

# Fostering Self-Directed Learning in MOOCs: Motivation, Learning Strategies, and Instruction

Meina Zhu

*Wayne State University, Detroit, MI, USA*

Curtis J. Bonk

*Indiana University, Bloomington, IN, USA*

Sarah Berri

*Wayne State University, Detroit, MI, USA*

## **Abstract**

Given the increasing number of learners in massive open online courses (MOOCs), students' self-directed learning (SDL) skills are necessary for their success. The purpose of this study was to explore learners' motivation for enrolling in MOOCs and their SDL strategies, as well as instructional elements that support SDL from learners' perspectives. This qualitative study adopted a phenomenological research design. The data source was semi-structured interviews with 15 learners from three MOOCs. The data were analyzed using thematic analysis. The researchers found that the motivation for enrolling in MOOCs included intrinsic motivation (e.g., curiosity, improving personal knowledge, and personal interest) and extrinsic motivation (e.g., supporting formal education and career development). The learning strategies used by MOOC learners were task strategies, self-monitoring, and self-management strategies. The task strategies included taking notes, reading texts or subtitles, watching videos, and conducting further research. The self-monitoring strategies included self-assessment, self-reflection, progress indicators, final projects, and authentic tasks. Learners' self-management strategies (e.g., time management and resource management) varied depending on their diverse motivations. In addition, the instructional elements that support SDL were self-assessment and discussion forums, instructor feedback, flexibility, clearly stated learning goals, the authenticity of the content, and small learning units. The implications of the study are discussed in the paper.

Keywords: Self-directed learning, SDL, motivation, learning strategies, instruction, MOOCs

Zhu, M., Bonk, C. J., Berri, S. (2022). Fostering self-directed learning in MOOCs: Motivation, learning strategies, and instruction. *Online Learning*, 26(1), 153-173.  
DOI: 10.24059/olj.v26i1.2629

Massive open online courses (MOOCs) are offering open-access learning materials in diverse subjects to learners (Zhu et al., 2018). More than 11,400 MOOCs were offered by the end of 2018 (Shah, 2019). The MOOCs differ from traditional online courses in several key ways, such as the number of learners in one course, open access to learning materials, the ratios of the instructor(s) to learners, how they are scheduled, the ability to contact and directly interact with the instructor, and so on. In one study, Chuang and Ho (2016) found that the average number of learners in a MOOC was 8,000 learners, though earlier research (Jordan, 2014) found that MOOCs enrollments initially averaged around 40,000 learners. During the COVID-19 pandemic time, the interest in MOOCs dramatically increased. One of the top providers, edX has over 24 million learners enrolled in over 2,600 courses, including nearly 300 micro-credentials and ten degree programs (edX, 2020; Shah, 2019). Those MOOC participants signing up for edX courses came from nearly 200 countries. At the start of the COVID-19 pandemic, another prominent MOOC vendor, Coursera, had the largest increase in newly registered learners, with 35 million new enrollments from mid-March to the end of July (Lohr, 2020). Udacity and FutureLearn also enrolled more than 10 million learners in 2019 (Shah, 2019); moreover, FutureLearn had established 49 micro-credentials and 23 degree programs (Shah, 2019).

Clearly, millions of learners have discovered a new way to learn and to keep up with the skill demands of their chosen fields, and many have also found a viable avenue in which to change careers without relying on full-time or part-time residential instruction. In addition to professional pursuits, others have learned valuable personal information related to health and fitness, financial management and investing, and learning to play a musical instrument (Businesswire, 2020).

As enrollments rise, it is becoming increasingly obvious that learning from MOOCs and other open educational resources (Kim et al., 2014) requires learners to have self-directed learning (SDL) skills (Kop & Fournier, 2010; Rohs & Ganz, 2015; Zhu, 2021; Zhu & Bonk, 2019a, b; Zhu et al., 2020), especially, for self-paced MOOCs and those MOOCs with limited presence from instructors or instructional support personnel. According to Brookfield (2013), “Self-directed learning is learning in which decisions around what to learn, how to learn it, and how to decide if one has learned something well enough are *all* in the hand of learners.” He further states that self-directed forms of learning are central to the educational pursuits of adults. The open education movement that has transpired over the past couple of decades (Bonk, 2009; Conole & Brown, 2018; MIT, 2001; Weller, 2014; Wiley & Hilton, 2009) has highlighted the need for research on SDL.

