical. This learning episode reinforced that. I intend to use social network analysis software such as Gelphi in the future, but I must first learn how to use it." (#DMCW/LL/129). In this example the learner starts from a FutureLearn discussion about a topic (History), identifies a need to reflect on the structure of social networks, which leads to a personal goal to learn a new software tool which will result in additional knowledge related to their own context. The latter remark also shows that once social learning has happened, integrating the new knowledge in the personal context happens individually, adding to the personal aspect of the learning experience.

Overall, personal goals direct the learner towards specific learning actions. Depending on the return on expectations of following or taking action in a FutureLearn course, participants decided to invest more or less time in specific parts of the course. This means that learners react upon their expectations of whether the FutureLearn course will provide them with answers to their personal learning goals, it also
means that personal learning goals are important enablers or inhibitors in the self-directed learning process.

### 7.4.3 Findings on organising learning

Learning within FutureLearn courses is organised by scheduling time, note taking during the learning process, and selecting what is learned depending on personal learning goals. The learner plans their learning in accordance to the available time, the relevance of the content, the social learning benefit and related time investment. Note taking is done primarily to ground what is learned, and to be able to retrieve information later on. Notes are kept by learners mostly using their preferred tools, even if alternative note taking options are provided by the course organisers. Learners shape their learning based on learning actions that are guided by their personal learning goals. Learning goals have an important impact on the self-directed learning as it makes learners select specific content, mediate whether they want to invest more or less time given the perceived results, and attaining bigger goals, such as careers. The personal learning goals of the learner also affect the action he or she takes with regard to engaging in social learning or which tools or technologies they want to use and learn. This means that personal goal setting is not limited to organising learning, but it affects other learning components as well. This makes personal learning goals important inhibitors or enablers of self-directed learning in FutureLearn courses.

### 7.5 Unexpected emerging data

One reoccurring category which emerged during the data analysis, but was not directly implemented in the sub-questions was context. Context is interpreted here as defined from the perspective of the learner and related to three personal environments: the learner’s external environment (workplace, learning space, social relations, etc.), internal environment (prior knowledge, philosophical views,
learning goals, etc.) and digital environment (prior technological experiences, online tools, etc.) which is based on the definition provided by Downes, in his blogpost on learning context in 2004. This offers the opportunity to relate to the content and learning activities which can be perceived as either distant or in close relation to the participants own context, as well as to the personal relations that the participant engages with.

7.5.1 Contextualizing content

Content which is applicable to the learner’s own profession or interest, works as an extra motivation. This could be content with a direct link to the learner’s profession: “the history of medicines was interesting and so was the pharmacology as I felt that I could relate it to my work as a nurse and trainer” (#SOM/I/500), or related to a parallel process: “as a teacher and developer I apply the concept of emergence in curriculum development and in my lessons social sciences at the University of Applied Sciences” (DMCW/I/222). This interest to apply the material in the learner’s own context also pushed learners to look at the material with a personalised view. In the BSE course the experiments were sometimes adapted to fit either available ingredients or a personal interest by the learner:

“With my children I've chosen maple sirup to put on the 4th ice tray container because it's like the honey used by the prof and it's a local product. It could be interesting to people abroad to get informed about the behaviour of frozen maple sirup. Our hypothesis was that the frozen maple sirup will sink in the liquid maple sirup. We will check the result tomorrow morning.” (#BSE/LL/125).

The contextual relevancy is also a basis to select specific parts of the course that are skipped or studied: “. I choose the topics that seemed relevant in relation to my personal interests and/or as teacher; I skipped the ‘ICT-exercises' playing with the computer models” (#DMCW/I/222). Context has an effect on the learning experience, it enables learning once the learner feels that the content is in some way
related to their context. This perception of proximity of the content and its impact on learning was also found in relation to selecting peers to interact with.

7.5.1.1 Proximity of context as motivator

References to personal or professional context emerged frequently, and in relation to being motivated or not. Context emerged while learners referred to their working or personal environment and the impact of circumstances on their learning. References and insights into the learners’ context were found in their self-reported logs. For example: “I just find the course and info very helpful as I am studying similar topics” (#DMCW/LL/114). The content related data revealed that a learner’s context, whether personal and/or professional, influences their motivation. Motivation changes with the learner’s response to a feeling of contextual proximity to the examples and/or content of the FutureLearn course. When the content seemed to fit a personal/professional purpose, their motivation increased, e.g. “[the content was] closely related to my own skills, mathematics and computer programming, for example. This inspired me to write my own agent based models or cellular automata.” (#DMCW/LL/140). On the other hand, if part of the content did not seem to be of interest to their own context, learners indicated that they skipped that part, “Did not find the technical section on networks relevant to my work, so I skipped it” (#DMCW/I/196). There can also be a very pragmatic motivation for following a FutureLearn course, which is illustrated by the learning log entry from a teacher: “preparing a lesson plan about biological catalysts” (#BSE/LL/131). But the proximity of the context can also be induced by personal experience “I discussed what I had learned with my son as he has experience of me being on medication for depression” (#SOM/LL/101). Whatever the reason behind the connection, there is a relation between the context of the learner and the resulting motivation to learn.
7.5.1.2 Peers and context

Learners connect with others based on whether the content or information provided by these peers is seen as relevant to their own context: “I am connecting to other people with similar interests to mine” (#DMCW/LL/168). This selection of peers undertaken by the learner also translates in the use of the ‘like’ and ‘follow’ options within FutureLearn: “I think I am making good process, and am actively trying to engage with other people on the course through liking posts and following people who post things similar to my interests so that I can get a more fuller experience through interacting and learning from others” (#DMCW/LL/164). This willingness to look for similar contexts, be it in terms of content or peer expertise contributes to the willingness of the learner to engage in social learning.

7.5.2 Findings on context relevance

The learner’s perception of any contextual similarities between their own context and the context proposed in the course, or shared by course peers impacts the learning experience. This perceived similarity of context can be related to the learner’s external environment (e.g. workplace, peers that have similar interests), the internal environment (e.g. personal learning goals) and the digital environment (e.g. online tools). Learners are more motivated to study course content or engage with peers if they feel related in some way to that content or those people. The familiarity with the course context has a stimulating effect on self-directed learning, as it enables the learner to bring the information within a contextual reach, linking it to the learners’ prior knowledge or experiences.

7.6 Summary of the findings

The research findings distilled from the previous sections are summarised in this section.
The findings reveal five key learning components influencing the self-directed, informal learning in FutureLearn courses: individual learner characteristics, technical and media elements, individual and social learning, organising learning, and context (including people and content).

### 7.6.1 Individual learner characteristics

The findings showed that the most dominant learner characteristics influencing the informal learning in FutureLearn courses are motivation and personal traits. Due to the informal nature of the courses the participation of the learner is more susceptible to influences coming from her or his motivation, as well as their character. The learner’s personality in terms of perseverance, self-confidence and overall feeling while actively engaging in the course results in the use of emotional language and intentional content and learning choices. This provides increased learner agency. Both the professional and personal interests add to the motivation of the learner. These interests determine which courses the learner chooses to follow and how they will act when facing complex content. The emotional responses inspired or deterred learners from specific actions, and due to the course informality, the learners could react to their emotions and change their learning according to these emotions. This puts the characteristics of the learner forward as one of the key elements for self-directed, informal learning in FutureLearn courses. Special focus goes to (intrinsic) motivation. Motivation came out as an active driver of learning, influencing the determination or avoidance for using any of the other key learning components, while being closely related to individual learner characteristics.

### 7.6.2 Technical and media elements

The findings also revealed that technical and media elements impact the learning process. As FutureLearn users connect to their courses through an internet-enabled device, and navigate through the content using the course tools as well as topic specific tools provided in the course, this has an impact on the learning process. The study participants used a laptop or desktop most of the time based
on their own comfort, the processor strength, and their familiarity with the device. Learners switch to mobile devices allowing them to study from a different location or at moments suiting their own agenda. These experienced online learners are aware of media affordances related to FutureLearn course elements and they use them according to previous successful actions. Learners compare new course features within the FutureLearn platform with those from prior online courses or tools. The new features of a platform can disrupt the learner’s familiar practice, or it can open up new found opportunities. New tools are screened by the learner who decides whether or not to test out new tools based upon the perceived usefulness of those tools (which can be either professional or personal). It is the learner who self-directs their learning and who decides which parts of the technology, media or tools might be beneficial to their learning at present, as well as for the future (e.g. considering the benefits of learning new tools).

7.6.3 Individual or social learning

Within the investigated FutureLearn courses there were options to engage in social learning. When investigating the variety from individual to social learning, the study showed that the majority of learning happened individually. The individual learner moves in and out of the course to find answers to their learning needs. Although not actively engaged in any discussions, or in the commenting sections of the FutureLearn courses, the individual learners engaged in lurking, or deliberately looking for answers in social spaces without engaging in these social spaces. The willingness of an individual learner to enter into social learning depends on the perceived time investment needed for this action, their personal preference to be either social or not and its perceived benefit, as well as their willingness to contribute. Once social learning is part of the learning process, different social actions are undertaken to achieve additional learning success. Learners also look for answers outside FutureLearn courses and they share their experiences with peers in- and outside of the course. The act of looking for answers or
sharing of information with others is also influenced by the nature of the course. FutureLearn courses that can be used for home-schooling purposes showed a different social dynamic (more family oriented) than courses that provided a professional or personal interest. Although the social group of peers in FutureLearn courses is big in numbers, the research data revealed that the learner still decides who to interact with, but the increased amount of learners inside the courses do provide more reflective triggers to the individual learners.

7.6.4 Organising learning

With all the content, peer learners, timing and personal agenda’s organising learning also emerged as a key component impacting the self-directed learning in FutureLearn courses. Most effort goes to scheduling time, note taking during the learning process, and selecting what is learned depending on personal learning goals. The learner plans their learning in accordance to the available time, the relevance of the content, the social learning benefit and related time investment. Note taking helps grounding what is learned, and retrieving information later on. Notes are kept using their preferred tools. Learning goals have an important impact on the self-directed learning as it makes learners select specific content, mediate whether they want to invest more or less time given the perceived results, and attaining bigger goals, such as careers. From this learning component, a second key learning driver emerged: personal learning goals. The personal learning goals influence the actions learners take with regard to engaging in social learning or which tools or technologies they want to use and learn. This means that personal goal setting is not limited to organising learning, but influences the other learning components as well.

7.6.5 Context

A last key learning component coming from the findings is context. The learner’s perception of any similarities between their own context and the context proposed in the course, or shared by course
peers impacts the learning experience. This perceived similarity of context can be related to the learner’s external environment (e.g. workplace, peers that have similar interests), the internal environment (e.g. personal learning goals) and the digital environment (e.g. online tools). The familiarity with the course context has a stimulating effect on self-directed learning, as it enables the learner to bring the information within a contextual reach, linking it to the learners’ prior knowledge or experiences.

The summary of the findings is visually represented in figure 16, below.

![Figure 16. Visual of the five learning components and two key inhibitors/enablers of learning](image)

Having summarised the findings coming out of this study, it is now time to discuss these findings and look at them from different theories that provided the background for this study.
8. Discussion

The discussion chapter will start with a synopsis of the main findings per research question. This synopsis is followed by more detailed discussions per research question, comparing existing research and insights coming from this study to prior research. While discussing existing research in relation to the findings from this study, new insights will be situated and contextualized given the FutureLearn course environment as well as interpretations. Possible explanations for the findings and resulting implications will be given, adding to the body of knowledge of online learning.

8.1 Recapturing the research questions

Before discussing into detail the findings related to each research question, an overview is given of the research questions. Each of these questions will be discussed in view of learning theories and research studies mentioned in the literature review. This discussion chapter is organised based on the findings and discussions per research question. At the end a brief synopsis of the most poignant conclusions of the discussion will be given.

If we look at what characterises the informal self-directed learning of experienced, adult online learners engaging in individual and/or social learning using any device to follow a FutureLearn MOOC, the following four sub-questions were examined:

1. Which individual characteristics influence the learning experience?
2. What are the technical and media elements influencing the learning experience?
3. How does individual and social learning affect the participants’ learning?
4. Which actions (if any) did the learners undertake to organise their learning?

Finding answers to these research questions is the main interest of the following chapters.

After taking into account the findings for each of the four sub-questions as described in this findings chapter, and having added context as an additional learning component influencing the FutureLearn
experience, it is now time to construct a more complete picture of the learning experience within
FutureLearn courses as it emerged from this study, specifically adding points of discussion.

The informal self-directed learning journey of experienced, adult online learners who are engaged in
FutureLearn courses spans in-course and out-course actions and connections. When looking at the
findings the learning experience consists of five learning components: individual characteristics,
technology, individual & social learning, context, and organising learning. Each of those learning
components harbour key categories that have a major impact on the learning processes within that
particular component. The learning components are not separate entities, but are interconnected.
They overlap in areas that have a mutual impact on each component. Self-confidence for example is an
individual characteristic, but it influences whether a learner will engage in social learning or not.

The initial findings pointed towards five components influencing the learning process: individual
characteristics, technology, individual & social learning, context, and organising learning. However,
once each component was investigated to see which were the most influential inhibitors and enablers
of learning, two main inhibitors or enablers of learning emerged: intrinsic motivation, embedded in the
individual characteristics of the learner, and personal learning goals, which influenced how the learner
organised their learning. Although motivation and learning goals were categorised to one specific
learning component, they influenced each of the other learning components as well. For instance,
intrinsic motivation was not only mentioned when it comes to individual characteristics. Intrinsic
motivation moved learners towards or away from social learning, intrinsic motivation also pushed
learners to get more deeply involved in specific technology and tools and it influenced the way the
learner modified the course itself to fit their own context.

The same crossover into each of the five learning components appeared when looking at personal
learning goals. Setting personal learning goals was the most important element mentioned by learners
in relation to organising their learning. But references to personal learning goal setting were present in the other learning components as well. When looking at individual or social learning, some of the learners who set a personal learning goal took action to reach that goal by entering into social learning. The personal learning goals fuelled the learners to take a closer look at technology in order to reach a personal learning goal. Learners also used their personal learning goals to select who they engaged with, and learners referred to personal learning goals in relation to their individual characteristics by for instance pointing to their eagerness to understand all the details of a specific topic.

An interesting relationship can be seen when comparing data from motivation and learning goals. Although intrinsic motivation and personal learning goals each belong to a specific learning component, they not only impact the other components, but they seem to mutually influence each other as well. Intrinsic motivation installs increased energy in the learner to go the extra mile to reach their personal learning goals, while personal learning goals provide potential stepping stones to reach a pre-set goal in a FutureLearn MOOC. Whether a learner attains this goal depends on the intrinsic motivation the learner can find to bridge the gap between what is known and what needs to be understood to attain that personal learning goal. If motivation is not strong enough a personal goal is not met, and if a learning goal is not set, however strong the intrinsic motivation is, it is left without a clear direction to move learning forward.

Then what is the detailed relationship between personal learning goals and intrinsic motivation if we investigate the learning experiences of adult learners who self-directed their learning in FutureLearn MOOCs? It seems that motivation provides the necessary drive and energy to attain personal learning goals, and that setting personal learning goals provides the learner with feasible steps to attain these goals, provided the intrinsic motivation is triggered or available.
This led me to deduce that the self-directed informal learning in FutureLearn MOOCs results in a heightened ownership of learning, as the learner mediates content, tasks and interactions in order to self-direct their learning in FutureLearn courses. Owning learning implies the ability to direct learning towards personal or professional interests based upon intrinsic motivation. This means the learner has to be in control, building on their own prior knowledge, influenced by their own contexts and needs, and oriented towards attaining their personal learning goals. Figure 7 shows a visual synopsis of the findings.

8.2 Which individual characteristics influence the learning experience?

The answers to this research question were sought by looking at key categories relating to individual characteristics that influenced the learning experience and which emerged from learning logs and interviews. This study concluded that motivation and personal traits such as perseverance and self-confidence play a key role in the self-directed learning of FutureLearn participants.

