A conceptual framework for learners self-directing their learning in MOOCs: components, enablers and inhibitors

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Abstract

The conceptual framework presented in this chapter describes the learning components influencing the learning experiences of adult informal learners engaged in MOOCs offered on the FutureLearn platform. It consists of five learning components: individual characteristics, technology, individual & social learning, organising learning, and context. 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, as they studied various subjects in MOOCs. Literature on MOOCs, mobile and informal learning provides scientific support, in addition to literature clarifying the rationale for self-directed learning as a focus of investigation. The participants of this study voluntarily followed one of three FutureLearn courses that were rolled out for the first time at the end of 2014. Data were collected at three stages through 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.

Keywords:

Informal learning, MOOC, conceptual framework, grounded theory, adult learning.

Introduction

This chapter reports on a study with adult informal learners using the Futurelearn MOOC platform and outlines a conceptual framework that was developed as part of this research. Bozkurt, Keskin and de Waard (2016) analyzed 51 theses and dissertations, and they concluded that "nearly half of the studies didn't benefit from any theoretical or conceptual perspective" (p. 203), pointing to the lack of frameworks for MOOC research. The chapter reviews background literature before presenting the research questions, methodology, research findings and conclusions.

Literature Review

Adult learners and MOOCs: a gap

Adult learners across the world are taking advantage of widely available MOOCs (massive open online courses). Research concerned with MOOC demographics shows that most MOOC learners are already employed, well educated, from developed countries and have higher levels of formal education (Liyanagunawardena, Lundqvist, & Williams, 2015, Breslow, 2016). This contrasts with the target groups of the majority of research studies investigating MOOC experiences, which look at experiences of students who have not yet graduated from Higher

Education. For example, 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); other MOOC literature highlights the popularity of professional learning with MOOCs (Mori & Ratcliffe, 2016; Wong et al., 2018). Morris (2014) noted that "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 chapter provides a conceptual framework which relates to the learning experiences of adult learners engaging in MOOCs and who already hold a first degree or a professional qualification.

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 Schneider's (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 also need "to understand learners' expectations and how they cope with the specific challenges that are associated with MOOCs" (p. 477).

Breslow (2016) indicates we need a better understanding of the actual learning experience in MOOCs. To explore the varying and shifting learners' intentions for participating in MOOCs, there is a need 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 (Kilgore, Bartoletti & Al Freih, 2015; Milligan & Littlejohn, 2016). Milligan and Littlejohn (2016) 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.

Researchers have found that most MOOC learners do not learn in a linear fashion. Guo and Renicke (2014) report 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 learners 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. Allowing learners to choose what they want to learn "allows individuals to choose how to engage with courses and is another strategy for supporting the diversity of learner needs" (Kizilcec & Schneider, 2015, 6:21). This was supported by Littlejohn, Hood, Milligan and Mustain (2016) who investigated the learning behaviours of 788 MOOC participants, with follow up interviews with 32 learners. They found that learners' motivations and goals "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" (p. 1).

Finally, 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). They argue it is essential to evaluate the psychological challenges, barriers and enablers to effective engagement and learning in MOOCs. Gasevic, Kovanovic, Joksimovic & Siemens, (2014) have emphasized the need to understand student motivation, metacognitive skills, learning strategies, and attitudes. These priorities and the prior research findings all informed the design of the study reported in this chapter, which involved learners using the FutureLearn platform.

FutureLearn MOOCs
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 (Scanlon, McAndrew & O'Shea, 2015). FutureLearn sets itself apart from the other major MOOC platforms with its outspoken focus on social learning.

This study uses the definition of social learning as offered by Sol, Beers and Wals (2013) who define it 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). 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 (Ferguson, Clow, Beale, Cooper, Morris, Bayne, & Woodgate, 2015; Sharples, 2016).

Research questions
The literature pointed to a research gap and suggested the need for a study that would provide a conceptual framework representing the experiences of adult learners who engage in MOOCs, and where elements of characteristics, technology, social learning and overall self-directing of learning would be positioned. This study specifically investigated adult learners with two years or more prior online learning experience. The following research questions arose.