An in-depth investigation of MOOC students’ SDL when taking MOOCs is needed. The purpose of this study is to examine students’ self-directed learning (SDL) strategies and experience in MOOCs in order to provide insights to MOOC instructors and instructional designers on instructional strategies to support students’ SDL.

## Theoretical Framework

This study adopted Garrison’s (1997) SDL model, which defined SDL with three closely related elements: (1) motivation, (2) self-monitoring, and (3) self-management. Motivation initiates and maintains learners’ effort toward learning to realize cognitive learning goals. It includes intrinsic motivation and extrinsic motivation. Self-monitoring refers to learners’ cognitive and metacognitive processes, which are related to learners’ ability to monitor learning strategies and think about their thinking. According to Garrison (1997), self-monitoring indicates

that learners are responsible for personal knowledge construction. Learners not only need self-monitoring to promote cognitive improvement but also external feedback from the instructors. The third element, self-management, refers to task control. It involves the external activities that impact the learning process, such as the management of time and learning resources and support. These activities are constantly assessed and negotiated.

Prior research has indicated that SDL is essential to adult education (Brockett & Hiemstra, 1991; Candy, 1991; Garrison, 1997; Merriam, 2001). Furthermore, studies show that taking personal responsibility, willingness, self-direction, and self-discipline are critical factors that impact learners' success in online classes (Grow, 1991; Schrum & Hong, 2002). Given that most MOOC learners are adults, SDL is viewed as a necessary element in MOOCs (Bonk et al., 2015; Kop & Fournier, 2010; Terras & Ramsay, 2015). Stated another way, with SDL originating in the field of adult education (Brookfield, 2013), and MOOC learners typically being adults (Bonk et al., 2015, Chuang & Ho, 2016; Zhang et al., 2020) who heavily rely on self-directed learning skills (Bonk & Lee, 2017), this study adopted Garrison's (1997) model as the theoretical framework.

Prior researchers (e.g., Bonk et al., 2015; Loizzo et al., 2017) examined learners' SDL in MOOCs, including exploring the relations among the elements of SDL (e.g., Beaven et al., 2014; Kop & Fournier, 2010; Terras & Ramsay, 2015). For instance, a psychological perspective of SDL was explored by Terras and Ramsay (2015). They found that motivation and self-regulation are important attributes while designing and teaching MOOCs.

### **Motivations in MOOCs**

Learners' motivation plays a key role in how they perceive their learning process (Bonk & Lee, 2017; Littlejohn et al., 2016). The main motives behind enrolling in MOOCs include intrinsic and extrinsic motivation (Glynn et al., 2011; Milligan & Littlejohn, 2017; Zheng et al., 2015). For example, Romero-Frías et al. (2020) found that MOOC learners showed a high level of intrinsic motivation, while at the same time, certain extrinsic motivations also played a role in their MOOC learning.

Barba et al. (2016) found a positive relationship between learner motivation, participation, and performance in MOOCs. Learners enroll in MOOCs to pursue different goals, and their core motives affect how they approach the courses and whether they complete them or not (Kizilcec & Schneider, 2015). Loizzo et al. (2017) found that motivations among students who enrolled in MOOCs varied; similarly, the criteria by which students measured their success also varied. Thus, learners' intentions should be considered when attempting to measure the success of a MOOC (Koller et al., 2013). Learners' intrinsic motivation affects their intentions of continuing in MOOCs (Abdullatif & Velázquez-Iturbide, 2020). Although the published dropout rates in MOOCs are high in comparison to traditional courses, they cannot be perceived as an indication of failure on the part of learners because not all learners enroll in MOOCs with the goal of completion (Alario-Hoyos et al., 2017; Clow, 2013; Reich & Ruipérez-Valiente, 2019; Walji et al., 2016).