8.2.1 Personal informal learning

This study found that motivation and personal traits play a key role in the self-directed learning of FutureLearn participants, especially due to the informal nature of the learning, which increases the learner agency as they have some freedom in choosing what to learn, and align their approach with their own personal preferences (e.g. engage in social learning or not, following the course structure). This alignment of the course to the learners own preference and interest and emotional wellbeing, is closely related to what Csikszentmihaly (1991) provided as a guideline for optimal learning in his Flow model. However, in FutureLearn courses, the boundaries of enabling a Flow experience are set by the
course content and possible interactions. Whereas the Flow can choose to adapt any learning (inside or outside courses) to enable the adaptation of optimal learning. Nevertheless, the learner optimises their learning according to their own emotional response to parts of the course.

Offering the ability of adapting what is learned to the interest of the learner also coincides with what Conole (2013) proposed as element leading to quality enhancement of MOOCs, and which is part of the 7Cs Learning Design framework. However, Conole (2013) looks at this option as one of the design features which teachers have to take into consideration when designing a MOOC. This means that Conole’s angle is more teacher oriented, while the findings here are decisions which the learner takes based on their own preferences and personalities. But once the learner feels there is room for learning which aligns with their motivation, and works with their own individual characters, they also perceive the course as providing learning quality.

8.2.2 Motivation and informal learning

Poellhuber, Roy, Bouchoucha and Anderson (2014) examined the motivation of MOOC students relying on previous research in education. They found that students who reported strong intrinsic goals for mastering the material, persisted more in the course. This is also one of the conclusions coming out of this study. In this study, motivation within a self-directed learning trajectory is looked upon as part of informal learning. This relation between motivation and informal learning was also noted by Merriam & Kee (2014) while looking at older adults engaging in self-directed learning and even two decades ago with Garrison (1997) investigating self-directed learning in adult, online education. However, this study found that FutureLearn MOOCs enable the learner to react much more to their intrinsic motivation and create a self-directed learning experience that is guided in part by their emotions. The informal nature of the FutureLearn courses makes the participation of the learner more susceptible to influences coming from her or his motivation, as well as their character, as they are not pushed in a specific
direction by extrinsic factors (e.g. formal certification needs, linear teacher-centred format). This provides the learner with an increased amount of learner agency and ability to react upon immediate feelings or motivations.

Motivational factors include professional or personal interests, and these interests co-determine which courses the learner chooses to follow and how they will act when facing complex content. A similar relation toward motivation was described by Milligan and Littlejohn (2014): “motivation determines the amount of effort a learner will devote to learning, and his or her persistence when other priorities (e.g., work or family) compete for attention” (p. 6). Motivation also seems to be stimulated by complexity once that complexity fits the learner’s need to learn specific content. Complexity had a stimulating effect on those participants that were intrinsically motivated to follow the whole or parts of the course. The finding on how complexity stimulated some participants coincides with what Vihavainen et al. (2012) recently established as a positive statistical significant correlation between the difficulty of a MOOC and its educational value.

8.2.3 Motivation and emotions

Findings showed that motivation was often expressed through emotions. These emotional responses inspired or deterred learners from specific self-directed actions. The freedom to respond on the spot to the emotions triggered by parts of the course is also enabled by the informality of the FutureLearn courses. The learners could and did react to their emotions and change their learning according to these emotions, as they were not bound by external needs to complete parts of the course. They were the sole actors in directing their own learning. Emotions and learning have been investigated in MOOC settings.

Wintrup et al. (2015) concluded that “good levels of involvement are also shown to increase learners’ enjoyment” (p. 32). But looking at the findings of this study, and thinking about the decisive answers
of some learners on whether or not they want to engage in social learning, it might be that learning will never transform into a social experience for some learners, even if they have the online learning experience, even if they feel self-confident. Future research is needed to unravel the barriers and realities of individual and social learning further.

Emotions seem to support motivation, but how or if motivation for learning can be altered in any way by infusing people with inspiring emotions needs to be seen. Emotional learning is a growing research field seemingly on the brink of a great breakthrough (Sharples et al., 2015). “Emotions, attention and engagement are key drivers for learning” (p. 36). Emotional facial tracking is already being used in marketing to bend consumer behaviour, and the speed of clicking, scrolling, shared emotional language is also being investigated as potential indicators for learning outcomes (Sharples et al., 2015).

8.2.4 Motivation

Intrinsic motivation plays an important role in successfully engaging in a FutureLearn course. The success is in this case not necessarily related to having successfully gone through all of the course materials, but having successfully finished a personal learning episode. Such an episode can comprise multiple or single pieces of content provided by the course. As the participants engage in informal learning, their own perception of dropping out is not important, what is important is their perception of a personal learning success. Intrinsic motivation makes the learner decide which course they want to follow, based upon their own interest. The usefulness of the course content in terms of their professional and/or personal interest also increases the learners’ motivation, especially in terms of completing a learning episode. Once the course is rolled out, the content and information provided in the course can also alter motivation depending on the perceived proximity of the course to the professional or personal context of the learner. This parallels previous research stating that individual
differences in motivation play a significant role in influencing engagement with content creation and motivations (Terras, Ramsay & Boyle, 2015).

An interesting point emerges when considering Morris, Hotchkiss and Swinnington’s (2015) study, which found that there is “strong evidence of an association between employment status and degree of completion of the course, with those not working being more likely to complete more of their course” (p. 204). How does professional motivation relate to completing a course when learners are employed? Are employed professionals selecting the topics more carefully, being self-confident that what they learn is exactly what they need to learn? Meaning, that they do not feel the need to go through all of the content, but they simply select what they feel is useful to their current profession?

While examining the potential for learning Kim et al. (2014) described learners looking for a new career and who considered MOOCs as a potential life changer. Kim et al. (2014) concluded that informal learning tools and resources need to be studied to get a better understanding of their actual learning potential. Kim et al.’s conclusion adds to the research gap on professional learners and their specific motivations. It is clear that “measuring and accounting for individual differences and supporting learners accordingly could go a long way toward improving learning experiences and the accessibility of open online learning environments” (Kizilcec & Schneider, 2015, 6:21), be it for professionals or the personally interested learner. But some learners are simply engaged in courses because they have time to spend and they like to spend it in MOOCs. FutureLearn MOOCs are also taken purely for leisure purposes, in those cases motivation comes from curiosity, a personal interest not related to a current profession. Motivation can drive learning in a variety of directions, ranging from leisure learning, over personal development, to a pragmatic yet interested professional interest. This makes intrinsic motivation an important inhibitor or enabler of self-directed learning in FutureLearn courses no matter what the personal purpose for learning is. The importance of intrinsic motivation in FutureLearn
courses adds to a conclusion by Dabbagh (2007) on online learning: “intrinsically motivated learners possessing a high internal locus of control, coupled with a positive attitude toward the instructor and a high expectation for grades and degree completion were more likely to succeed in a distance education course” (p. 218). In FutureLearn courses the facilitator is not that present, and the courses studied here did not offer grades or credit, but motivation and emotion do play a role in self-directed learning in MOOCs.

8.2.5 Personal traits and emotions

Personal traits and emotions play a role in the FutureLearn MOOC learning experience. Specific personal traits such as self-confidence and perseverance let the learners self-direct their learning towards specific learning actions (e.g. engaging with content or peers). In formal education emotions and personal traits will be present, but in most cases it is not within the power of the learner to let these emotions guide or stop the learning. In the FutureLearn experience the learner has the power to either stop their learning, or choose the content that fits their personal need. There is more room for the learner to act upon his or her emotions, or to satisfy specific personal traits (e.g. learn everything in detail, only focus on stimulating content). As a result, the learner has more agency to self-direct their learning within the FutureLearn MOOC environment. In research the lack of perseverance by learners has been linked to the learner completing a course or dropping-out (Sahami, Guzdial, Martin & Parlante, 2013; Veletsianos & Vrasidas, 2015). In this study perseverance is linked to the drive of the learner to understand every detail before moving on.

This study found that self-confidence has an effect on learning, and especially on the willingness to engage actively in social learning. Milligan and Littlejohn (2014) also found participants of their study describing the lack of self-confidence to be a barrier to interact with MOOC peers. The fact that learners feel confident does not necessarily result in successful learning. Hood, Milligan and Littlejohn (2015)
saw that five participants who had high overall self-regulated learning scores scored in the bottom half of learners for self-efficacy. These participants were not as confident in their existing content knowledge, however, they considered themselves to be effective learners and had confidence in their ability to engage with the course material.

Although there has been research on self-regulated learning in informal, on-the-job, professional learning (van Eekelen, Boshuizen & Vermunt, 2005; Littlejohn & Milligan, 2015; Milligan & Littlejohn, 2014; Littlejohn & Hood, 2016), the professionally related learning which happened in this study was outside of the learner’s job environment. The context for learning was happening in an informal, not professionally intended environment. The difference in results coming from on-the-job learning or implementing professional knowledge coming from outside-of-the-job courses might shed light on the effects of both types of professional learning.

Interdisciplinary MOOC research has great potential as mentioned by Veletsianos and Shepherdson (2015). Findings on motivation, emotion, and individual character have immediate links with psychology, and it would be enriching to set up interdisciplinary research collaborations, for example in a collaborative research project, where each researcher takes up one part of a selected MOOC topic (e.g. in relation to social learning: the neurobiological effect, the psychological effect, the pedagogical effect), each researcher focusing on the topic from their own discipline. Although MOOC research was first primarily affiliated with Education and Computer Science disciplines (Veletsianos & Shepherdson, 2015), it has grown to fruition and the time has come to improve our understanding and practice of digital and online learning with regard to MOOCs. An overarching research group, including researchers from different disciplines might produce a more holistic view of what learning is, and where it can be taken to ensure optimal outcomes.
8.3 What are the technical and media elements influencing the learning experience?

Technology plays a necessary role in learning within FutureLearn courses as the course content is only available through technology. Learners have to connect to the course through an internet-enabled device, and then learn to navigate through the content using the course tools as well as topic specific tools provided in the course. The experienced, adult online learners in this study navigate through courses using their preferred device/s, relates to mobile learning theories.

8.3.1 Mobility and preference

When looking at the technical and media elements influencing the learning experience, this study showed that learners inevitably have to connect (at least in a first instance) to the course through an internet-enabled device, and then learn to navigate through the content using the course tools as well as topic specific tools provided in the course. Depending on the context, learners switched to mobile devices allowing them to study from a different location or at moments suiting their own agenda. It is the learner who self-directs their learning and who decides which parts of the technology might be beneficial to their learning at present, as well as for the future (e.g. considering the benefits of learning new tools). This way of working is similar to what Koole (2009) found and proposed in FRAME. The interesting overlap with this study is that within the FRAME framework space is given to the learners to mediate their learning through the use of technology (in case of FRAME these are mobile devices). In her FRAME model, Koole also allocates learning mediation on the level between learner aspect and the social aspect, describing that as Interaction Learning. However, the device usability aspect which is a crucial part of the FRAME model, did not feature dominantly in this study, as learners were already experienced in online learning. This study also expands to learning with all internet enabled devices. Where Koole’s framework was specifically looking at mobile learning in a moment that mobile learning
was still developing, the findings from this study come from learning from FutureLearn courses, which means that the learning dynamics have now embedded mobile learning. Additionally, the learning is no longer restricted to mobile devices, but embrace either the use of multiple devices or one specific internet-connected device. Admittedly, this learners’ choice is still confined to the boundaries set by the course designers as well as the technical limitations or affordances of the FutureLearn platform.

The learners indicated that they used a laptop or desktop most of the time based on their own comfort, the processor strength, and their familiarity with the device. Depending on the location learners used different devices in order to follow the FutureLearn course. This indicates that seamless learning is happening across devices (Wong & Looi, 2011). This mobile flexibility is made possible by the design of the content, which is served to the learner in small sized bits of information. The importance of bite-sized content for ubiquitous learning was predicted by Sharples, Delgado, Kloos, Dimitrianis, Gralatti and Specht (2015), who said that “the content should be accessible in short bursts, so the learner can easily re-engage with the course and can get an effective learning experience over a short period of time while on the move” (p. 2). However, when looking at the potential of different devices such as smartphones, that are often equipped with multiple sensors, it becomes clear that the FutureLearn courses investigated in this study did not make active use of the potential of the existing technologies.

Their mobile devices are merely used to access content, not to interpret or produce new content. If learners were to be able to introduce contextual data from their own region or life, it would add to the conversations and social dimension of FutureLearn, as the personal will become more present in the crowd, and the content produced by mobile technology will become the focus point of the conversation across virtual and physical contexts, transforming the mobile device into a social instrument (Kukulska-Hulme et al., 2009).
8.3.2 Course elements

Experienced online learners are aware of media affordances of the known FutureLearn course elements and how to use these media for learning purposes. In this study learners used the ‘like’, ‘follow’ and ‘mark as done’ buttons to structure their learning. As such the technology was not only used to access material, but also to organise it based on the learners’ preference (e.g. selecting peers to follow, indicating progress). Participants of this study also used media they felt familiar with, e.g. Evernote, YouTube. The learners used these media in accordance with their needs, and they could use them because these media were cloud-based (Ozdamli, 2013). The learners also linked to specific content from media outside of the course and made it available to course peers. This is similar to what Kizilcec and Schneider found, which is that “selectively engaging with available resources on social media platforms, such as YouTube or Tumblr, is very common and socially acceptable” (Kizilcec & Schneider, 2015).

The study found that learners compare new course features within the FutureLearn platform with those from prior online courses or tools. The new features of a platform can disrupt the learner’s familiar practice, or it can open up new found opportunities. Once they have used a new tool they reflect upon its usefulness before considering implementing it in their own settings. When faced with new tools, the experienced learners will decide whether or not they will test out new tools based upon the perceived usefulness of those tools (which can be either professional or personal). Whether it concerns choosing the learning device, using new platform elements, or testing out new tools, it is the learner who self-directs their learning and who decides which parts of the technology might be beneficial to their learning at present, as well as for the future (e.g. considering the benefits of learning new tools).

The FutureLearn platform is already a responsive system, it provides its course content in a format fitting different screen sizes, and different devices. Taking into account the impact of context even in
the rather limited variance in the instructional design within FutureLearn (e.g. curated content from which the learner chooses topics relating to their information need, no automated customisation of the content depending on the region of the learner) a lot of options are left open to truly integrate contextualized learning. This pedagogical format is already investigated successfully in mobile learning, and seems to be of interest for MOOCs, in order to provide an additional, meaningful contextual layer. In their 2015 paper on mobile and accessible learning in MOOCs, where Sharples, Delgado Kloos, Garlatti and Specht investigate new forms of learning for MOOCs based on existing, successful mobile pedagogies, the authors clearly point towards instructional design options that will bring along new methods of context-sensitive, geo-located and crowd-learning. Looking at the findings coming from this PhD study, adding additional context-sensitive layers needs to be investigated to see whether it adds to a successful learning experience in FutureLearn MOOCs. Studies have shown that collecting data in context can enable more authentic and personally relevant learning (Kravcik, et. al, 2004)

Kim et al. (2014) found it interesting to discover that across all the educational sites that were rated in their study, the novelty of technology was deemed quite low. Their result implies that emerging and cutting-edge technologies are not often employed for non-traditional educational purposes. This coincides with findings from this study. Given the conscious design of FutureLearn around potential mobile learning opportunities, there are clear opportunities to incorporate and embed contextualised mobile learning opportunities in future courses. This means the course designers must be made aware of new mobile learning opportunities (e.g. the use of mobiles in NQuire, where the learner's context is integrated into the learning through sharing information gathered by the sensors available in their smartphones). Additionally, the learners themselves must realise the mobile learning potential brought along with contextualising the personal environment and integrating personal realities and facts into any course content to create more crowd-based, yet localised content. There is room for developing a
wider set of mobile learning options, so that mobile devices are used to their fullest potential. In the meantime mobile learning across location and time is taking place in FutureLearn courses, and it adds to the overall learning flexibility used by self-directed learners. However, this potential shift to create more learner-produced material as content also has repercussions for the facilitators of FutureLearn courses, as Morris (2014) explained: “the challenge for teachers has shifted from one of information transfer to a role supporting students to curate, filter and critique information, and use it to solve real-life problems” (p. 2).