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?

Research methodology

Data collection
The participants of the main study followed one of three FutureLearn courses: "The Science of Medicines" organised by Monash University in Australia, "Basic science: Understanding Experiments" organised by The Open University in the United Kingdom, and "Decision Making in an Increasingly Complex and Uncertain World" organised by the University of Groningen in the Netherlands. These three publicly available courses were all rolled out for the first time in September 2014.

Three research instruments were used for collecting data in three 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. The learners self-reported on their FutureLearn course learning experiences by filling in learning logs provided to them by the researcher. 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 on the experience. The questions for those interviews were derived from the sub-questions related to this study, as well as from the information shared in the learning logs (de Waard & Kukulska-Hulme, 2019).

Once the data were collected, they 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, that was developed into a framework. 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.

Target population

The target population for this study was selected in a number of steps, including recruiting volunteers for the study and selecting the participants based on their prior online learning experience. An overview of the procedure to select the participants can be seen in figure 1.

FutureLearn courses open for registration
- Through the FutureLearn platform
- Via mails sent out by FutureLearn marketing to learners who followed similar courses

Pre-course online survey
- Willing to take part in research
- Sign informed consent
- Three FutureLearn courses (SOM, BSE, DMCW)

115 Participants signed informed consent form
- Describing research
- Expected time investment
- More than one year of online learning experience

Target population
- Learning logs from 56 participants
- 147 learning logs
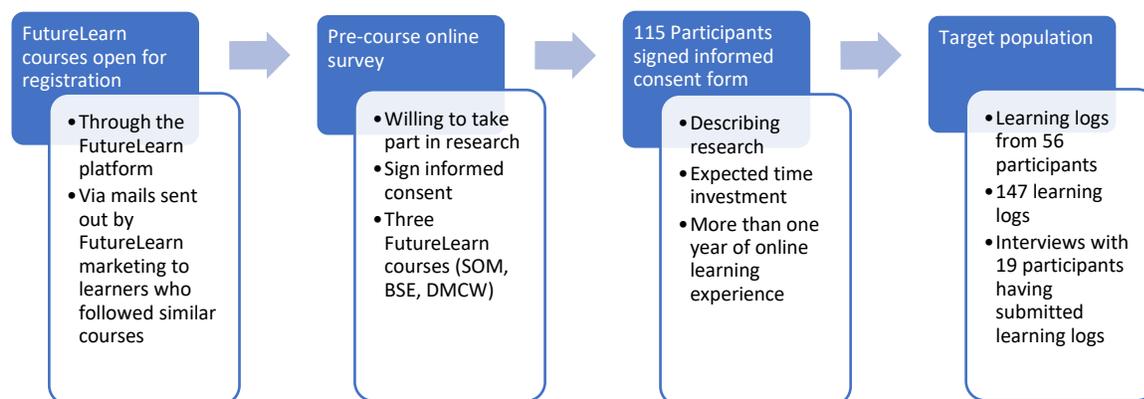- Interviews with 19 participants having submitted learning logs

Figure 1. Visual overview of the target population selection procedure for the main study

Data corpus and sample size

The data corpus of the main study comprised the following:

- A pre-course survey, following 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 completed learning logs: 56 (4 SOM, 15 BSE, 37 DMCW participants).
- Learning logs kept: 147 (15 SOM, 41 BSE, 91 DMCW; ranging from one to five learning logs submitted by a single learner).
- Semi-structured one-on-one interviews: 19 participants (1 SOM, 4 BSE, 14 DMCW).

Research findings

To ensure participant anonymity and data transparency, the data from all participants were coded as shown in Table 1.

Participant identifier: #DMCW/I/222	Description of each element of the participant's identifier
#DMCW	#Course, i.e. Science of Medicines (SOM), Basic Science – Understanding Experiments (BSE), Decision Making in an Increasingly Complex World (DMCW)
/LL$	/Learning log (LL) or Interview (I)
/222	/participant ID

Table 1. Learner data coding description

Which individual characteristics influence the learning experience?