Some enroll in MOOCs to learn or refresh their knowledge about a specific topic without having the end goal of earning any credentials (Hew & Cheung, 2014; Wang & Baker, 2015). Research indicates that learners often enroll in MOOCs with the motivation to continue until the end; however, certain factors, such as loss of interest, inadequate prior knowledge, and inability to manage time or self-direct their learning may hinder their initial intentions (Chang et al., 2015; Kop et al. 2011; Hew & Cheung, 2014; Rieber, 2017; Veletsianos, 2015). Therefore, having the motivation and the end goal of course completion does not always guarantee a successful result.

Internal factors such as autonomy and self-regulation are important for a successful learning experience (Durksen, 2016; Milligan & Littlejohn, 2016; Ossiannilsson, 2015). Other critical external factors, such as sound course design and effective pedagogies, are also important to prevent complicated course navigations and the loss of interest in learners (Liu, 2015).

### **Self-Directed Learning Strategies**

Notetaking—the recording of vital information during the learning process—is a widely used learning strategy. Learners take notes while reading textbooks (Kiewra et al., 1991), listening to video or audio lectures (Titsworth & Kiewra, 2004), and learning online (Kauffman, 2004). In effect, notetaking is an important study skill for information recording and in-depth understanding (Kobayashi, 2005).

Earlier researchers identified two important functions of taking notes. First, taking notes help learners encode information from short-term memories into long-term memories. Researchers found that providing advance organizers improves learning outcomes (Titsworth & Kiewra, 2004). Second, notetaking serves an external storage purpose (Kauffman & Kiewra, 2010; Kiewra et al., 1991).

Researchers such as Makany et al. (2009) and Kauffman et al. (2011) explored different ways of taking notes for the external storage function. Kauffman et al. (2011) examined the advantages of using three different notetaking strategies: conventional, outline, and matrix notes. They found that the matrix notetaking strategy was most effective for learning. The matrix note is a two-dimensional, cross-classification table in which topics are listed on the top row, repeatable categories are listed down the left-most column, and then detailed information is generated in the intersecting cells (Kauffman et al., 2011). Matrix notes enable the learners to collect more information and then critically organize and analyze them.

Importantly, in MOOC-based learning environments, note-taking has been identified as one of the most effective strategies to support learning (Veletsianos et al., 2015). In this study, MOOC learners could take notes on hard notebooks or digital documents. Veletsianos et al. (2015) suggested integrating notetaking functions into MOOC platforms.

As a critical element of SDL, self-monitoring relates to skills of tracking and evaluating learning progress towards specific learning goals (Chang, 2007). It offers learners self-awareness of their understanding or learning performance (Butler & Winne, 1995; Lan, 1998; Pintrich et al., 2000; Winne, 1996), which helps keep learners on task and in control of their overall learning process. Researchers also note that self-monitoring skills can be trained to improve adaptive goal setting and learning. Prior research revealed that cultivating self-monitoring skills is beneficial to learners (e.g., Delclos & Harrington 1991; Maag et al., 1992; Malone & Mastropieri, 1991; Schunk, 1982). In a recent mixed methods study, we explored instructors' strategies to foster self-monitoring in MOOCs (Zhu & Bonk, 2019). In that study, we found that quizzes, tutorials, learning aids, reflection questions, learning communities, and progress indicators could support learners' self-monitoring process. In addition, external feedback from instructors, teaching assistants, and peers also supported learners' self-monitoring in MOOCs (Zhu & Bonk, 2019).

Self-management is one of the important elements of SDL. Self-management includes time management and resource management (Zhu & Bonk, 2019). Time management enables the learners to manage time to study and achieve learning goals in MOOCs. Prior research indicated that poor time management is one of the reasons that cause learners to drop out from MOOCs (Kizilcec & Halawa, 2015; Nawrot & Doucet, 2014; Zheng et al., 2015). In addition, researchers (e.g., Kizilcec et al., 2016) have explored time-management and its influence on learning in MOOCs. Through interviewing 17 learners, Kizilcec et al. (2016) discovered that time-

management strategies were critical for effective self-directed learning. On the other hand, they found that it was challenging for learners to manage learning times based on their learning goals (Beaven et al., 2014; Loizzo et al., 2017; Milligan & Littlejohn, 2016). For example, the amount of time spent completing assignments failed to meet the learner's expectations (Chen & Chen, 2014).