8.4 How does individual and/or social learning affect the participants’ learning?

The majority of learning within FutureLearn courses still happens individually. However, the individual learner moves in and out of the course to find answers. At times the individual learners engaged in lurking, or deliberately looking for answers in social spaces without engaging in these social spaces. Whether or not an individual learner decides to enter into social learning depends on the perceived time investment needed, their personal preference to be either social or not and its perceived benefit, as well as their willingness to contribute. Once social learning is part of the learning process, different social actions are undertaken to achieve additional learning success which was not (yet) attained by a learner’s individual learning. This includes looking for answers in- and outside FutureLearn courses and sharing their experiences with peers in- and outside of the course. These actions coincide with the action patterns suggested in the conversational framework of Laurillard (2013): the informal learners select their own teacher, who may be any peer and they define their own curriculum based on what they are interested in. This creates a complex learning environment, with learners using others in their peer group for negotiation of ideas, and their personal context as the source of goals, forms of action, and intrinsic feedback. However, this study also showed that not all learners will indeed interact or
search for peers to enhance their cognitive development. So only considering social interactions would be limiting the self-directed learning of experienced online learners. Nevertheless, it is clear that FutureLearn enables social learning, and if we take another look at the definition of social learning as given by Sol, Beers and Wals (2013) then we can see that the interactive and dynamic process in a multi-actor setting where knowledge is exchanged and where actors learn by interaction and co-create new knowledge in on-going interaction is clearly happening. But not all the actors of a multi-actor setting are necessarily actively involved in all the dynamics of the course.

8.4.1 Individual learners

The majority of learning within the FutureLearn courses investigated happened on an individual basis. In order to fully understand the course material and/or to fulfil personal learning needs, the individual learner moves in and out of the course to find answers. Although not actively engaged in any discussions, or in the commenting sections of the FutureLearn courses, individual learners did mention that they engaged in lurking, or deliberately looking for answers in social spaces without engaging in these social spaces. Milligan, Littlejohn and Margaryan (2013) made an interesting distinction between learners whose primary network was located within the course, or outside of the Change11 course. Interestingly lurkers indicated that their network was situated outside of the course, but this could have been a result of the MOOC under investigation, which was a connectivist MOOC. Or, since the FutureLearn platform offers little support for maintaining social networks within a course, then it can be assumed that most learners only had one option to connect with their networks outside of the course. Future research into the balance of learning inside and outside of a course in relation to social interactions and types of MOOC might shed light on the reasons for this discrepancy in learning connections.
Whether or not an individual learner decides to enter into social learning depends on the perceived time investment needed and their personal preference to be either social or not. This confirms Milligan, Littlejohn and Margaryan’s (2013) conclusion which described some participants clearly indicating they were not interested in engaging with others to learn, while other lurkers indicated their lack of self-confidence to enter into conversations with course peers.

8.4.2 Social learners

Once social learning is part of the learning process, different social actions are undertaken to achieve additional learning success which was not (yet) attained by a learner’s individual learning, or because learners liked to engage with others, or wanted to offer assistance. Learners look for answers in- and outside FutureLearn courses, they also share their experiences with peers in- and outside of the course. This selecting of peers to interact with socially also demands managerial skills as mentioned by Sharples, Kloos, Dimitrianis, Garlatti, and Specht: “The social challenge stems from the need to manage ‘learning from crowds’ within a massive, open and diverse online environment.” (p. 1).

The act of looking for answers or sharing of information with others is also influenced by the nature of the course. FutureLearn courses that can be used for home-schooling purposes showed a different social dynamic (more family oriented) than courses that provided a professional or personal interest. Social learning in FutureLearn courses happens on a larger scale compared to classic eLearning courses, as the social group within FutureLearn courses can be as large as thousands of learners taking a course simultaneously. Although the social group of peers in online courses increased dramatically, the research data revealed that learning is still directed by the learner, for example the learner decides who to interact with. Due to the increased amount of learners in courses, more reflective triggers are available and due to cohort learning more learning happens based upon the social learning interactions. Metcalfe’s law said that for some networked systems the value of a product or service increases with
the number of people using it (Hendler & Goldbeck, 2008). In the FutureLearn courses, this is the case as more people can lurk or actively gain knowledge by reading the comments of others. Sharples (2016) compared social learners (those who post at least one comment) for different platforms (EdX, Coursera, FutureLearn) and found that 36% of FutureLearn learners entered social learning, where this was only 12% for the EdX learners, and 9% of the Coursera learners (when looking at statistics between July 2013 and December 2014). This study had results on social learning that were similar: 37% learners were engaging in social learning. The difference between social learning between platforms emphasizes the success of embedding social learning design into the FutureLearn platform.

This study found that some learners did not feel self-confident enough to enter into social learning. Gasevic, Kovanovic, Joksimovic, and Siemens (2014) analysed the MOOC proposals that entered the MOOC Research Initiative, and they indicated that “the scale of and (often) shorter duration of MOOCs than in traditional courses limits opportunities for establishing sense of trust between learners, which likely leads to much more utilitarian relationships in social learning” (p. 168). The reasons for entering into social learning still need to be explored in-depth. In the study of the first MOOC delivered by the University of Leeds, Morris, Livesey and Elston (2014) also found that “participants were not as social in their learning habits ... only 51% liked discussing things online with other learners” (p. 263). It would be of interest for future research to see what is most prevalent: the choice to only engage in individual learning actions, or whether social learning options can be made available that do attract learners that were previously only engaged in individual learning actions? What this PhD study also adds is attention to the course connections made by the participants to people outside of the course. Although this is not a formal type of social learning as the connections are to people that are not engaged in the course, it is however adding to the comprehension of the learner on the topic of the FutureLearn course. An ideal option would be to visualize the connections made by the learner to peers inside and outside the
course in order to get a full understanding of the actual social learning taking place, especially as participants indicated self-confidence as a potential barrier for entering into dialogue. This could also mean that those who do not feel confident enough to comment inside of the course, do reach out to peers they trust outside the course. Another study also found proof of MOOC learners connecting to outside course peers. Milligan and Littlejohn (2014) pioneered a study investigating the learning behaviours of health professionals within Fundamentals of Clinical Trials, a MOOC offered by EdX while using the concept of self-regulated learning. 35 semi-structured interviews were conducted and analysed to explore how the design of this MOOC supported professional learning. They report that “Around half of the study participants reported discussing course content with their external networks, to seek support or to explore ideas with trusted colleagues or relations” (p. 209). It matches the findings from this study on people sharing their experiences, as well as looking for answers, outside the course.

In FutureLearn courses the social factor is seen as an important part of MOOC learning, but how does this add to the informal learning in MOOCs? Kim, Jung, Altuwaijri, Wang and Bonk (2014) designed a study to reveal the essential characteristics of successful informal, online resources. They isolated eight criteria to evaluate informal learning resources that can provide self-directed learning. Surprisingly, social learning was not a central criteria, but this could be attributed to the fact that not all educational sites had social learning features (some were self-paced learning sites). This study shows that social learning is an inherent part in the self-directed, informal learning experience for those learners willing to interact, as well as for those learners who gather information coming out of the course conversations and comments. Another interesting case study comes from Bonk, Lee, Kou, Xu & Sheu (2015), investigating the learning preferences, goals and motivations, achievements, challenges, and possibilities for life change of self-directed online learners who subscribed to the monthly OpenCourseWare (OCW) e-newsletter from MIT. Bonk et al (2015) came to the conclusion that MOOCs
must embed a sense of choice and control for the self-directed learner, both in terms of technology, and in terms of interactions. Informal and self-directed learning were already seen by Bonk et al.’s participants as being life changers, and playing an important educational role in society. One of the priorities for future research according to Bonk et al. (2015) was to get a better understanding of the characteristics of self-directed learners and processes of self-directed learning. This FutureLearn MOOC study adds to a better understanding of self-directed learning in MOOCs. It also emphasizes the importance of personal and social learning and providing instruments that can help the learner to make social and personal learning choices, such as the ‘like’, ‘follow’ buttons, or the fact that learners can pick and choose content based on their own needs.

Social learning inside FutureLearn courses does happen on a larger scale compared to classic eLearning courses, as the social group within FutureLearn courses can be as large as thousands of learners taking a course simultaneously. Because of the increased amount of learners inside the courses, more reflective triggers are available, and are used.

8.5 Which actions (if any) did the learners undertake to organise their learning?

Learning within FutureLearn courses is organised by scheduling time, note taking during the learning process, and selecting what is learned depending on personal learning goals. The learner plans their learning in accordance to the available time, the relevance of the content, the social learning benefit and related time investment.

8.5.1 Personalised learning

Learning within FutureLearn courses is organised by scheduling time, note taking during the learning process, and selecting what is learned depending on personal learning goals. The learner plans their
learning in accordance to the available time, the relevance of the content, the social learning benefit and related time investment. This relates to the concept of personalised learning, as personalised learning advocates “that instruction should not be restricted by time, place or any other barriers, and should be tailored to the continuously modified individual learner’s requirements, abilities, preferences, background knowledge, interests, skills, etc” (Sampson & Karagiannidis, 2010, p. 25). But the self-directed learning in FutureLearn courses is not fully personalisable, as FutureLearn courses are limited to their choice of curated content provided by the course facilitator, and the flexibility of the course tools within the platform which provide the scope for personalising learning within the course. Learners shape their learning based on learning actions that are guided by their personal learning goals. Personal goal setting is not limited to organising learning only, but it affects other learning components such as entering social interaction or going beyond what was originally planned. This makes personal learning goals important inhibitors or enablers of self-directed learning in FutureLearn courses.

Note taking is done primarily to ground what is learned, and to be able to retrieve information later, so catering to personalised learning needs. Notes are kept by learners mostly using their preferred tools, even if alternative note taking options are provided by the course organisers.

8.5.1 Personal learning goals

Learners shape their learning based on learning actions that are guided by their personal learning goals. Learning goals have an important impact on the self-directed learning as it makes learners select specific content, determine whether they want to invest more or less time given the perceived results, and try to attain bigger goals, such as careers. The personal learning goals of the learner also affect the action he or she takes with regard to engaging in social learning or which tools or technologies they want to use and learn. This means that personal goal setting is not limited to organising learning, but it
affects other learning components as well. This makes personal learning goals important inhibitors or enablers of self-directed learning in FutureLearn courses.

Because learners have different learning goals, they look for different types of content to satisfy their information needs. This calls for more in-course signposting as proposed by Morris, Livesey and Elston (2014): “designing online courses for learners at different levels requires very clear signposting within the course materials to indicate which resources are appropriate for which type of learner” (p. 263).

The modularization of content to suit personal needs was also prevalent in research by Kizilcec and Schneider (2015). They remarked that “conceptualizing the MOOC as an archive positions the content in a larger information ecosystem. Individuals who are seeking granular information within a given MOOC are likely to be seeking related information elsewhere on the Web or in different MOOCs” (Kizilcec & Schneider, 2015, p. 6:19). They reintroduce tagging as a means to enable the future linking and organising of content inside and outside of specific MOOCs. Wintrup, Wakefield, Morris, & Davis (2015) interviewed ten experienced online learners. They also offered specific suggestions and recommendations for improving the MOOC learning experience. Their contributions on the nature of social aspects of a MOOC are linked to learning and not merely connecting for connections sake.

Information about what is expected of learners in terms of timing, how the MOOC is structured and clear descriptions of the learning blocks, all contribute to facilitating the learning experience and to enable learners’ to manage their expectations (Wintrup et al, 2015). In short, enabling the personalisation of learning might provide answers to the diverse FutureLearn MOOC learner population and its learning goals.

But offering a more transparent content to cater to the different learner needs is not the only task that can be taken to open up FutureLearn courses for a diversity of learners. “Designing tasks … which encourage the learners to build on existing knowledge and share their experience can enrich the
learning experience for all by exposing learners to real world experience and new practices” (Milligan & Littlejohn, 2014, p. 210). Within learner diversity there is also the option to provide more modular ways of learning, catering to those learners who built their own learning trajectory across FutureLearn MOOCs. DeBoer, Andrew, Ho, Stump and Breslow (2016) suggest that enrolment, traditionally measured as the number of students registered as a proxy for students who commit to complete a class, can be reconceptualised as differentiated tracks reflecting users’ individual goals. Participation can be reconceptualised according to the diverse ways it occurs. Curriculum can be reconceptualised as individual, asynchronous pathways, for which there is no correct, prescribed way to proceed. Finally, achievement can be reconceptualised relevant to individual goals. Educational researchers must critically examine the assumptions and desired interpretations of traditional concepts in the MOOC space.

8.5.2 Learning goals and performance measurement

Only when a strong understanding of learning achievement exists, can we introduce performance measurements that fit those achievements. Hood, Milligan and Littlejohn (2016) indicate that: “the diversity of learners participating in MOOCs leads to a range of learning motivations and goals ... measurement of learning in a MOOC must move beyond extrinsic or performative measures to also examine the intrinsic motivations and personal outcomes by which learners measure their learning” (p. 12). This study concurs with the need to use different performative measures than are prevalent in higher education and classic online learning courses which use externally standardized grading systems. Although this study has not measured intrinsic motivation in relation to learning outcomes specifically, it did show that intrinsic motivation is used to create a sense of learning success, by concluding learning episodes that learner’s set for themselves. This points to learners attaining personal learning success. Some research has been conducted to find learning outcomes that are not related to grades, especially
in professional learning. Milligan and Littlejohn (2014) found little evidence of professional learners routinely relating the course content to their job role or work tasks, and little impact of the course on practice. What is a useful outcome from informal learning? Is it a personally appreciated stepping stone (e.g. learning the simple vocabulary of a new language) or is an outcome that which can be translated into a formal, measurable result (e.g. succeeding in an English language proficiency test for non-native English speakers)?

8.6 Unexpected emerging data related to the informal learning journey of experienced, adult online learners engaged in FutureLearn MOOCs

In addition to the four aforementioned sub-questions, another important component emerged impacting self-directed learning of experienced, adult online learners: context.

8.6.1 Context in mobile and conversational learning

When looking at the findings, there is a link to prior mobile learning research which focuses on context. Crompton (2013) already placed a lot of importance on context in her definition of mLearning: “learning across multiple contexts, through social and content interactions, using personal electronic devices” (p. 4). This definition not only links learning to context but also to the social importance of interactions as an effect on learning with electronic devices. Context is also part of the FRAME model (Koole, 2013) and the conversational model (Laurillard, 2013). However, what makes this study relevant is that it draws its conceptual framework from the learners, and builds upon their learning experiences within broader online courses, such as these FutureLearn courses.

The learner’s perception of any contextual similarities between their own context and the context proposed in the course, or shared by course peers impacts the learning experience. This perceived
similarity of context can be related to the learner’s external environment (e.g. workplace, peers that have similar interests), the internal environment (e.g. personal learning goals) and the digital environment (e.g. online tools). Learners are more motivated to study course content or engage with peers if they feel related in some way to that content or those people. The familiarity with the course context has a stimulating effect on self-directed learning, as it enables the learner to bring the information within a contextual reach, linking it to the learners’ prior knowledge or experiences.