Two key aspects emerged when investigating Individual characteristics: motivation and personal traits including emotion.

Motivation

Motivation can influence what, when, and how we learn (Schunk, 1995). Intrinsic motivation refers to "doing something because it is inherently interesting or enjoyable", and extrinsic motivation 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 expressed in the data.

Motivation prior to the course. 61% of the participants indicated they had a specific personal interest in the course. Of 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.

Motivation as mentioned in learning logs and interviews. The learning logs and post-course interviews revealed that the professional or personal motivations vary from course to course. The biggest difference in motivation based on coding the excerpts was in the DMCW and BSE courses. The DMCW course is mentioned more frequently in relation to the participants' professional motivation (65%), and the BSE course had more learners referring to motivation

based on their personal interest (29%): "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).

Motivation for completing a learning episode. Learners who were professionally motivated completed 74% of the learning episodes. Learners who indicated personal motivation to follow the course completed 38% of the learning episodes they started. Overall, 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, but rather that it is successful as perceived by the participants.

Key personal traits and emotions influencing the learning process

Two personal traits related to individual characteristics emerged most frequently during the line-by-line data analysis: perseverance and self-confidence.

Perseverance. Perseverance was mentioned by 16 participants. Some learners had to reflect on whether or not to learn all the details of a course. Participants indicated their need to grasp all that they felt needed to be done and this was supported by their emotions. Learners can be particularly stimulated by unforeseen context or content, the satisfaction of having learned, and the affinity they feel with 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".

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).

Self-confidence impacting social learning. 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 issue: "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.

Emotional language and learning. In both learning logs and interviews the participants used emotional language to support accounts of their self-reported learning experience. The emerging data suggested that content and facilitators can inspire the learner. When the content of the course aligned with personal expectations or needs, it added to the pleasure of learning, e.g. "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. "having access to very up-to-date information was very stimulating" (#DMCW/I/179).

Findings on individual characteristics

Intrinsic motivation seems to have a profound effect on learning within FutureLearn MOOCs. It 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. 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.

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). Emotions colour the learning experience; they can deter learners from learning or stimulate them.

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. This section pertains to the devices used, FutureLearn course elements, and learning new tools suggested in courses.

Multitude of devices

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. Table 2 gives an overview of which devices were used to access the courses.

Devices	Smartphone	Tablet	Laptop	Desktop	Other
Percentages	13 %	12 %	45 %	26 %	4 %

Table 2. Devices used by the learners to access the course (n=147)

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 worked with a preferred device, but depending on the context learners switched to other devices, mostly mobile devices as these allowed them to engage with the course from a different location.

FutureLearn course elements

The FutureLearn platform uses different features to create the course environment. In the learning logs participants often referred to their use of FutureLearn features: selective use of media, the conversational commenting option, and videos were mentioned as easy learning material. 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 watched the same videos at different moments in their learning episode to increase their understanding of the content.

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 study found that 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).

Learning new tools suggested in courses

Learners 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: Lightbeam was mentioned by 11% of the learners, although it was not a mandatory tool to explore. This 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.

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. 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.

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, and social learning actions.

Individual learning actions

63% of the learners completed the learning episodes by themselves, learning individually, and subsequently are addressed as individual learners in this section. Individual learners take the following actions: viewing and reading course media, reflecting on content, looking for answers on the internet, linking to prior knowledge (de Waard & Kukulska-Hulme, 2019). Although individual learners refrain from engagement in any discussions, or in commenting, they did testify that they looked at those 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). Lurking seemed a deliberate action, following unresolved questions: "I really only look to see what others have written if I don't know the answer" (#SOM/LL/104).

Individual learners did not want to interact with others based on time considerations as well as 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 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).

Social learning: connecting and sharing

37% of all participants indicated they connected and/or shared their learning with others (course participants, family, friends, partner, and professional colleagues).

Looking for answers versus experience sharing. This study revealed that participants turn to different people when looking for answers, or when sharing course experiences. In Table 3 only the quantitative data from BSE and the DMCW course were considered, as there were only 4 SOM participants and those were mainly individual learners.