## Research Purpose and Questions

The purpose of this study was to explore learners' motivation for enrolling in MOOCs and their SDL strategies, as well as the instructional elements that support SDL from learners' perspectives. In effect, the prime research goal was to provide insights to MOOC instructors and instructional designers on instructional strategies to support students' SDL. Accordingly, the following three research questions guided this study:

1. What motivated individuals to enroll in MOOCs?
2. What were the learning strategies that helped learners' SDL in MOOCs?
3. What were the design and instructional elements of MOOCs that facilitated learners' SDL?

## Methods

This qualitative study adopted a phenomenological research design. The researchers explored the MOOC phenomenon in-depth in a natural context (Yin, 2013). In effect, the reason for using qualitative methods is to have greater depth in the understanding of a phenomenon, in this case, MOOCs. The data source of this study was interviews with 15 MOOC learners. The semi-structured interviews gathered in-depth, rich information about learners' learning experiences in MOOCs. The interview protocol was developed based on the conceptual framework of Garrison (1997). The semi-structured interview protocol included four parts: (1) consent information, (2) two questions about interviewees' background, (3) four questions about SDL strategies, and (4) three questions about the design and instruction of the MOOCs that help their SDL (see Appendix).

### Data Collection

The MOOC learners who participated in the authors' prior study (Zhu et al., 2020) volunteered to be interviewed. In the prior study, the authors asked the MOOC instructors to embed an online survey in three MOOCs (i.e., two Coursera courses and one FutureLearn course), which were delivered in English. The survey participants of the prior study indicated whether they wanted to volunteer to join a semi-structured interview and shared their email addresses with us. Among the 75 volunteers, the authors selected 15 volunteers that represented as many countries, ages, and educational backgrounds as possible. The semi-structured interview was conducted via Zoom, a popular and robust online meeting tool. Each interview lasted around 30-60 minutes. These interviews were audio or video recorded through Zoom. After the interview, the researchers transcribed the interview verbatim. To promote validity, the researchers conducted member checking with the interviewees to confirm the accuracy of the transcripts. Six of them provided detailed revision (e.g., misspellings), while nine replied without revisions but claimed that the transcript was accurate. To recruit study participants, a \$25 Amazon gift card was provided to all the interviewees for the interview and member-checking.

Guest, Bunce, and Johnson (2006) found that saturation occurred within the first twelve interviews in non-probabilistic sampling interviews. The resulting interviewees (see Table 1) were MOOC learners in the United States (n=4), the UK (n= 2), Canada (n=1), Mexico (n = 1),

Yemen (n=1), Turkey (n=1), Indonesia (n=1), Germany (n=1), the Netherlands (n=1), Albania (n=1), and Egypt (n=1). They have enrolled in or finished diverse MOOC topics. For privacy purposes, the interviewees were assigned pseudonyms.

Table 1  
*Fifteen Interviewees' Demographic Information*

<b>Pseudonyms</b>	<b>Gender</b>	<b>Countries</b>	<b>Occupations</b>
Abdulrahman	M	Turkey	Teacher
Ali	M	Yemen	Student
Alina	F	The UK	Student
Betty	F	Albania	Engineer
Chang	M	Canada	Athlete
Dan	M	Mexico	Professor
Helen	F	Indonesia	Administrative assistant
Jacob	M	The US	Retired management consultant
Jane	F	The US	Educator
Joe	M	The UK	Retired engineer
Melena	F	Germany	Student
Mostapha	F	Egypt	Student
Sandy	F	The US	Student
Sarah	F	The US	Between jobs
Sophia	F	The Netherlands	Retired office manager

### **Data Analysis**

To analyze the interview data, thematic analysis (Braun & Clarke, 2006; Braun et al., 2014) was used. Interview recordings were transcribed verbatim for coding after each interview. The recordings were stored in Kaltura for mechanical transcription. Next, the researchers reviewed the transcripts a second time to check their accuracy.