It must be said that context in relation to learning is rather limited within the FutureLearn MOOCs that were investigated in this study. This aligns with Traxler and Kukulska-Hulme (2015) who mentioned that “contextual mobile learning does not seem well aligned with the MOOC phenomenon” (p. 214), even with respect to FutureLearn designed for mobile delivery. The tasks and assignments that were used within the three courses did not stimulate the learners to add any contextualized data, especially not through the use of their mobile phones, although this contextual mobile learning has been described by Metcalf and Hamilton (2015) as a sure path within next generation mobile learning (e.g. integrating location data such as learners sharing data from mobile sensors). This discrepancy between FutureLearn’s drive to integrate mobile use and innovative pedagogies, and the fact that contextualized mobile learning does not yet seem to be picked up, is an interesting and timely option for future research. Integrating contextual mobile learning might also enhance the full learning experience. In the Innovating Pedagogy report, Sharples et al. (2015) already mentioned that learning across contexts is happening, “communities of amateur scientists already share and compare local data on, for example, weather, wildlife, rocks and fossils” (p. 21). This might increase the learning experience. For example, if a FutureLearn course provides the basic geological information, a community of learners could then add their contextual geological information while using their mobiles. In those cases – if the learner is willing - the common theme is “learning that comes from being situated in and understanding a context,
and from reporting and comparing events across multiple contexts” (p. 21). This would deepen the learning experience in a way that individual learning could not provide, as it demands engagement in order to increase the personal learning taking place. “As learners, we are simultaneously embedded in a context as we move through locations across time, and we create context through our interactions with settings, artefacts and people” (Sharples, Delgado Kloos, Dimitrianis, Gralatti & Specht, 2015, p. 2). Contextualising the material and the tasks of the courses to fit all of the learner’s contexts could enhance the potential of the overall learning process.

8.6.2 Context and professional learning

The relation between context and professional learning in MOOCs was described by Littlejohn et al. (2016), who saw that “individuals with high SRL scores engaged with the MOOC primarily as a professional learning opportunity. Their motivation and goals for participation … was tied specifically to their workplace context than more extrinsic motivations such as passing the assignments and receiving the certificate of completion” (p. 10). Interestingly Fidalgo-Blanco et al. (2014) had similar conclusions, but related to informal learning in MOOCs. With regards to the research question about if there is any variable that defines the willingness to work with informal learning activities, the intention to apply course content can be highlighted. The individuals that specify that they are not going to apply the course content are those that have participated the least in informal learning. Meanwhile, individuals that have indicated that they have thought about applying the knowledge acquired in the course are those that have participated the most in informal learning activities.

Milligan and Littlejohn (2016) emphasized the informal learning opportunities that MOOCs can offer when learners are left to choose what to learn. Learners who perceived themselves as high self-regulated learners were conceptualizing “the MOOC as a non-formal learning opportunity, enabling each learner to independently determine activities and material they would engage with based on their
individual needs” (p. 10). These learners with higher self-acclaimed learning abilities showed a less uniform and less-linear trajectory throughout their MOOC learning experience, and more prone to use what they learned in their professional setting. This study has similar findings, however, it also adds a personal need that can be equally stimulating to engage in-depth with MOOC content.

8.7 Conclusion of what characterises the informal self-directed learning of experienced, adult online learners engaging in individual and/or social learning using any device to follow a FutureLearn MOOC?

Recapturing the discussions per research question, reveals that some elements which emerged from this study were investigated in prior research. However, when listing the main findings and resulting discussions of these findings in relation to existing research a few meaningful additions to the existing research on online learning, and MOOC learning in particular can be identified.

8.7.1 Five learning components

This study reveals a conceptual framework consisting of five learning components: individual characteristics, technology, individual & social learning, context, and organising learning. Each of those learning components harbour key categories that have a major impact on the learning processes within that particular component. The learning components are not separate entities, but are interconnected and examples of this interconnectedness are given below for each of the five elements.

8.7.1.1 Individual learner characteristics

While the individual learner characteristics that emerged are motivation and personal traits, they have a specific influence for the informal self-directed learning of experienced online learners. The learner’s personality in terms of perseverance, self-confidence and overall feeling while actively engaging in the
course results in the use of emotional language and intentional content and learning choices. The learning has an increased learning agency, but this also means that the learner must be motivated in order to keep learning. This puts the characteristics of the learner forward as one of the key elements for self-directed, informal learning in FutureLearn courses. Motivation came out as an active driver of learning, influencing the determination or avoidance for using any of the other key learning components, while being closely related to individual learner characteristics as it is fuelled by emotion, perseverance and self-confidence. Additionally, the individual learner characteristics will also influence other learning components, e.g. if someone is social, they will feel comfortable in engaging in social learning, or if some of the context of a course feels familiar, this feeling of familiarity will trigger trust and increase their learning interest.

8.7.1.2 Technical and media elements

Technical and media elements impact the learning process. No matter whether the learning is done on mobile devices or desktop computers or newly developed devices for learning, the choice of the device (or devices) comes from the learner. The same is true for which course tools the learners are willing to use. Understanding multiple media affordances due to their prior online experience, the learners pick which FutureLearn elements they want to use. And although a (temporal) disruption can take place if a technical or media element is not working as expected, if enough motivation is in place, or if the need to achieve a learning goal is big enough, those learning obstacles will be overcome by the learner. The technical and media elements are not a confined entity, they influence the other elements as well, e.g. which tools the learners are willing to use to engage in social learning, or with which tools they are more than happy to use (emotional preference).
8.7.1.3 Individual or social learning

Engaging in individual or social learning is in many cases a personal choice. The individual learner moves in and out of the course to find answers to their own learning needs. The individual learners engage in lurking, or deliberately looking for answers in social spaces without engaging in these social spaces. Once social learning is part of the learning process, different social actions are undertaken to achieve additional learning success. Individual or social learning is also not a standalone component. The learner decides who to interact with, and this can be based on individual characteristics (self-confidence, feeling comfortable with specific people, having access to media elements that provide a sense of trust, etc.). But the act of moving beyond a preferred way of learning – either individual or social - depends on motivation and personal learning goals they want to achieve.

8.7.1.4 Organising learning

With all the content, peer learners, timing and personal agenda’s organising learning also emerged as a key component impacting the self-directed learning in FutureLearn courses. The learner plans their learning in accordance to the available time, the relevance of the content, the social learning benefit and related time investment. Notes are kept using their preferred tools. But a driving force behind organising learning are the personal learning goals. The personal learning goals influence the actions learners take with regard to engaging in social learning or which tools or technologies they want to use and learn. This means that personal goal setting is not limited to organising learning, but influences the other learning components as well, as part of the overall organisation of their learning.

8.7.1.5 Context

Context is the fifth key learning component. The perceived similarity of context can be related to the learner’s external environment (e.g. workplace, peers that have similar interests), the internal environment (e.g. personal learning goals) and the digital environment (e.g. online tools). The
familiarity with the course context has a stimulating effect on self-directed learning, as it enables the learner to bring the information within a contextual reach, linking it to the learners’ prior knowledge or experiences. But context is also connected to the other learning components, e.g. if a learner feels another course peer works in a similar field, this proximity of professional interest might trigger social learning, or if a specific software is shown as a tool, it will more likely be picked up by the learner if its functionality can be used in their own context.

8.7.2 Two inhibitors/enablers of learning

Once each component was investigated, two main inhibitors or enablers of learning emerged: intrinsic motivation, embedded in the individual characteristics of the learner, and personal learning goals, which influenced how the learner organised their learning.

8.7.2.1 Relation between intrinsic motivation and personal learning goals

When investigating all five learning components that make up the learning experience of the participants, two key inhibitors or enablers for learning emerged. Motivation and learning goals had more impact on the learning process than other categories emerging during the analysis phase. The reason that motivation and learning goals got highlighted, is because participants referred to either motivation or learning goals when describing actions that were related to specific learning components. Motivation and learning goals were mentioned for all five learning components. While investigating motivation and learning goals, it became clear that participants pointed mainly towards intrinsic motivation when describing their motivation, and the learning goals were mostly referring to personal learning goals. This finding meant that the informal nature of FutureLearn MOOCs, increased the personal direction in which the learning was oriented. By identifying intrinsic motivation and personal learning goals as the main inhibitors or enablers of learning, the self-directed learning in FutureLearn
MOOCs pointed towards personal learning based on intrinsic motivation and attaining personal learning goals or vice versa.

Considering that motivation and learning goals spill over into the other five learning components while being embedded in a specific learning component, one could wonder whether other elements of each of the five components are equally important for the overall learning process. For instance, self-confidence might play a part in taking on a technological challenge, or it might help in moulding course content into a personal, contextualized content.

But when comparing intrinsic motivation and personal learning goals to other elements that emerged from the data, there is a difference in effect on the full learning process. Both motivation and learning goals push the learner into taking multiple actions, across all the learning components. With intrinsic motivation and personal learning goals the learner pushes their own learning boundaries and they go beyond what they could do before or what they knew before. Whereas some of the other elements, such as taking notes, having emotions while learning, planning the learning, ... only have instantaneous effects on the learning process. The other elements do not drive the learner beyond their own limitations, or beyond their capacities, those other elements are part of the known learning actions by the learner and are only instrumental to learning. Interesting enough Hood, Milligan, Littlejohn and Mustain (2016) did not make a distinction between which of the two factors of learning had a stronger effect: motivation or learning goals? Although there is a distinct connection between the two.

Milligan, Littlejohn and Margaryan (2013) identified three key factors affecting engagement: confidence (with a clear link to not daring to enter into peer-to-peer interactions), prior MOOC experience (where active participation was clearly related to prior MOOC experience), and motivation (in relation to course aim of the learner). In their 2016 study Littlejohn and Hood investigate the SRL sub-processes learners employ in MOOCs and they probe on how different learning motivations
influence self-regulated learning behaviours. What they found aligns with findings in this study, in that motivation and goal setting are particularly strong drivers for learning. This study found that people with a personal learning interest can be equally intrinsically motivated. Informal learning offers the opportunity to learn enthusiastically, with intrinsic motivation, but based on non-professional learning interests. This is seen in the outcomes from the Basic Science: Understanding Experiments course, where there is less of a professional need, but more of a family, personal need igniting motivation. It might be interesting to explore potential differences for MOOC learning and behaviour in non-professionally oriented courses.

### 8.7.4 Owning the learning

Self-directed informal learning in FutureLearn MOOCs, results in a heightened ownership of learning. As the learner mediates both content, goals and interactions in order to self-direct their learning in FutureLearn courses. Owning learning implies the ability to direct learning towards personal or professional interests based upon intrinsic motivation. This means the learner has to be in control, building on their own prior knowledge, influenced by their own contexts and needs, and oriented towards attaining their personal learning goals. This study also shows that the informal self-directed learning journey of experienced, adult online learners who are engaged in FutureLearn courses spans in-course and out-course actions and connections, which broadens the idea of personal ownership to include content from any source.

### 8.7.5 Grassroots research: hearing the voices of the learners

An important part of what makes this study stand out, is that it started out as a research to get a deeper understanding of what the learners actually experienced. Veletsianos and Shepherdson (2016) already emphasized the importance and need for more qualitative research as “learners’ voices were largely absent in the literature” (p. 17). This makes this research already stand out. The fact that Charmaz’s
constructing GT approach was used, added to the ability of the study to give rise to the voices and experiences of the learners, as the learners self-reported their learning (on multiple instances all through their FutureLearn course experience), and added additional meaning to their learning logs by engaging in one-on-one interviews. Without this approach, the conclusions would not have shown the subtle differences between existing theory, and the freedom of experienced, informal learners to self-direct their learning while being engaged in FutureLearn courses.

8.8 Considering self-determination and self-regulation post-study

It might be that a sub-set of the learners does have advanced learning skills which fit self-determined learning as proposed by Hase and Kenyon (2000): e.g. choosing content, participatory learning skills, reflecting on each step of the learning process, taking MOOCs as part of a full learning trajectory set out by the learner herself. This provides a good basis to follow the idea of heutagogy, and set up a self-determined learning study limited to those advanced, autonomous learners with advanced capacities for learning and participating. Researchers embracing and supporting the heutagogical approach of self-determined learning see learners as highly self-determined, creative and productive individuals. However, at present FutureLearn courses do not offer many opportunities for creating and producing knowledge that can then be either shared with peers, or uploaded to the course as additional content.

Beaven et al. (2014) added an important distinction, suggesting that Blaschke’s (2012) progression from pedagogy, to andragogy, and then to heutagogy might be a helpful way to distinguish different types of MOOCs and, in particular, to pinpoint the levels of self-determination required for success. Beaven et al. (2014) saw cMOOCs, with their emphasis on creativity, sharing and production, as to be more in line with a heutagogical view of the learner, whereas more content-based MOOCs were seen as more befitting self-directed learning. Wheeler (2012) suggested a similar connection stating that "the ethos of heutagogy extends to learner choice, where students can create their own programs of study, a
feature often seen in the loose and unstructured aspects of some Massively Open Online Courses" (para. 3). However, having gone through the study, I find that how a learner learns is actually up to them, and up to their capacity for learning. It might therefore not specifically be related to any type of MOOC. Looking at the outcomes from this study, it seems to me that self-determined learners are a subset of the self-directed learning that is going on in FutureLearn MOOCs. There are learners who do connect resources and in a way built their own curriculum, their own content, in- and out-course, across different sorts of media, while connecting to people they perceive to have the knowledge to help them develop further. But those self-determined learners are only a subset of the FutureLearn MOOC learners. In fact, I see the self-determined learners as a sub-set of the self-directed learners that guide themselves through the course of a MOOC. Self-determined learners are more equipped in terms of learning capabilities, in making course, material and peer cross-overs. I disagree with Beaven et al. (2014), in that the difference is the viewpoint from which you look at self-determined learning. If you think of self-determined learning, you should not start any definition from a course, whether it is face to face, blended, online such as a MOOC. If self-determined learning is about the learner, than the starting point should be the learner and what she or he does in terms of selecting resources, including content coming from MOOCs, whereas self-directed learning is something every adult learner does within a course, they select, learn, adjust... but not necessarily while pulling in other resources.

With hindsight, there is something to be said about applying a self-regulated learning approach to investigate FutureLearn MOOC learning. However, this is only possible through hindsight, as a basis for the learning experience needed to be set, without too much prior-study filtering. However, while looking at the dominant learning factors of motivation and learning goals, it relates to the characteristics given to SRL by Bernacki, Aguilar & Byrnes (2011): “SRL is meta-cognitive, strategic, adaptive, engaged, self-initiating” (p.4). But here again, it only seems to cover a sub-set of the learners,
as some learners had not shared meta-cognitive actions or reflections, while others did. Having completed this study, using the self-directed learning concept embedded in andragogy, I feel this was the right approach to take to establish a rich learner experience based on the FutureLearn MOOC testimonies from the participants. And now future research can focus on sub-sets of the FutureLearn MOOC learners, using dedicated instruments of each learner-centered concept.

Reflecting upon self-regulated learning and motivation post-study, made me take another look at the study by Littlejohn, Hood, Milligan and Mustain (2016). Their research is of particular interest for motivation, as the study placed a particular focus on the variation in motivations for taking a MOOC either as a learner who see themselves as highly capable self-regulated learners, or low self-regulated learners, and how this shapes their behaviour and employment of SRL strategies. However, with regard to SRL and learner success, Kizilcec, Pérez-Sanagustín and Maldonado (2016) interviewed 17 very successful MOOC learners and they found that SRL strategies do not improve performance in a MOOC. Kizilcec, Pérez-Sanagustín and Maldonado (2016) investigated how to support self-regulated learning in MOOCs in order to promote course performance. They did this by first gathering SRL strategies from learners that completed MOOCs, after which these SRL strategies were proposed to MOOCers and the effects of these SRL strategies were then evaluated for their effectiveness. For self-regulated learning to take place “learners need to autonomously and actively engage in the learning process. This involves independently setting learning goals, identifying effective ways to learn, and monitoring one’s progress toward those goals” (Kizilcec, Perez-Sanagustin & Maldonado, 2016). An interesting finding from Kizilcec and Schneider (2015) revealed that “merely telling MOOC learners about ways to engage in self-regulated learning does not lead to improvements in course persistence or achievement, despite our efforts to select especially relevant strategies and communicating them with authentic quotations”
This prompted me to realize that “a deeper understanding of learners’ SRL profiles can support more targeted approaches to scaffolding the learning experience”.