Looking or sharing answers with others (n = 147)	Course	Mostly inside course (in %)		Mostly outside course (in %)				Other (%)
		Course facilitators	Course peers	Professional colleagues	Friends	Family	Partner	
Looking for answers	BSE	12	37	11	4	19	11	6
	DMCW	17	45	10	8	5	8	7
Sharing experiences	BSE	2	35	13	13	30	7	2
	DMCW	1	32	17	16	19	15	0

Table 3. Who people turned to in order to find answers and who people connected to in order to share their FutureLearn course experiences

Table 3 provides an overview of who learners interacted with, either to look for answers or share their course experiences with. These data come from the learning logs where learners were asked to indicate who they interact with, which was then cross-tabulated with the two options of either looking for answers or sharing experiences. Most interactions involved engaging with course peers. 49% of the participants from the BSE course connected with people inside the course, but remarkably 45% of them were also looking for answers with people outside the course. For the participants from the DMCW course, the percentages were 62% connecting with people inside the course, and 31% outside the course. In the case of sharing experiences, the interactions with others outside the course outnumber the interactions inside the course.

The course facilitators were mainly contacted by learners in order to find answers to learners' 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).

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, and partners. Friends were more frequently interacted with to share the FutureLearn experience. Learners also simply shared what they are doing with others, without necessarily wanting answers to 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).

Learners were not only looking for answers, they also shared their own knowledge. The social learning happened inside as well as outside the FutureLearn course.

Social learning actions

Social learning involves learners interacting with each other, either online or in real life (de Waard & Kukulska-Hulme, 2019).

Choosing who to interact with. In a classroom, be it digital or face-to-face, the first few weeks allow learners to assess 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. more or less 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. However, 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 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).

In order to achieve the best possible social learning option, the learners build on their familiar practices, and test out new course options.

Reflective actions. Reflecting on the content was a recurring action in the learning logs, ranging from individual reflecting to openly social reflecting. Reflective actions are an essential part of learning, and due to the social learning availability within FutureLearn courses extra reflections are triggered 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).

Cohort learning. FutureLearn courses have a clear starting point, thus offering the opportunity to move forward in a cohort of learners. Cohort learning can add to the group feeling for learners. 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).

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. Because of the increased amount of learners inside the courses, more reflective triggers are available.

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, and personal goal setting.

Scheduling

The learner schedules their learning depending on available time and considering the return on time investment in social learning.

Available time. Time is a reoccurring influence on organising learning. 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[d] accept I may not understand or complete that particular challenge" (#DMCW/LL/125).

Time investment in social learning. Learners referred to the time investment of social learning or time they were willing to dedicate to discussions. 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 additional links to resources. Willingness to dedicate time stands in close relation to the usefulness of the content as perceived by the learner.

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. Of 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').

Notes were kept to highlight useful content, to reflect upon more complex material, and to be able to recall content later on. 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.

Personal goal setting

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. 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). In total 9% of the participants referred to studying other courses on top of the investigated FutureLearn course.

Range of personal learning goals. The learning goals set by the participants vary from specific, personal, to a more general interest, and include specific time related content actions. 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 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.

Selecting content. The way learners select content is part of their personal learning goals (based on learning needs they self-define), but also based on prior online learning experiences (de Waard & Kukulska-Hulme, 2019). Whether a learner decides to put extra effort into understanding specific content, depends on the perceived benefit of the content in view of their own learning goal. Once content is selected based on a learning goal, the learner structures the learning depending on 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 reach their own goals, which are not necessarily the goals of the course facilitator/s.

Curated content benefit. MOOCs 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. Open searches for information are time intensive as the right information needs to be found and selected, but 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% searched for additional information in non-digital resources. 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).

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.

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.

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 with 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, for example in relation to 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.

Context

Context was a reoccurring category emerging from the data analysis, but which was not directly reflected in the research sub-questions. 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.)" (Downes, 2004).