To perform thematic analysis, the researchers had the research questions in mind. Then, they read through the entire set of data. Afterward, the researchers chunked the data into smaller meaningful parts. Next, the researchers labeled each chunk with a code and compared each new chunk of data with previous descriptions. The similar chunks were labeled with the same code.

After all the data had been coded, the codes were grouped by similarity to identify themes. As recommended by Haney, Russell, Gulek, and Fierros (1998), the researcher read the transcripts and performed the open coding using Word documents. Once the individual coding was completed, two researchers debriefed the analysis results with each other to discuss the categories and themes. The inter-rater reliability was 92%. The final analysis resulted in three main categories and 11 sub-categories (see Table 2).

**Table 2**  
*Coding Themes*

<b>Themes</b>	<b>Sub-themes</b>
1. Motivation	Intrinsic motivation Extrinsic motivation
2. Learning strategies	Task strategies Self-monitoring Self-management
3. Instructional elements that support SDL	Self-assessment The discussion boards and instructors' involvement The flexibility of the courses Clear learning goals The authenticity of the content Small learning units

## Findings

### Research Question 1 (RQ1). What Motivated Individuals to Enroll in MOOCs?

Different motives, intrinsic and extrinsic, drove the learners to enroll in MOOCs. This study found that intrinsic motivation included curiosity, improving personal knowledge, and personal interest, whereas extrinsic motivation included supporting formal education and career development.

#### Intrinsic Motivation

In the interviews, intrinsic motivation was the primary reported motive to decide to take a MOOC. Several participants described curiosity and personal knowledge as the reasons behind enrolling in MOOCs. Betty, an engineer from Albania, noted that “The reason why I chose this course is not that I want to learn something to use in life, but more something to use for my curiosity and additional knowledge that maybe I will never use.”

Jacob, a retired management consultant from the US, expressed his motive behind enrolling in MOOCs as strictly intrinsic, “There's no reward. I'm retired. It's really just [that] I get very interested in topics. I realize holes in my knowledge and try to fill the holes.”

#### Extrinsic Motivation

Besides intrinsic motivation, extrinsic motivation also plays an important role in MOOC enrollments. Some participants enrolled in MOOCs to aid in their current educational journeys. In the interview, Melena, a student from Germany, mentioned that “sometimes it is helpful to prepare for my exams; I listen to courses about physiology, and that was really helpful.” Other participants have similar motives. For example, Ali, a second-year medical student, and Mostapha, a fifth-year medical student, both enrolled in MOOCs related to the field of medicine to aid in their formal education.

Besides educational purposes, some participants enrolled in MOOCs to help with their career development. For example, Sarah, who received her Ph.D. degree and was in between jobs at the time, selected topics such as anatomy, MatLab software, oncology, biology, and neuroscience. Sarah explained the purpose for taking these types of MOOCs was:

To acquire and improve my knowledge as a medical physicist...I consider my resume when selecting MOOC. I choose courses related to my professional field to add them to my curriculum; otherwise, there would be a period without being in contact with my profession.

## **RQ2: What Were the Learning Strategies That Helped Learners' SDL in MOOCs? Task Strategies**

The recurring themes that emerged among the participants with respect to the task strategies included: taking notes, reading texts or subtitles, watching videos, conducting further research, and using learning strategies flexibly.

Notetaking was a common learning strategy used by the interviewees. Alina used notetaking as the core learning strategy to study for her courses. Similarly, Dan stated that his main learning strategy was notetaking: "I always have my little notebook for the MOOC that I'm working on or I'm studying. And whatever videos or whatever exercise that I was doing, I was always taking notes..." Likewise, Abdulrahman took notes during lectures, read the reading materials that were available to him, and visited the external links to prepare for the tests. He approached the courses with dedication and seriousness because he needed to obtain the certifications. In the interview, he observed: "Taking notes. Organizing my time, like most of the time, I did this in the evenings. I almost finished it before the deadline ahead."

Ali, a college student from Yemen, also explained how conducting further research on certain concepts helped him understand the materials more clearly. Similarly, Alina also conducted further research on topics that sparked interest in her. She described her approach as follows: "For the whole thing, I wrote down all the information alone on the notebook. If I am interested in something, I do research on that."