In summary, the findings from this study overlapped with prior research, but also added to the body of knowledge related to online learning, and FutureLearn MOOCs in particular. The results provide new insights for future research, as well as potential FutureLearn platform development options to empower learners to create a more personalized learning environment that fits their own personal learning goals and ignites their intrinsic motivation.
9. Conclusions

This thesis concludes by providing an overview for possible future research, listing the limitations and implications of this research, validating this study as a GT study, and describing its contributions.

9.1 Future research

This research only investigated a relatively small sample size of learners enrolled in three FutureLearn courses. Research is needed using a bigger sample size in order to test the findings coming out of this study. Furthermore, other MOOC platforms should be investigated to understand to what extend the findings of this study parallel the self-directed learning of experienced online learners enrolled in other types of MOOCs. Apart from these directly related future research options, additional future research is listed in the following sections.

9.1.1 Research into the philosophical worldview accompanying course content

Curated content provides a certain timbre to a course, as the material that is brought together by the course organiser(s) reflects their background and philosophical worldview. This contextualized background can trigger reflective thoughts in the minds of learners who come from slightly other contexts. One learner made this explicit in one of his remarks: “Today, I got a bit reflective and thought greatly on the way we Africans have been making decisions in the face of uncertainty...I wanted to know if Africans are not too reliant on fate and luck” (#DMCW/LL/173). The philosophical layer attached to selected content impacts learning. Also, the contextualised and cultural assumptions of education, and how those influence SDL. This study did not take a closer look into the impact of the power established by selecting specific content and/or examples, but this would be of interest to future research.
9.1.2 Research into personalised learning

The overall learning experience and the active personalisation coming from the learner, relates to what Morris (2014) suggested for future MOOCs: “MOOCs could offer high quality learning experiences for all types of learners, ... considering a MOOC that adapts to the individual. In order for this to happen, the platform will need to understand the learner in advance of the course”, pointing to a pre-course survey gathering information on the participant’s learning experiences, prior modes of learning, social learning preferences, tracking the learner’s progress over a series of courses, etc. Similar realisations lead Gasevic (2014) to state that “it seems necessary first to understand students’ intentions for taking a MOOC, before trying to study the effects of interventions (e.g., motivational messages) on the students with different initial intentions” (p. 164). Personalised learning is an important research area to investigate. Snow and Cronbach (1977) were the first to reflect on the notion of personalised instruction based on student characteristics and they reported on that in their ‘aptitude-treatment interaction (ATI)’ research. With the increase of online learning where curation of content can be done by any person and focused on their own needs, personalised learning becomes increasingly popular. Personalised learning advocates “that instruction should not be restricted by time, place or any other barriers, and should be tailored to the continuously modified individual learner’s requirements, abilities, preferences, background knowledge, interests, skills, etc” (Sampson & Karagiannidis, 2010, p. 25). Personalised learning builds mainly on “the cognitive and constructivist theories of learning. Instructional principles of cognitive theories argue for active involvement by learners, emphasis on the structure and organisation of knowledge, and linking new knowledge to learner’s prior cognitive structures” (Sampson & Karagiannidis, 2010, p. 26). Within FutureLearn courses, the limits of personalisation are related to the range of content provided by the course facilitator, and the flexibility of the course tools which provide the scope for personalising learning within the course. Nevertheless,
the informal learners can decide where their learning focus lies, which topics or course interactions they will engage with, and to what extent they engage with peers (Sunar, Abdullah, White & Davis, 2015). If a course and its subsequent assignments enables the learner to build a personalised learning path, or to create assignments that benefit their own contexts and professional or personal interest, it will most likely increase the intrinsic motivation accompanying that particular FutureLearn course. This might result in an increased sense of learner success.

9.1.3 Research into intrinsic motivation and personal learning goals

Investigating the specific relation between intrinsic motivation and personal learning goals in FutureLearn MOOCs, or MOOCs in general. How do these two inhibitors and enablers relate to each other? In terms of setting up a long-term research, it would be interesting to see the long-term effect of learners that quickly seem to identify personal learning goals, and those who are not particularly conscious of setting personal learning goals.

Investigating which tools might support setting and attaining personal learning goals. Learning goals and motivation have been proven to go hand in hand for two decades (Schunk, 1995), but within FutureLearn MOOCs learners need to set their own learning goals, whether that is done consciously or unconsciously. Many learners referred to learning goals, but in terms of recognising that by learning some content from the MOOC, they would attain a learning goal. This means they set their own learning goals, and they are not set by others. It might be worthwhile to see whether previously proven instructional design options exist to increase learner motivation, making goal setting and goal attainment easier, for example Hattie (2008) research on achieving visible goals.

Examining how to increase positive signposting effects within FutureLearn courses to guide the learners. In order to appeal to the intrinsic motivations of the learners, it is essential to provide an accurate course description, including the areas to which the course can be applied. This might be
accomplished by asking active learners at the end of the course how they used the course information for their own professional and personal use, and why this course enabled them to do that. Providing easily contextualised, authentic assignments will increase the applicability of the course content to the learners personal context.

Interdisciplinary research is needed to understand the complexity that comes along with MOOC platforms and all of the interactions it provides. One of the potential investigation can be neurobiological research: measuring brain activity in learners that are engaged in FutureLearn courses (find trigger points for increased motivation and learning goals – interdisciplinary research).

9.1.4 Research into mobile learning & contextualization

The FutureLearn platform is the first MOOC platform that is build mobile first. This opens up opportunities for integrating mobile learning aspects into the platform. Mobile learning has been steadily exploring and implementing contextualized learning options (Traxler & Kukulska-Hulme, 2015), but these options have not yet been fully integrated into MOOCs. Investigating learning effects of integrating personalised context would be of interest. This would also add to the Mobile First oriented platform design that FutureLearn is, and would add increased personal learning tools that could benefit future learners in all regions.

9.1.5 Research using self-regulated and self-determined learning

This research provided a conceptual framework for the informal self-directed learning taking place in FutureLearn courses. In addition, a lot of ground-breaking research has been done on self-regulated learning inside professional FutureLearn MOOCs. However, it becomes clear that there is a vast potential to examine self-regulated learning sub-processes in order to get a deeper understanding of self-efficacy of learners. Additionally, as mentioned in the discussion section, it might be of interest to select a particular sub-set of MOOC learners, that have advanced literary, social and technical skills and
capacities and follow them in a longitudinal research project to see how MOOCs can be used within the concept of self-determined learning.

9.1.6 Research into gender disparities within MOOCs

In terms of gender and the MOOC learner there is a distinction between the FutureLearn platform and the Coursera & EdX platform, with Coursera and EdX having more male learners and FutureLearn having more female learners on average (Morris, Hotchkiss & Swinnerton, 2015; Liyanagunawardena, Lundqvist, & Williams, 2015). The reason for this disparity was unknown when this study was planned, and it is presently unknown, but it might be of interest to investigate in future research.

9.1.7 Research into MOOC and the Big Five

In research the lack of perseverance by learners has been linked to the learner completing a course or dropping-out (Sahami, Guzdial, Martin & Parlante, 2013; Veletsianos & Vrasidas, 2015). In this study perseverance is linked to the drive of the learner to understand every detail before moving on. This might point toward one of the ‘Big Five’ personality traits, namely neuroticism. Interdisciplinary research combining educational technology with one of the widely accepted models of personality traits in contemporary human psychology, namely the ‘Big Five’ (McCrae & Costa, 1997) would be of interest. How does the FutureLearn experience relate to the big five, especially when research into personality traits recognizes the contextual, situational or environmental factors involved in their expression (Feist, 2010).

9.1.8 Research potential for theoretical frameworks

Investigating how motivation and learning goals within FutureLearn MOOCs match the Flow concept. When considering motivation and learning goals, the Flow researched by Csikszentmihalyi since 1991 is worth investigating. The finding with regard to the effect of complexity and motivation coincides with
the concept of the Flow (Csikszentmihalyi, 1991). The idea behind the Flow is a more open idea of learning in which the learner self-imposes an increased learning complexity on their learning experience. The Flow concept has been described and researched by Csikszentmihalyi since 1991. The Flow also supports the idea of goal-driven learning, in which learners keep themselves motivated by increasing the complexity of what is learned. It is a concept that can be used within, and across courses. There is a limit to the course complexity that can be added in FutureLearn courses, purely on the basis of the target population it wants to deliver the content to, or for which learning actions are provided. Nevertheless, a possible demand of some learners might be answered by the content that is shared on topic by learners who feel more advanced in the topic.

Researching social learning that happens outside of the FutureLearn MOOCs. Learners make an intricate web of resources and people to which they turn during the actual FutureLearn experiences. Sometimes they look for answers in- and outside the FutureLearn MOOC, sometimes they share their FutureLearn experiences in- and outside the MOOC. But they also link to outside sources to increase their understanding of the course content. This means the learner is much more the central point of decision in their FutureLearn MOOC learning experience. The social learning factor might be used to reconsider an additional influence to Laurillard’s conversational framework (2013). Where teachers were an essential part of the framework within the first versions of the conversational framework (Laurillard, 2002), depending on the type of FutureLearn MOOC the MOOC teachers or facilitators might only be the actor for curating the content, while the people who influence the actual learning of the learner are present within and outside of the FutureLearn MOOCs, including friends, family and partners. It might be of interest to investigate the effects of peer tutoring or off-platform support on FutureLearn’s conversational framework.
9.2 Limitations of the research

The study is confined to the participants engaged in three FutureLearn courses, rolled out during the last months of 2014. This means that the findings are related to the design of the FutureLearn platform as it was in that moment in time. FutureLearn is a learning platform in development, with a clear roadmap to increase social learning options. For example, small group learning through study groups is now being implemented and used in some courses.

Participant’s responses are reflections of, and confined to their personal experiences in each of the three FutureLearn courses that were part of this study.

Because this study made use of purposeful sampling, I cannot say with confidence that the sample is representative of the overall population.

The fact that learners were asked to keep self-reported learning logs, will have had an effect on their learning. The introduction of the learning logs, and the subsequent triggering of having to think about their learning on a meta level, might have given rise to alterations in their learning behaviour.

Due to the nature of qualitative research, the data obtained in this study may be subject to different interpretations by different readers, especially due to the complexity of both the technology, the terms used in the instruments, and the subsequent interpretations of the definitions and the available design of the FutureLearn platform, because of the interpretative nature of the qualitative research, I might have introduced bias into the analysis of the findings. This could have happened because I am part of the data analysis process, which means that my interpretations and assumptions might direct my analysis. To avoid or limit the effects of bias memos were kept by me throughout the study and used to visualise potential assumptions that could have influenced research findings.
The study only sampled participants who were still participating in the MOOC and willing to share their learning log data. This might influence the results as research participants were at least self-confident enough to share their thoughts with regard to learning.

All of these limitations can and will have an effect on the findings, and limit them as such.

**9.2.1 Methodological limitations**

Choosing the constructing Grounded Theory approach as suggested by Charmaz (2014) was guided not only by the novelty of the informal, online learning experience within MOOCs, but also by the need to provide a theoretical perspective derived from the study, that would equip future researchers and/or FutureLearn developers with a usable framework to increase ease of learning in FutureLearn courses. By using a constructed GT approach, the data would inevitably come from a more limited amount of participants than if the research would be based on a quantitative approach. But as outlined in the method chapter, the novelty of the subject area, combined with the need for additional MOOC research (Bozkurt, Keskin & de Waard, 2016) supports the use of qualitative studies to explore new modes of learning.

This study selected only experienced online learners as its target population. But as mentioned in the literature chapter, having prior online experience also influences the learner’s satisfaction with the online course. This might result in different learning outcomes related to motivation. It would be of interest to investigate the difference in effect of learners who are new to MOOCs and engage in FutureLearn courses, and possibly follow them up to reveal at what point in time a familiar online learning experience is formed that will form a basis for future online learning actions.

Furthermore, the use of additional observation methods could have helped overcome some of the limitations of relying primarily on self-reported logs and post-course reflections. For instance, participants’ accounts of how deeply they were engaged with the course content as they were learning
might have given a more poignant insight into the intensity of the learning episode. Additionally, it is acknowledged that interview studies are prone to self-report bias (Van de Mortel, 2008). Participants may respond to questions by saying what they believe the interviewer wants to hear. In my studies, this may have led to an overly positive or negative response.

9.2.2 Practical limitations

FutureLearn courses are MOOCs, but not all MOOCs are FutureLearn courses, especially when taking into account the conscious social learning element that is typical for the FutureLearn MOOC environment and relies on learner interactions. New insights into the effectiveness of learning in MOOCs is published on a regular basis, directing the way MOOCs are designed. This means that some of the findings might only be relevant for a short period of times for as long as specific features are used within FutureLearn (e.g. mark-as-done button).

9.3 Explanations for the findings

The findings related to different fields and theories. What makes this research of interest, is that it looks at the learning process as it is constructed by the learner, even though the learner only has little agency to curate the existing course content or its interactions, the fact that the learner is able to tailor the course to their own personal or professional need has a positive effect on their motivation. When the learner finds a way to achieve personal learning goals it increases their motivation to learn. The learners select which parts of the course content they choose to be useful and they enter into social learning or not based on personal preferences towards actively engaging with others.

9.4 Implications of the findings

In spite of the above mentioned limitations, there are a number of potential implications from this study for online instructors, learners, and administrators of online programs. Arguably the most
significant contribution of the study is that it offers an overview of the learning components that make up a FutureLearn course learning environment, and it shows the two key enablers or inhibitors of learning, namely intrinsic motivation and personal learning goals. The study offers a conceptual framework describing how experienced online learners self-direct their learning, and which factors are essential to create a more flexible learning environment for the learner, allowing them to construct their own informal learning path throughout the course, while engaging with as many or as little peers as they want to. This social or individual learning preference builds on what Morris, Livesey and Elston (2014) concluded. This might indicate that social learning is not a good fit for every learner. This study also shows the importance of personalised learning in order to reach learning goals and increase motivation, but in order to personalise learning very clear signposting must be done inside of each course. In addition learners must be given the tools to understand how they can reach their own learning goals, while being driven by their own intrinsic motivation. By doing so, this study builds on the findings of recent studies on the effects of motivation on the learning outcomes (Milligan and Littlejohn, 2014; Hood, Milligan and Littlejohn, 2016).

This study also emphasizes the importance of enabling the learner to customize the course in order to fit personal quests for information gathering or knowledge construction. This fits with the call for more contextualisation as was previously suggested by Sharples, Delgado Kloos, Dimitrianis, Gralatti & Specht (2015) and coincides with earlier conclusions coming out of informal language learning using mobile devices in contemporary designs for mobile learning as described in the book by Traxler and Kukulska-Hulme (2015).

**9.5 Validation of the study**

Before moving on to the contributions of this research, it is important to ensure the validity of this study. As part of the validation of this study, a summary of the first findings was sent to the participants
taking part in this study, with a kind request to send feedback or comments on any part of the findings. Two participants answered to this request, both acknowledging that the findings seemed to concur with their own learning experience, but at the same time adding small remarks illustrating their own learning preference, but befitting the findings. In addition to this specific action, I also address the validity of this GT study, following the seven criteria as suggested by Strauss and Corbin (1998) and as first described in section 3.5.9. Each of these criteria is addressed to support the validity of this study.