Contextualizing content

The contextual relevancy is a basis for selecting 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. 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, 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 perception of proximity of the content and its impact on learning was also found in relation to selecting peers to interact with.

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. 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). 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.

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). 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 learner's prior knowledge or experiences.

Conclusion

This study reveals a conceptual framework consisting of five learning components: individual characteristics, technology, individual & social learning, organising learning, and context. Each of those learning components harbours key categories that have a major impact on the learning processes within that particular component. Each of the five components is influenced by the other components. In addition, there are two major enablers/inhibitors of self-directed learning within MOOCs: motivation and learning goals, where motivation is mostly intrinsic in nature, and the learning goals mostly personal. A visual representation is given in Figure 2.
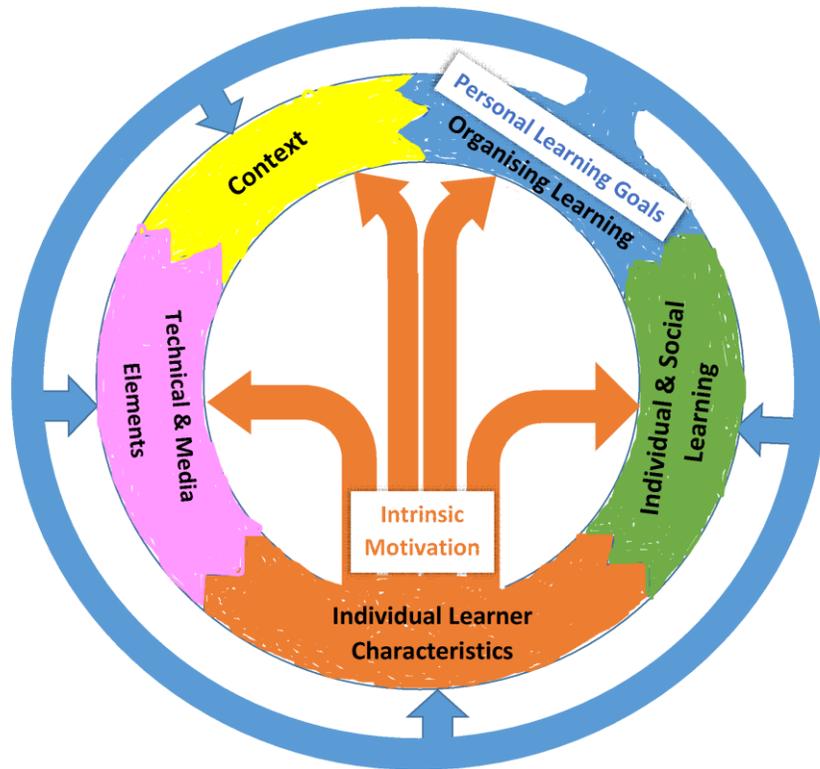
Figure 2. The five learning components and two key inhibitors/enablers of learning

Motivation and personal learning goals have a major impact on each of the five learning components. Motivation (in most cases intrinsic) keeps participants wanting to keep on learning. If the learning goals are not addressed by the course content, learners stop engaging with the course. If the content inspires, the learning goals (either professional or personal) are what make learners move above and beyond the barriers that each of the components might induce in them, e.g.: 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 results of this study provide a conceptual framework for the informal learning experience in MOOCs offered through the FutureLearn platform, specifically from the learner's perspective as this research emerged from the voices of the learners who shared their self-directed learning experiences through self-reported learning logs and interviews. 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). The fact that Charmaz's constructing GT approach was used, added to the ability of the study to give an outlet to the voices and experiences of the learners, as the learners self-reported their learning (in multiple instances all through their FutureLearn course experience), and added additional meaning to their learning logs by engaging in one-on-one interviews.

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Glossary of terms:

Learning episode: A period of time during which a learner is engaged in learning.

MOOC: A massive open online course, available to all on the web.

Social learning: Generally understood to be a theory of learning and social behaviour which proposes that people learn by observing and imitating others. However, there are other definitions, such as the one adopted in this chapter: "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" (Sol, Beers and Wals, 2013, p. 36).