Some participants kept changing their learning strategies based on the courses and their needs. For instance, in the interview, Chang explained:

I have been changing my strategies so I can learn more efficiently; in the beginning, sometimes I looked at videos and took notes, and then I found this is not efficient. (now) I just don't take notes and just look at the whole video and download the notes and go back to the parts that I don't understand. I have been changing my learning strategies.

## **Self-Monitoring Strategies**

Self-monitoring is another critical element of SDL. In order to successfully lead their learning endeavors, it is crucial for learners to monitor and assess their learning throughout the process. MOOC learners in this study reported some strategies for self-monitoring; these included self-assessment, self-reflection, progress indicators, final projects, and authentic tasks.

To help her self-monitoring, Melena noted how enriching her knowledge and knowing new things that she did not know before, along with doing well on the quizzes and tests, were vital indications of her progress. She explained, "Usually, there is a test after each week. Performing it, I can see in which topic I have the biggest gaps, or I got it well. Moreover, if I apply it in other areas of my life and it can also be seen then."

Joe, on the other hand, assessed himself based on the courses and what they had to offer. If the course included quizzes and tests, then he relied on them for self-assessment; however, if the course did not include testing, then he relied on self-reflection and his own evaluation of his knowledge acquisition.

Dan considered the progress bar to be a good indication of his progress, and it also created a healthy competition among the learners. Seeing where he was at in the course compared to the other learners gave him a push. He stated,



All the progress bar with milestones, with a small quiz that doesn't count for the evaluation, but they're good for you to check if I'm really learning. And, for example, I like when you have these kinds of nice competition[s], right. Everyone starts a MOOC at the same time, but you see that these weeks you progress faster than other members in the MOOC.

Abdulrahman relied on the final project to assess his general knowledge of the courses he had enrolled in. He stated,

There is a kind of capstone project to show what you learn during all these four courses. So, you show them. You write. You design. You tape yourself. You teach. You send the information to see if you are progressing and what you are studying, what you learn.

However, Helen felt that proceeding from “not knowing” to “knowing” is how she monitored and assessed her learning. For instance, when she enrolled in a physiology class, she wanted to understand how the brain functions under Alzheimer's because her mother was diagnosed with this degenerative disease. To her, the course was a way of trying to find answers to what was happening with her mother. She explained:

The reason I studied the brain because I have a mother who lost her mind. So, because the process is so slow over the years, like, why it started from her forgetting things, I need to get an answer to this “Why?” So, the more I studied, the more I know more. So, for me, the progress is, as I get the answer for all these things, that's how I progress. That's how I evaluate my progress. Before, it's just a big question mark. Why? But then I understand why.

### **Self-Management Strategies**

MOOC learners reported self-management strategies from two perspectives: time management and resource management. Regarding time-management, the strategies varied based on their motivation to enroll in MOOCs. Learners who had an intention to get certificates or career development tended to rely on stricter strategies. Learners who enrolled in the MOOCs for personal interest learned with a more flexible schedule. In terms of resource management, some participants explained that they did further research to attempt to understand unclear content, whereas others were honest that they skipped complex content.

Regarding the time schedule, Ali found that studying in the mornings before attending medical school was what worked best for him. Similarly, Dan, the participant that enrolled in MOOCs as a learner and also taught MOOCs, described how he dedicated a certain time to work on MOOCs. For the most part, he allocated the mornings for reading and the afternoons for writing.

For me, I'm a researcher. I'm better at writing papers in that afternoon and reading in the morning... Also, I try to schedule my time for the MOOC as everyone scheduled. This is time to go to the gym or whatever.

Some MOOC learners in this study were relatively flexible with time. Jacob believed that his learning strategy was dependent on the course and his end goal. For courses that he planned

on finishing, he treated them like regular college classes and, hence, took notes, listened to lectures, took the quizzes, etc. However, in courses that he just wanted to get certain information out of, he only searched for that specific information. During the interview, he explained: “I’m after a specific piece of information, so really the strategies revolve around as I search to get answers, you know, being efficient in my search process.”