- Criterion #1: Are concepts generated? Yes, the learning components, as well as the two key inhibitors or enablers of learning came out of the data themselves.
- Criterion #2: Are the concepts systematically related? Yes, each of the elements to describe SDL in FutureLearn courses is related to either a bigger learning component, or an inhibitor/enabler of learning (e.g. self-confidence was illustrated as having an effect on social learning).
- Criterion #3: Are there many conceptual linkages and are the categories well developed? Yes, the emerging categories were based upon subcategories/codes in terms of the basic features-conditions, context, actions/interactions and consequences (e.g. the reasons why learners persevered in the course was based on information coming from personal/professional interest, challenges they met, and actions they needed to take. The categories were rich and built upon several iterations looking at linkages between the codes, subcategories to come to the major concepts).
- Criterion #4: Is there much variation built into the theory? Yes, the resulting theory leaves room for variation. Although each of the five components (individual characteristics, context, individual & social learning, technology & media, organising learning) group specific elements, the components can vary, but at the same time stay valid components (e.g. although FutureLearn is built for mobile, when this theory is used for other learning environments the technology & media component can just as easily only be looking at desktops, and still hold up to see how motivation and learning goals are then affecting the self-directed learning).
- Criterion #5: Are the broader conditions that affect the phenomenon under study built into its explanation? Yes, throughout the thesis rationales were added to provide insights into the existing conditions of the phenomenon. Additionally, descriptions of the full research environment were given both to allow this research environment to be clearly explained, but also in regard to other – similar – environments, such as MOOCs on other platforms.
- Criterion #6: Has "process" been taken into account? Yes, the process of using GT was offered throughout this study. For example by indicating which GT theorists were followed at what stage (e.g. Glaser during pilot study), and also by clarifying the used coding process, and illustrating it with examples from the data.
• Criterion #7: Do the theoretical findings seem significant and to what extent? Yes, the theoretical findings are significant. An account of their significance can be found in the conclusions, as well as in the contributions that this study has made.

By reflecting upon the GT approach after finishing the study, it was possible to validate the GT approach and ensure that the chosen method was used to benefit the results of this research.

9.6 Contributions of this study

The contributions of this study can be divided into theoretical, methodological and practical contributions. Each of these contributions will be described in the following sections.

9.6.1 Theoretical contribution

This study resulted in understanding the informal self-directed learning of experienced, adult online learners engaging in individual and/or social learning using any device to follow a FutureLearn MOOC. This type of study addressed a gap in online learning research that was described in the literature chapter (section 2.2). Briefly synthesized, the early xMOOC literature focused on research involving institutional experiences in setting up MOOCs, together with MOOC studies examining higher education students (Skiba, 2012; Yuan, Powell & Cetis, 2013; Kaplan & Haenlein, 2016). Another research strand within recent MOOC literature was related to professional learning within MOOCs (Milligan & Littlejohn, 2014; Milligan, Littlejohn & Ukadike, 2014; Mori & Ractliffe, 2016). However, a research gap remained open: those of adult learners informally learning in MOOCs.

Another research gap which emerged from literature was related to the actual MOOC learning experience (Liyanagunawardena, Adams & Williams, 2013; Kizilcec & Schneiders, 2015; Terras & Ramsay, 2015). Researchers noticed a gap in research related to the learner experience and the reasons why learners participate and were motivated or demotivated in MOOCs. Most of the research up until now investigated MOOC dropout (Jordan, 2014; Perna et al., 2014; Weller, 2014; Morris, 2014;
Adamopoulos, 2013), however little was known on the actual learning that was being done. This study identified five learning components that influence FutureLearn MOOC learning: learner characteristics, technical & media elements, context, individual & social learning, and organising learning. The study also found two key inhibitors or enablers of learning: intrinsic motivation and personal learning goals. By providing an overview of the key learning components that make up MOOC learning, and by pointing towards two inhibitors/enablers of learning a theoretical contribution to online learning in general, and MOOC learning within FutureLearn MOOCs is made.

9.6.2 Methodological contribution

In their literature overview of empirical MOOC research, Veletsianos and Shepherdson (2016) emphasized the importance and need for more qualitative research. They stated that “very few studies were informed by methods traditionally associated with qualitative research approaches (e.g., interviews, observations, and focus groups). Thus, even though results suggest that research on MOOCs focuses on student-related topics, learners’ voices were largely absent in the literature” (p. 17). Choosing a Grounded Theory approach provided the needed flexibility of qualitative research which allowed me to follow up on leads that emerged from the learner’s data. By using an approach that covered both the pre-course, during course and post-course data coming from the learners’ voices, it offered a view into the learner experience from the beginning (choosing a FutureLearn course), through their actual learning, and right up to the end when learners had the opportunity to reflect on their learning experience.

This study also contributed by using a combination of GT methods. Glaser (1978) approach of keeping an ‘open mind’ was used in the pilot study, because it provided an open view towards the data from the pilot study, it allowed ideas to come from the data as a first distinctive action before relating it to specific theory. Glaser’s approach also proposes a ‘constant comparative method’, while Strauss and
Corbin (1990) propose a three step coding approach. Charmaz’s (2014) approach for constructing GT, which builds on Strauss and Corbin’s coding analysis approach, was used for the main study for two reasons. First of all, the dimensions between the data (moving from codes to categories) would reveal more relationships between the data provided by the participants. Secondly, I no longer had an open mind when it came to related MOOC and SDL literature, as I had been interpreting the results from the pilot study to the existing literature. This combination of keeping a blank mind in the first stages of an GT study, and moving towards a more structured approach in the next phase of a study helped to keep let the learner’s voices emerge from the data to the resulting theory, which enhanced the quality of this study.

**9.6.3 Practical contribution**

This study contributed to the practical realisation of online learning research, by providing a new set of research instruments and adding information to the historical narrative of the FutureLearn platform. In preparation of this study new research instruments were written: the learning logs. These learning logs made it possible for learners to share their learning experiences, while also allowing the researcher to get quantitative as well as qualitative data reflecting the learners ideas and actions (see appendix 13 to read a filled in learning log from a DMCW participant).

Because FutureLearn was still in development when this study was conceived, the research also provides a historical perspective on the FutureLearn platform development. The pilot study provides a unique view into the two FutureLearn trial course that ran for two weeks in from 27 August to 13 September 2013, and the main study which ran during the Autumn of 2014, offers an overview of the FutureLearn courses as they were rolled out only one year after FutureLearn had launched its first, complete public courses.
9.7 Main conclusion

From the voices of the learners who shared their self-directed learning experiences through self-reported learning logs and interviews, a conceptual framework was built.

The research described in this thesis has provided a conceptual framework of how experienced, online learners self-direct their informal learning in informal FutureLearn courses. This study contributes to the body of knowledge of online learning, by providing a conceptual framework consisting of five learning components that make up the FutureLearn learning experience of experienced, online learners: context, individual and social learning, organising learning, technical & media elements, and learner characteristics. Further analysis revealed that there are two major enablers/inhibitors for the FutureLearn experience: intrinsic motivation and personal learning goals. These two factors have a major impact on each of the five learning components. This adds to a feeling of learning success and supports Merrill Cook (2016) who said that “emphasis on self-motivation means that the success of massive open online courses is more accurately measured by whether or not a course empowers learners to reach the goals they desire” (Online Course Report, 2016).

These findings showed that within the FutureLearn course environment, the informal learner is able to own their learning, as the learner can increasingly decide what she or he learns within and outside of an online course. This also means that the learner has an increased learner agency when comparing it to more traditional modes of learning or formal learning, as formal learning is generally stricter in what has to be learned and when. As a result, the experienced online learner engaged in FutureLearn courses has the ability to personalise their learning by self-directing their learning across the five learning components, while acting upon their intrinsic motivation and the personal learning goals they want to achieve.
The study has also provided a substantial body of empirical data on informal self-directed learning in open online courses which might guide future platform developments. The insights from this study allows course facilitators and instructional designers to develop future courses that will add to the learning experience of FutureLearn participants.
References


Fini, A. (2009). The technological dimension of a massive open online course: The case of the CCK08 course tools. *The International Review of Research in Open and Distance Learning, 10*(5).


Liu, I. F., Chen, M. C., Sun, Y. S., Wible, D., & Kuo, C. H. (2010). Extending the TAM model to explore the factors that affect Intention to Use an Online Learning Community. Computers & education, 54(2), 600-610.


Skiba, D. J. (2012). Disruption in higher education: Massively open online courses (MOOCs). *Nursing education perspectives, 33*(6), 416-418.


Appendices

Appendix 1. Pilot: invitation mail

Invitation mail for pilot research on closed beta FutureLearn course starting 27 August 2013

Dear [first name],

Thank you for indicating your interest to engage in additional research on FutureLearn course. I have selected you as a possible volunteer for a pilot study, based upon your online survey answer with regard to follow-up research.

The purpose of this pilot study is to explore your learning experiences while you are engaged in a FutureLearn course. The study will be conducted by me, Inge de Waard, and I am a PhD student at The Open University investigating self-directed learning in massive open online courses such as FutureLearn. This is an independent research study not related to the FutureLearn team or its courses. As such your successful conclusion of this FutureLearn course is by no means dependent on volunteering for or finalizing this research.

The pilot study consists of three phases:
1. Filling in a daily learning log for each day you engage in a FutureLearn course
2. Filling in a weekly log
3. A one-on-one interview, organized after the FutureLearn course has ended.

Each of these phases will be described to you in detail in the informed consent form that you can find in attach. You can find the daily learning log in attach, to give you an idea of what to expect. The weekly learning log template will be sent to you after I have received your informed consent reply. The informed consent reply can be sent by copying the text inside the frame of the informed consent form which is included as an attachment, or sending me the complete, filled in consent form via email.

Your participation is most appreciated. The reason why I am investigating the learner experiences is to help all of us learners in creating a more fluent online learning environment. As such your feedback will help optimize the learning experience inside the FutureLearn platform, helping those learners who come after you. In addition you will receive a copy of the report with the results from the data analysis, as soon as the report is written.

Please know that you are free to withdraw from the study altogether at each point during the course. Any of your personal data collected up until that point can be removed on your request by mailing me at Inge.deWaard@open.ac.uk. There is no penalty for discontinuing participation.

Your responses will be kept completely confidential.
Thanks again and best wishes,

Inge (de Waard)
Appendix 2. Pilot: informed consent form

Informed consent form for the pilot project investigating learning experiences in FutureLearn courses

You are kindly invited to participate in a study gathering your FutureLearn course experiences related to Self-Directed Learning (SDL), or how you organize your learning amidst your daily life, and while coping with (new) technologies.

Purpose of the pilot study is to get a better understanding of all the learning experiences that come along with participating in a FutureLearn course. In order to gather these insights learning logs are provided to research volunteers such as you. The study will be conducted by Inge de Waard, who is an independent PhD student at The Open University and not related to the FutureLearn team.

Phases of the study: this research into learning experiences consists of three phases:

1. Filling in of a daily learning log for each day you engage in the FutureLearn course (estimated time needed 10 minutes per studying day)
2. Filling in a weekly log, to be filled in once a week (estimated time: 10 min per week)
3. A semi-structured one-on-one interview, organized after the FutureLearn course has ended (estimated time needed for the interview: 45 – 60 min).

The weekly learning log will be sent to you after Inge de Waard has received the filled in informed consent form. By emailing the text box included at the end of this form, you agree to be a volunteer for this research. A bit more information on what the research entails is provided here;

Phase 1- daily learning log: Learning logs are written or typed entries in which you share what you have learned and how you experienced your learning. There are two different learning logs provided: one weekly learning log and one daily learning log. You will be asked to fill in the daily learning logs once a day, for each day you engage in the course. More information on how to use the learning log is provided in the learning log template itself. The daily learning log is a template. Please copy the template for each daily learning log you wish to fill in. You are kindly requested to return the filled in daily logs on Monday 16 September 2013 by email (Inge.deWaard@open.ac.uk).
Phase 2: Weekly learning logs: You are kindly requested to fill in the weekly learning log after each week of your FutureLearn course. More information on how to use the weekly learning log is provided in the learning log template itself. You are kindly requested to return the filled in learning logs on Monday 16 September 2013 by email (Inge.deWaard@open.ac.uk).

Phase 3: One-on-one interview: after the course has finished, you will be asked to participate in a one-on-one interview. The interview will be semi-structured, following a sequence of predetermined questions that will be discussed, and possible additional questions following your answers. The interview will last 45 - 60 minutes. You are not required to answer the questions. You may pass on any question that makes you feel uncomfortable.

Benefits of this Study: based on your input and feedback the FutureLearn platform will be enhanced. You will also receive a copy of the report with the results from the data analysis.

Risks or discomforts: no risks or discomforts are anticipated from taking part in this study. If by any chance you would feel uncomfortable during the study, you can withdraw from the study altogether at each point during the course. Any of your personal data collected up until that point can be removed on your request by mailing Inge de Waard at Inge.deWaard@open.ac.uk. There is no penalty for discontinuing participation.

Confidentiality: your responses will be kept completely confidential. Only the principal researcher and the supervisor will see all the collected data. The list of e-mail, learning logs and information data of the participants will be stored electronically in a password protected folder; a hard copy will be stored on a non-connected, stand-alone hard disk that is kept in a locked closet in a secured office at the premises of the Open University in the UK. The data will be stored for the duration of the PhD research. All data will be expunged once the research findings have been published. Any publication or dissemination will only consist of anonymized data.

Dissemination of the research: Insights gathered by you and other participants will be used in writing a research report, which will be read by my supervisors (Professor Mike Sharples and Professor Agnes Kukulska-Hulme) and presented as part of a thesis for the PhD at The Open University.
If you have any questions about this study or if you wish to withdraw or would like additional information to assist you in reaching a decision about participation, please feel free to contact Inge de Waard via email.

To participate in this research, please fill in the form below and email it to Inge.deWaard@open.ac.uk.

I, (print name in full) ……………………………………………………….. am over 18 years old and I agree to participate in this study being conducted as part of an Open University research project.

I give permission for the data collected to be used in an anonymous form in any written reports, presentations and published papers relating to this study. My written consent will be sought separately before any identifiable data is used in such dissemination.

At any time during the research I am free to withdraw and to request the destruction of any data that has been gathered from me, up until one week after the course has ended. The request to withdraw and/or to destroy any data gathered from me, can be sent to the principal investigator of this study Inge.deWaard@open.ac.uk, who will take all the necessary steps to guarantee the correct follow up of the request to be taken out of this research at any stage.

I understand the purpose of the research, as explained in the informed consent form, and accept the conditions for handling the data I provide.

Date: ...........................................

Inge de Waard, PhD Research Student

Institute of Educational Technologies, The Open University
## Appendix 3. Pilot: filled in daily learning log

<table>
<thead>
<tr>
<th>Reference #</th>
<th>7157837</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Complete</td>
</tr>
<tr>
<td>Time. Please check all time-slots that apply for this learning day. You only need to fill in this learning log for each day you are learning.</td>
<td>Early evening (5 pm – 8 pm)</td>
</tr>
<tr>
<td>Location where the learning occurred. Please check all that apply.</td>
<td>Other, home office</td>
</tr>
<tr>
<td>less then 10 minutes</td>
<td></td>
</tr>
<tr>
<td>10 – 30 min</td>
<td></td>
</tr>
<tr>
<td>30 – 60 min</td>
<td></td>
</tr>
<tr>
<td>1 – 2 hours</td>
<td>1</td>
</tr>
<tr>
<td>More than 2 hours</td>
<td></td>
</tr>
<tr>
<td>With which devices did you perform your learning activity? Please check all that apply.</td>
<td>Laptop</td>
</tr>
<tr>
<td>Is there a specific reason for using this or these specific devices for today’s learning?</td>
<td>Default</td>
</tr>
<tr>
<td>Learning activities, please check all the learning activities you took part in.</td>
<td>Viewing multimedia content, Listening to multimedia content, Reading text-based content, Reading course discussions, Adding notes, Responding to discussion(s), Filling in a multiple choice test, Reflecting on the course in a nonFutureLearn social tool (Twitter, Facebook, blog …)</td>
</tr>
<tr>
<td>Problems or challenges met before, during or after the learning took place and that influenced your self-directed learning experience. Please indicate all that apply.</td>
<td>Emotional, Other (specify)</td>
</tr>
<tr>
<td>When you faced certain learning challenges, did you search for support for your learning?</td>
<td>No</td>
</tr>
<tr>
<td>Where or from whom did you search for support for your learning?</td>
<td></td>
</tr>
</tbody>
</table>

250
Please briefly explain the problem/challenge you faced with regard to your learning experience during this day.

I am deeply frustrated by the one-sided content. And I cannot even properly rant about this since social media discussions of content violate the Alpha testing conditions. I have started to write angry tweets with the hashtag #SecretMOOCmustntSpeakAbout. I am glad that, by now, there is some counterdebate on the forums and in the notes/comments, but the awful structure makes this disorganized and haphazard. I'm a pretty conservative person in economic matters, but the blatantly propagandistic treatment of brands in this academic (?) context shocks me.

[Sorry for using this log to rant. The social media ban makes me use any excuse for ranting.]

If you adapted your learning strategy today, please briefly describe the adaptation.

Tweeting with „secretMOOC“ hashtag. Started to use the notes/comments function. Hijacking forum threads.

<table>
<thead>
<tr>
<th>Last Update</th>
<th>2013-09-28 14:07:47</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Time</td>
<td>2013-09-28 14:06:09</td>
</tr>
<tr>
<td>Finish Time</td>
<td>2013-09-28 14:07:47</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IP</th>
<th>92.16.92.139</th>
</tr>
</thead>
<tbody>
<tr>
<td>Browser</td>
<td>Chrome</td>
</tr>
<tr>
<td>OS</td>
<td>Windows</td>
</tr>
</tbody>
</table>
### Appendix 4. Pilot: filled in weekly learning log

<table>
<thead>
<tr>
<th>Reference #</th>
<th>7177493</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Complete</td>
</tr>
<tr>
<td>Please write down the date you wrote up this weekly log:</td>
<td>4 September 2013</td>
</tr>
<tr>
<td>Did you spend some time planning your learning for this week?</td>
<td>Yes</td>
</tr>
<tr>
<td>At this point in time: how do you perceive the FutureLearn course with regard to your learning? (Please check all answers that apply).</td>
<td>I am still finding my way around the FutureLearn course environment, but I feel I am finding my way bit by bit., The FutureLearn course environment meets my expectations of an online course., I am looking at the content only and not engaging with other FutureLearn participants</td>
</tr>
<tr>
<td>Finding your way around the course:</td>
<td>I was able to immediately enter the course where I left it</td>
</tr>
<tr>
<td>Who did you interact with for this part of your learning (Please check all answers that apply).</td>
<td>Nobody</td>
</tr>
<tr>
<td>At this point in time how do you perceive managing the course (time wise)?</td>
<td>I am able to cope with the speed of the course</td>
</tr>
<tr>
<td>Please summarize your learning experience – positive as well as negative - with the FutureLearn course during this week (reflecting on your own learning, as well as the FutureLearn learning environment).</td>
<td>The course is great so far ... my only problem is that my laptop as it needs looking at (live in the country / Ireland so will not be able to get to PC World till Sunday) so using my mums pc and she has a mix of Windows 7 &amp; 8 &amp; Windows Office is kicking all into skydrive - so not frustrated with course only my situation here that is frustrating me and my speed (internet) is faster than my mothers so things are a bit slower. Not a problem but as a student I am normally faster and better responsive then this - hopefully by next week will have all sorted.</td>
</tr>
<tr>
<td>Last Update</td>
<td>2013-10-08 12:13:05</td>
</tr>
<tr>
<td>Start Time</td>
<td>2013-10-08 11:48:15</td>
</tr>
<tr>
<td>Finish Time</td>
<td>2013-10-08 12:13:05</td>
</tr>
<tr>
<td>IP</td>
<td>137.108.145.39</td>
</tr>
<tr>
<td>Browser</td>
<td>Chrome</td>
</tr>
<tr>
<td>OS</td>
<td>Windows</td>
</tr>
</tbody>
</table>
Appendix 5. Welcome to week 1: research invitation

This is the email invitation addressed to research participation which was added to the “Welcome to Week 1” mail for each of the three FutureLearn courses. All three FutureLearn course leads had agreed to put this paragraph in their subsequent “Welcome to Week 1” mail.

“Please volunteer for a research study related to your course learning experience.

A PhD research study is exploring how experienced online learners engage with FutureLearn courses. If you have had previous experience of online learning (e.g. MOOC learning, online learning, distance education, networked learning), please consider taking part in the study to help future adult learners.

The research will include filling in a learning diary on 4 to 6 occasions during the course, sharing your learning actions. To join the study, please either select the link <URL of sign up form was added here, each course had a different URL>, or send an email to inge.dewaard@open.ac.uk with the subject line: FutureLearn research study. The PhD researcher (Inge de Waard) will then send information for you to decide whether to engage with the research.”

After obtaining the signed informed consent form, other documents were sent to the participants.
Appendix 6. Informed consent form

Informed consent form for the FutureLearn research investigating Self Directed Learning

You are kindly invited to participate in a study gathering your learning experiences related to Self-Directed Learning (SDL), or how you plan and self-organize your learning while being enrolled in a FutureLearn course.

**Purpose of this study:** the purpose of this study is to explore and investigate learning experiences of online learners while they are enrolled in a FutureLearn course. The research will focus in particular on people who have prior experience of online learning (“experienced learners”). An experienced learner can be anyone who has had prior experience with formal online learning (e.g. MOOC, distance education), but can also be someone who has successfully self-taught her/himself through online learning based on personal interests or needs. The investigation will focus on your learning actions that are either related to technology (e.g. searching answers on the internet), communicating with other people (e.g. contacting someone you suspect will know an answer or can help you reflect on a topic), and your own learning strategies (e.g. what you know works, or finding out new ways of learning). The study will be conducted by Inge de Waard, PhD student at The Open University.

This study is an independent research, performed by a PhD student who is not related to the FutureLearn team or its courses. As such your successful conclusion of this FutureLearn course is by no means dependent on volunteering for this research.

**Phases of the study:** this research into self-directed learning consists of three phases:

1. A brief online survey delivered to you as soon as you have indicated your interest in becoming a research participant during this FutureLearn course

255
2. A learning log to keep track of your learning during your FutureLearn course at bi-weekly intervals

3. A one-on-one interview, organized within one month after the FutureLearn course has ended.

*Phase 1: online survey:* the URL of the online survey will be sent to you immediately after you have sent this informed consent form back to the principal researcher. The online survey will consist multiple choice questions, open questions and multiple answers. The survey will take 10-15 minutes to complete. The survey includes questions about your prior online experiences, your reasons for registering for this course, and your course or learning expectations.

*Phase 2: Learning logs:* once the course has started you will be asked to keep a learning log, describing learning episodes. Learning logs are written or typed entries in which you share what you have learned and how you went about learning about that particular subject, topic, or personal need. You will be asked to fill in the learning logs on a bi-weekly basis: i.e. in week 2, Week 4, and finally in Week 6. During these learning log weeks, you will be asked to describe two learning episodes you experienced that week. Detailed information on how to use the learning log will be provided together with a template of the learning log. You will be asked to return the logs within the first week after the course (exact date per course will be inserted here) has ended to Inge de Waard by email (Inge.deWaard@open.ac.uk).

*Phase 3: One-on-one interview:* once the course has finished, you will be asked to participate in a one-on-one interview. You will have the option to plan a Skype meeting with me (Inge de Waard) on a moment fitting your schedule. The interview will be structured, following a sequence of predetermined
questions related to your learning. The interview will last between 30 - 60 minutes. You are not required to answer all the questions. You may pass on any question that makes you feel uncomfortable. The interview will be recorded to help the researcher accurately capture your insights in your own words.

**Benefits of this Study:** based on your input and feedback the knowledge on online learning and adult learning will be improved, enabling others to benefit from your experiences and your understanding. You will also receive a copy of the final research report.

**Risks or discomforts:** no risks or discomforts are anticipated from taking part in this study. If by any chance you would feel uncomfortable during the study, you can withdraw from the study altogether at each point prior to or during the course, up until one week after the course has ended. Any of your personal data collected up until that point can be removed on your request by mailing the principal investigator of this study at Inge.deWaard@open.ac.uk. There is no penalty for discontinuing participation.

**Confidentiality: your responses will be kept completely confidential.** Only the principal researcher and her two academic supervisors will see all the collected data. The list of e-mail, learning logs and information data of the participants will be stored anonymously and electronically in a password protected folder for the duration of 5 years; a hard copy will be stored on a non-connected, stand-alone hard disk that is kept in a locked closet in a secured office at the premises of the Open University in the UK. The data will be stored for the duration of the PhD research, i.e. until November 2019. Any publication or dissemination will only consist of anonymized data.
**Dissemination of the research:** Insights gathered by you and other participants will be used in writing a research report, which will be read by my supervisors (Professor Mike Sharples and Professor Agnes Kukulska-Hulme) and presented as part of a thesis for the PhD at The Open University in the United Kingdom and in publications such as journal articles or conference papers.

If you have any questions about this study or if you wish to withdraw or would like additional information to assist you in reaching a decision about participation, please feel free to contact Inge de Waard via Skype Ignatia_dW or email Inge.deWaard@open.ac.uk.

Thank you in advance for your interest in this project. To participate in this research, please return a filled in and signed version of this informed consent form by (date will be different depending on which FutureLearn course this consent form is related too, but always considering five days after the start of the course) or earlier and return the following statement to Inge de Waard, Jennie Lee Building, Walton Hall, Milton Keynes, Buckinghamshire MK7 6AA, United Kingdom or via e-mail to Inge.deWaard@open.ac.uk.

I, (print name in full) .......................................................... am over 18 years old and I agree to participate in this study being conducted as part of an Open University, United Kingdom research project.

I give permission for the data collected to be used in an anonymous form in any written reports, presentations and published papers relating to this study. My written consent will be sought separately before any identifiable data is used in such dissemination.
At any time during the research I am free to withdraw and to request the destruction of any data that has been gathered from me, up until one week after the course has ended. The request to withdraw and/or to destruct any data gathered from me, can be sent to the principal investigator of this study Inge.deWaard@open.ac.uk, who will take all the necessary steps to guarantee the correct follow up of the request to be taken out of this research at any stage.

I understand the purpose of the research, as explained in the covering letter, and accept the conditions for handling the data I provide.

Signature: ........................................
Date: ...........................................

Inge de Waard, PhD Research Student
Institute of Educational Technologies, The Open University, UK

Please return completed form to Inge.deWaard@open.ac.uk
Appendix 7. Invitation e-mail for the online survey

E-mail subject: FutureLearn research investigating online learning - brief survey

Dear [firstname of participant],

Thank you for your willingness to become a research participant in the FutureLearn study investigating online learning.

To start this research, I would like you to fill in a brief, four question survey (only 1 page). This will allow me to get an idea of your previous online experience and your overall reason for joining this course as described in your own words.

**Your Unique Identifier is:**

**SOM101**

I will ask you to add this identifier to all the online documents, this will allow me to analyse the data in a logical, yet anonymous way.

The online survey can be found here:

[http://tinyurl.com/FLonSurvey](http://tinyurl.com/FLonSurvey)

Thank you for helping future learners to improve their learning based upon your FutureLearn experiences.

Best wishes,

260
Appendix 8. Online survey questions

These pre-learning log questions provided the basis for selecting research participants that could be considered experienced online learners (= learners that had prior online learning experience, either in formal or in informal – self-taught - contexts).

Survey questions and introductory message

Thank you for your willingness to become a research participant in this study.

Please fill in the following online survey questions. These questions will allow the researcher of this study to get additional insight in your prior online learning experience, as well as in your expectations of your FutureLearn course.

1. What is your prior online learning experience? (Multiple choice: no prior experience, 1 year or less online learning experience, less than 3 years online learning experience, less than 5 years online experience, more than 5 years online learning)?

2. What type of online learning do you have experience with? (Multiple answer: MOOC, online learning, distance education course, learning experience by self-organised learning to stay on top of my field of interest, learning online from my network, self-taught online learning on random subjects, other)

3. What is your reason for registering for this particular course (Multiple answer: professional interest, personal interest, learning need, other)?
4. What do you expect to get out of this course? (Open question)

**Thank you message**

At the end of the online survey the participants received the following automated thank you message:

“Thank you for participating in the first step of this research study. The researcher of this study will contact you within 48 hours and provide you with a learning log template and accompanying instructions. This will allow you to start your next step in this research project.”
### Appendix 9. Filled in online survey example from SOM participant

<table>
<thead>
<tr>
<th>Reference #</th>
<th>7862952</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Complete</td>
</tr>
<tr>
<td>Please provide your Unique Identifier (sent to you via email)</td>
<td>som005</td>
</tr>
<tr>
<td>What type of online learning do you have experience with? (Multiple answers possible)</td>
<td>online learning or e-learning, distance education course(s), learning experience by self-organised learning to stay on top of your field of interest (either personal or professional)</td>
</tr>
<tr>
<td>Please indicate your years of online learning experience? (Multiple choice)</td>
<td>less than 3 years online learning experience</td>
</tr>
<tr>
<td>What is your reason for registering for this FutureLearn course? (Multiple answers possible)</td>
<td>professional interest</td>
</tr>
<tr>
<td>Please describe what you expect or hope to get out of this course?</td>
<td>I teach people about dementia. People with dementia are usually old and have other diseases and problems that are often treated with medication. I have a friend who is a nurse prescriber and when I am talking to her I realise the my deficiencies. I need a deeper understanding of medicines and pharmacology generally.</td>
</tr>
<tr>
<td>Last Update</td>
<td>2014-09-01 16:59:11</td>
</tr>
<tr>
<td>Start Time</td>
<td>2014-09-01 16:55:17</td>
</tr>
<tr>
<td>Finish Time</td>
<td>2014-09-01 16:59:11</td>
</tr>
<tr>
<td>IP</td>
<td>91.84.209.107</td>
</tr>
<tr>
<td>Browser</td>
<td>Chrome</td>
</tr>
<tr>
<td>OS</td>
<td>Windows</td>
</tr>
<tr>
<td>Referrer</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Appendix 10. E-mail inviting participants to fill in a learning log

E-mail subject: Learning log information – FutureLearn online learning research

Dear [Firstname of participant],

Thank you for filling in the online survey. In attachment you will find a PDF version of the learning log template which is part of the online learning research.

To fill in the learning log you can use the following link:

http://tinyurl.com/FL-learningLog

Specific information on the learning log can be found in the document or online form.

Please fill in two learning logs for each of the following weeks:

Week 2: starting next week 8 September 2014,
Week 4: starting 22 September 2014,
Week 6: starting 6 October 2014.

You are free to choose which days you fill in the learning logs for those particular weeks.

In each learning log you are asked a couple of questions to provide insight in which learning actions you take. You are the expert online learner, as such it might be that you take certain learning actions for granted (e.g. surfing the net to find an answer, discussing what you saw during the course with your partner...). However, for this study both the ‘simple’ learning actions, as well as any ‘complex’ learning actions are important.
Looking forward to your learning log experiences.

Best wishes and good luck with your FutureLearn course,

Inge
Appendix 11. Learning log template

Remark concerning the learning logs: the FutureLearn course ‘Basic Science: Understanding Experiments’ consisted of only 4 weeks, the learning log template for that course only indicated Week 2, and Week 4 in the Learning Log instructions. The learning logs were provided in an online format which saves the learning log information filled in by the research participant automatically.

Actual learning log information and template:

Before providing you the actual learning log questions, some additional information and instructions are offered. In case this information is unclear or you have any questions concerning the research, do not hesitate to mail the researcher of this study Inge de Waard (inge.dewaard@open.ac.uk).

Learning log instructions:

Frequency for filling in the learning logs.

From Week 2 of your FutureLearn course, and from there on for every second week until the end of your FutureLearn course (i.e. Week 2, Week 4, and Week 6), you are kindly asked to fill in two learning logs for that particular ‘research week’. You are free to choose which days you fill in the learning logs for that particular ‘research week’.