Regarding management with learning content and resources, Sophia, a retired office manager from the Netherlands, tackled the content with more flexibility. She read all the chapters, watched the videos, and made screenshots of interesting parts of the courses in order to further research them. But she did not stress over the parts that she could not understand because she was mainly taking the courses for personal knowledge and not necessarily to obtain a certificate. As she admitted, “When it was too complicated, I did not try to follow everything. I just picked out the nice things. And what I couldn’t understand well, I skipped it.”

### **RQ3: What Design and Instructional Elements of MOOCs Facilitate Learners’ SDL from the Student’s Perspective?**

The MOOC learners in this study reported the design and instructional elements of MOOCs that facilitated their SDL. For instance, such SDL items included self-assessment and the use of discussion boards. It also can include the degree of involvement of MOOC instructors, the flexibility of the courses, having clearly stated learning goals, the authenticity of the content, and small learning units. Clearly, there is much that can be done to foster SDL in MOOCs.

#### **Self-Assessment**

Supplying learners with self-assessment outlets, such as exercises, quizzes, tests, and projects is critical in aiding their learning autonomy. One participant, Betty, from Albania, utilized all the free quizzes and tests that were available in the courses. She also took part in the discussion forums to write and answer questions about the content.

Besides tests, Alina believed that having worksheets or a set of questions after each module was the most helpful strategy to evaluate her learning step-by-step. Being able to answer the questions after each module gave her a sense of how much knowledge she retained before starting the next module. Similarly, Sandy elaborated upon how quizzes and tests were helpful, but she wished they were more advanced and included questions and answers rather than only multiple-choice questions. In the interview, she stated, “It might have been nice to have at least, you know, a bigger test that maybe involved a little more writing. Then you really have to understand the information in order to write something, rather than just answering multiple-choice questions.”

#### **Discussion Board and Instructors’ Immediate Feedback**

Most MOOCs have discussion boards available to the learners where they can have stimulating discussions and receive feedback and answers from one another. Most participants viewed the discussion boards as key in facilitating their SDL. Another feature that was also recurrent among the participants was the instructors’ involvement in the courses.

Jane believed that the discussion forums were crucial in keeping the learners accountable and creating a sense of community. She said, “I think the community is what’s really important.” Similarly, Jacob, a retired management consultant, reflected on the importance of the instructors’ presence. He claimed that it would have been more helpful if professors were more involved in the discussion boards and offered feedback from time to time. The extended time between posting a question and actually getting a reply back can discourage the learners. Jacob sadly acknowledged “I’ll ask [the professor] a question today. I’ll type in a question on my computer in the forum. It may be 2 to 3 weeks before I get a reply.” Ali expressed that “It would be great to

communicate with professors.” Similarly, Sarah explained that what affected her experience the most was the “lack of real-time interaction with the teacher.”

### **Flexibility**

The flexible nature of MOOCs can create a more relaxed learning experience for the learners to lead their own learning on their own time. Conversely, MOOCs might foster a more stressful experience if they do not employ the available resources correctly. Sandy, a former perfectionist, described her MOOC experience as life-changing. In this situation, the learner felt more comfortable directing her own learning rather than being pressured to follow a stricter schedule. When asked to describe her MOOCs experience, she explained,

It helped me realize that I enjoy learning a lot more when I can just be a little more casual about it. I just find it a lot more enjoyable to learn. I think when I’m enjoying it more, I probably actually learn a lot more.

### **Clear Goals and Expectations**

Dan suggested that instructors at the beginning of MOOCs offer the learners tips on how to manage their time, tell them what to expect from the courses, and provide them an idea of the anticipated course pace. Having a clear picture of what to expect is important for learners to plan their upcoming learning plans and schedules. As Dan explained the following tips at the beginning of the MOOC may be helpful: “Hey guys, this is a MOOC that requires you a certain amount of hours per week. And there is a strong deadline for delivering homework and during your quizzes.”