In each learning log you are asked a couple of questions to provide insight in which learning actions you take. You are the expert online learner, as such it might be that you take certain learning actions for
granted (e.g. surfing the net to find an answer, discussing what you saw during the course with your partner...). However, for this study both the 'simple' learning actions, as well as any 'complex' learning actions are important.

With setting up this bi-weekly frequency of two learning logs for each of those research weeks, the researcher hopes to limit your time investment for this research, yet at the same time allow you to make distinct descriptions of your learning episodes as they manifest themselves during that week.

Learning log terminology

The learning log refers to certain learning concepts. In order to allow us all to have the same definition in mind while filling in the learning logs, three concepts are defined here:

- **Learning episode**: a learning episode consists of a sustained, deliberate effort from the learner to learn. A learning episode can consist of one or multiple learning actions (e.g. communicating with peers, reflecting, searching the Web, watching a FutureLearn video). These learning actions can be suggested by the FutureLearn course, and/or they can also be initiated by your own expertise and/or learning need. A learning episode leads to a personal journey on something which you feel you need to learn; therefore it does not need to reach a final goal or objective. A learning episode is more of a longer learning momentum that gives you a satisfied or inquisitive feeling at the end of a learning day or week.

- **Learning objective**: a learning objective is a small learning goal you set yourself. This could be related to content, technology, or it can be related to communicating with other people or anything that you feel is a small, achievable learning goal for you.
• **Learning outcome**: a learning outcome is any type of learning result that will allow you to learn better in the future. Learning outcomes can be based on good experiences, but also on poor experiences that made you adjust your learning.

---

**Learning log template questions**

Thank you for taking the time to read the instructions.

Please fill in the learning log questions below and thank you in advance for your time and effort.

**Learning episode**

Please describe the learning episode you engaged in today (open question).

**Question with multiple answer checkboxes, and an open question to describe why**

- Was this learning episode completed successfully? (yes/no) If no, will you try and complete it in the near future? (yes/no)
- Did you try and find a solution for this learning episode individually? (yes/no – please say why?)
- Did you connect to other people in order to find solutions to your learning episode? (Multiple answer: course facilitators, course peers, professional network/colleagues, friends, family, nobody – please say why)
- Did you find answers to your learning episode in the content of the course? (yes/no – please say why)
- Did you look for answers on the internet? (yes/no)
- Did you find answers to your learning episode on the internet? (yes/no – please say why)
- Did you look for answers in other locations than the internet? (yes/no - If so, where?). Did you find answers to your learning episode in these places? (yes/no – please say why)
- Did or do you use a specific tool that is not part of the FutureLearn course to keep track of your learning or learning episodes? (eg. twitter, bookmarking, blogging...) (open question)

- Which online devices did you use to solve this particular learning episode? (multiple answer: smartphone, tablet, pc, laptop, desktop, other).

- Do you keep some kind of (personal) record of what you have learned (multiple answer: personal notebook, course notebook, blog, e-portfolio, other)?

- Did you share what you learned with other people? (yes/no) If so, with whom? (multiple answer: course facilitators, course peers, professional network/colleagues, friends, family, nobody, other).

Learning objectives

- Did you have a learning objective in mind that prompted you to the learning episodes described in this learning log? (Yes/No) If so, please describe the learning objective you wanted to achieve?

Mediation

- How did you decide which content or which person (this could be you or anyone else) could solve your problem in the best way? (open question)

- What (if any) were your considerations to decide to contact someone to solve one of your learning episodes? (open question)

Reasons for not solving a learning episode or for looking even harder to solve it (all open questions)

- Have you encountered a learning episode that was too difficult to solve? If so, what did you do to try and solve it (if anything)? In case you decided that this learning episode would be too
difficult to solve, can you share at what point you decided it was too difficult? What was the reason for deciding not to solve this particular learning episode?

- Have you engaged in a learning episode that demanded more of you than you would have expected beforehand, but which you accomplished successfully? What made you decide to invest extra time and effort in this learning episode? What or whom motivated you to solve this learning episode?

- Did you have an unexpected learning outcome? Or did you learn something unexpected (e.g., learn about a new tool that other learners use, learning strategies that others suggest, time management options)? If so, please describe this unexpected learning.

Learning strategies

Did this learning episode result in a learning strategy you want to use in the future? If so, please describe this learning strategy. (open question)

Thank you very much for your time and effort to fill in this and each one of your learning logs!

Inge de Waard
Appendix 12. Learning log example (BSE) sent to participants requesting more information

This filled in learning log is just an example to give you an idea of what a learning log might contain. Of course your own shared experiences might be totally different. As the goal of this research is to get an idea of how experienced online learners learn, every type of filled in learning log is of importance. I highlighted the answers to the questions, for easy reading.

Thank you in advance for your time!

Best wishes,

Inge de Waard

In case any information in this learning log is unclear, or if you have questions concerning the learning log or the research, please mail me - Inge de Waard (inge.dewaard@open.ac.uk).

Learning log

Please provide your Unique Identifier here: learner101.
(mailled to you in email related to online survey)

Learning episode

A learning episode consists of a sustained, deliberate effort from the learner to learn. A learning episode can consist of one or multiple learning actions (e.g. communicating with peers, reflecting, searching the Web, watching a FutureLearn video). These learning actions can be suggested by the FutureLearn course, and/or they can also be initiated by your own expertise and/or learning need. A learning episode leads to a personal journey on something which you feel you need to learn; therefor
it does not need to reach a final goal or objective. A learning episode is more of a longer learning momentum that gives you a satisfied or inquisitive feeling at the end of a learning day or week.

Please describe the learning episode you engaged in today:

This week I was looking forward of learning an experiment taught to me online, while actually performing it in my own home. Plotting my graph. First I read the instructions, and downloaded the activity booklet. I also had another look at the videos provided in the course. One concept in the video was unclear to me, so I asked the other course participants what they thought it was. One learner was very helpful providing a link to another video (on youtube) that showed a good description of the concept.

**Question with multiple answer checkboxes, and an open question to describe why** Was this learning episode completed successfully?

- [ ] Yes
- [x] No, but I will complete it later
- [ ] No

Did you find answers to your learning episode in the content of the course?

- [x] Yes
- [ ] No

Please explain why?

Although not everything about the experiment was clear from the start, the answers to my questions were found by talking to other members of the course. I also found some of the videos and transcripts that were provided very useful.

Did you find answers to your learning episode on the internet?

- [x] Yes
- [ ] No

Please explain why?
As I mentioned before, one of the course colleagues sent me a link to another video on Youtube and that was very helpful in understanding the full experiment.

Did you look for answers in other locations than the internet?

- X Yes
- ❑ No

Please share where you looked for answers?

I also have an old school book on the subject, which I dug up and used to refresh my knowledge to get a better understanding of the video provided in the course.

If you used a specific tool that is not part of the FutureLearn course to keep track of your learning or learning episodes please share which tool it is? (eg. twitter, bookmarking, blogging...)

I write short episodes on my blog so I can keep track of what I learn during the course. I use my own study journal, as mentioned in the video.

Which online devices did you use to solve this particular learning episode? (multiple answers possible)

- X Smartphone
- ❑ Tablet
- X Laptop
- ❑ Desktop ❑ Other:

Do you keep some kind of (personal) record of what you have learned?

- ❑ a notebook
- X one or more blogs
- ❑ an e-portfolio
- ❑ other: ...

Learning objectives
A learning objective is a small learning goal you set yourself. This could be related to content, technology, or it can be related to communicating with other people or anything that you feel is a small, achievable learning goal for you.

If you had a learning objective in mind that prompted you to the learning episodes described in this learning log, then please describe the learning objective you wanted to achieve here.

I wanted to understand this week’s topic and perform the experiment, to refresh my old scientific interest. My brother is a science teacher, so I am looking forward to discussing what we did in this online course.

Mediation and collaboration

Did you try and find a solution for this learning episode individually? (yes/no – please say why?)

- Yes
- No

Please explain why?

As mentioned I asked other people that take this course for help

Did you connect to other people in order to find solutions to your learning episode?

- course facilitators
- course peers / course learners
- people from your professional network/colleagues
- friends
- family
- I connected to nobody

Please explain why?

I find that asking them for help usually provides me with quick and correct answers.

Did you share what you learned with other people? (yes/no)

- Yes
If so, with whom?

- course facilitators
- course peers / course learners
- people from your professional network/colleagues
- friends
- family
- I connected to nobody
- Other / Who?

Please explain why?

I share what I know with course peers so they might be helped. And while I was talking to some friends, they asked me what I learned from this MOOC, so I shared what I experienced. Some of my friends, and my brother, are teachers as well. Discussing the experiments make a good conversation.

How did you decide which content or which person (this could be you or anyone else) could solve your problem in the best way?

I connected to no one specific for this learning, just general reaching out. But I have noticed that some people seem to know more on the subject than others. So I do think I will connect with the one’s that know more on the subject in the future.

What (if any) were your considerations to decide to contact someone to solve one of your learning episodes?

For now I did not have a particular goal in mind. But I might talk to some teachers I know, or maybe even the course facilitator, as they are obviously very knowledgeable. But hesitating because I do not want to intrude on the facilitators schedule.

Surpassing difficulties, obtaining learning results (all open questions)
If you have encountered a learning objective or episode that was too difficult to solve, what did you do to try and solve it? Or what was the reason for deciding not to solve that particular learning objective or episode?

My first attempt to watch the video was with my smartphone. But that did not work well, so I waited until I was home to look at the video with my laptop.

I like that fact that I can engage my children in the experiments.

If you have engaged in a learning episode that demanded more of you than you would have expected beforehand, then what or who motivated you to invest extra time and/or effort to solve it?

At present the content and experiments seem fairly comprehensible. But I do set aside study/experiment hours to ensure I will be able to go through all the material and all the actions.

Learning outcomes and strategies

A learning outcome or strategy is any type of learning result that will allow you to learn better in the future. Learning outcomes can be based on good experiences, but also on poor experiences that made you adjust your learning.

If you learned something unexpected, please describe this unexpected learning (e.g. learn about a new tool that other learners use, learning strategies that others suggest, time management options you found).

Planning my study time seems really important in this course. I learned this from another online course which I dropped out of.

The experiments are new to me, so each hands-on action provides me with new insights. For example realizing new ways of obliterating potatoes with my microwave.

If this learning episode resulted in a learning strategy you want to use in the future, please describe this learning strategy here.

Planning and discussing experiences with others.
Please add any additional remarks you might have on your learning process.

I do feel at times that this online learning is also some kind of past time for me. It is like going jogging, but instead of a physical exercise I get a mental exercise.

Thank you very much for your time and effort to fill in this learning log!
Inge de Waard

Inge.deWaard@open.ac.uk

Appendix 13. Filled in learning log from DMCW participant

<table>
<thead>
<tr>
<th>Reference #</th>
<th>7920263</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Complete</td>
</tr>
<tr>
<td>Please provide your Unique Identifier</td>
<td>dmcw226</td>
</tr>
<tr>
<td>Please describe the learning episode you engaged in today.</td>
<td>I'm in week two of my course at FutureLearn.com and its amazing. I enjoyed most of the classes especially by Dr. Natasha Barrett. The video is good which runs smoothly without stucking or buffering. It is amazingly creating my utmost interest in cardiology (the course which i'm taking). Week one was very fun like commenting, sharing thoughts, ideas about what other gets and where are you, what's your progress etc. In short i'm loving studying by this pattern.</td>
</tr>
<tr>
<td>Was this learning episode completed successfully?</td>
<td>Yes</td>
</tr>
<tr>
<td>Did you find answers to your learning episode in the content of the course?</td>
<td>Yes</td>
</tr>
<tr>
<td>Did you look for answers on the internet?</td>
<td>Yes</td>
</tr>
<tr>
<td>Did you look for answers in other locations than the internet?</td>
<td>Yes</td>
</tr>
<tr>
<td>If you used a specific tool that is not part of the FutureLearn course to keep track of your learning or learning episodes please share which tool it is? (eg. twitter, bookmarking, blogging...)</td>
<td>yahoo answers</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Which online devices did you use to solve this particular learning episode? (multiple answers possible)</td>
<td>Laptop</td>
</tr>
<tr>
<td>Do you keep some kind of (personal) record of what you have learned?</td>
<td>a notebook</td>
</tr>
<tr>
<td>If you had a learning objective in mind that prompted you to the learning episodes described in this learning log, then please describe the learning objective you wanted to achieve here.</td>
<td></td>
</tr>
<tr>
<td>Did you try and find a solution for this learning episode while solving it individually?</td>
<td>Yes</td>
</tr>
<tr>
<td>If you connected to other people in order to find solutions to your learning episode, please indicate who? (multiple answers possible)</td>
<td>professional network/colleagues, friends</td>
</tr>
<tr>
<td>Did you share what you have learned so far with other people?</td>
<td>Yes</td>
</tr>
<tr>
<td>If you shared what you have learned with others, who did you share it with? (multiple answers possible)</td>
<td>Family</td>
</tr>
<tr>
<td>How did you decide which content or which person (this could be you or anyone else) could solve your problem in the best way?</td>
<td>I and my friends and cousins mostly help me.</td>
</tr>
<tr>
<td>What (if any) were your considerations to decide to contact someone to help, support or solve one of your learning challenges?</td>
<td>my cousin who is also learning and teaching and of course better than me.</td>
</tr>
<tr>
<td>If you have encountered a learning objective or episode that was too difficult to solve, what did you do to try and solve it? Or what was the reason for deciding not to solve that particular learning objective or episode?</td>
<td>I try and try until i reach a certain result i want.I search yahoo answers ,go to Google browse for information, go to libraries grab the related books or ask any professional for the solution.</td>
</tr>
<tr>
<td>If you have engaged in a learning episode that demanded more of you than you would have expected beforehand, then what or who motivated you to invest extra time and/or effort to solve it?</td>
<td>If it's a online course like what i'm taking at FutureLearn.com then it would bee easy because i can by my self manage my studies time.If not then it would be about priority like which subject is prior for me and needs more concentration.</td>
</tr>
<tr>
<td>If you learned something unexpected, please describe this unexpected learning (e.g. learn about a new tool that other learners use, learning strategies that others suggest, time management options you found).</td>
<td>I enjoyed it by learning it every day until i get bore.</td>
</tr>
</tbody>
</table>
Appendix 14. One-on-one interview questions - post course

This was the information and the semi-structured questions sent to the participants before the one-on-one Skype interviews.

After analysing all the learning logs, some questions emerged. These questions are the last step in this research study as mentioned in the informed consent document and will be part of the one-on-one Skype interview. I hope you are able and willing to respond to most of or all the 12 questions. Your answers will help strengthen the research results.

These are the 12 questions I will ask:

1. Now that you finished the course, did you gain anything you did not expect to gain from the course?
2. Did this FutureLearn course help you attain one or more personal or professional learning goal(s) that you set for yourself prior to the start of the course? And if so, what were these goals?

3. Did you learn information that has been helpful for your career or personal interest? Did the course already have an impact on your work or interests?

4. Was there a moment during the course you decided to learn more individually or more in collaboration with others? Could you describe the reasons for this shift?

5. On this course there were a number of people who decided to connect with others to deepen their understanding of the course concepts and ideas. If you did connect, what were your reasons for doing so? Can you give an example?

6. A number of participants decided to skip a specific topic, or focus only on a small part of the course content. Did you select specific content or topics? And if so, what were your reasons?

7. In case you used different electronic devices to connect to the course (tablets, smartphones, desktop, laptop...), did you have specific reasons to use one or the other device for specific learning or course reasons?

8. Please share the reasons (if any) that made you decide to put in the extra effort to learn something in an online course?

9. What is the point beyond which you think it is not worth the extra effort to reach an answer or a personal learning goal in an online course? Please explain why.

10. Did the ways in which you organised your learning change during the course?

11. Did you reflect on your learning during the weeks you did not have to fill in the learning logs?

12. How was your learning experience of the FutureLearn course compared to other online courses you have taken in the past?