### **Authentic Examples**

The free nature of MOOCs can sometimes create an easy decision for learners to drop out of the courses whenever they lose concentration and interest. Therefore, the design of the content is crucial in maintaining the interest of the learners. One participant, Helen, believed that authentic examples, resources, and visuals that some instructors demonstrated in their courses helped maintain her curiosity. In our interview, she explained:

When I studied the brain, the professor showed the real brain. Like, she took us to the laboratory and showed us how the brains, how they did it, they did things in the laboratory. So, I find it fascinating. I find it very interesting. Even though for the test I try to read, but for understanding and looking at the real thing, the visualization is very good.

### **Small Learning Units**

Another important feature that helped the learners stay on track was the chunking of the content. Joe found the division of the content into small chunks highly effective in maintaining consistency and engagement while avoiding distractions. As Joe explained:

I think what’s really good is keeping it into small chunks. I’m going to say, roughly speaking, 3 to 7 minutes long because that makes it easy for you to put it down and pick it up again in small bits.

## Discussion

The current study examined MOOC learners' motivation for enrolling in MOOCs as well as their SDL strategies and the instructional elements that can support SDL from a learner perspective. For this purpose, the researchers conducted semi-structured interviews with 15 MOOC learners in 11 different countries. We found that learners enrolled in MOOCs with intrinsic or extrinsic motivation or both. The intrinsic motivation included curiosity, improving personal knowledge, and personal interest, whereas the extrinsic motivation included supporting formal education and career development. This finding is in line with the data reported by previous researchers (e.g., Glynn et al., 2011; Milligan & Littlejohn, 2017; Zheng et al., 2015).

Naturally, the varied intrinsic and extrinsic motivational elements influence the learning behavior of MOOC learners. Littlejohn et al. (2016) stated that learners' motivation is critical in how they perceive their learning process. In this study, we found that learners with diverse motivations have diverse time-management strategies, which supports the prior studies from Barba et al. (2016) and Kizilcec and Schneider (2015). In the current study, we discovered that learners exhibiting motivations to obtain a certificate or finish the course to support their formal education and career development had relatively strict and fixed time-management strategies. In contrast, MOOC learners who only relied on personal interest to learn certain topics or parts of the course without having the goal of finishing the course had relatively more flexible time schedules. Thus, future MOOC instructors might provide diverse support based on MOOC learners' motivations and intentions.

The MOOC students in this study revealed that their SDL strategies included task strategies, self-monitoring, and self-management strategies. The task strategies involved notetaking, reading texts or subtitles, watching videos, and conducting further research. We found that notetaking is one of the most commonly used and effective learning strategies among MOOC learners. For instance, it was noted that MOOC learners like to record notes on hardcopy notebooks or take digital notes on their computers. This finding aligns with the finding of the research from Veletsianos et al. (2015), which indicated that notetaking is one of the more common and effective learning strategies for MOOC learners.

Prior research also indicates that notetaking supports deep comprehension while acting as an external storage function (Kobayashi, 2005). MOOC instructors and instructional designers might explore strategies to support notetaking in MOOCs. For instance, to promote digital notetaking, Veletsianos et al. (2015) suggested integrating notetaking plug-in tools into MOOC platforms to facilitate learners taking notes as well as collaborative notetaking. Further and more detailed functions and features could be explored regarding the tools and resources that can support digital notetaking. For learners who prefer taking notes by hand on paper notebooks, MOOC instructors could provide sufficient pauses and suggestions in the learning materials to give learners time and opportunities to take notes.

In a recent quantitative study of SDL in MOOCs employing a structural equation modeling approach (Zhu et al., 2020), we found that self-monitoring is a mediator element between motivation and self-management. Therefore, instructional strategies to facilitate learners' self-monitoring skills was deemed critical. In terms of self-monitoring strategies in the current study, MOOC learners reported that they used self-assessment, self-reflection, progress indicators, final projects, and authentic tasks to help their self-monitoring. This finding resonates with another one of our prior studies (Zhu & Bonk, 2019b) concerning the perspectives of MOOC instructors on learner SDL skills and the instructional techniques that these instructors engaged in to nurture and support such skills. Besides the internal monitoring from the learners

themselves, external feedback from the MOOC instructors was a key extrinsic motivational element reported by the learners in that earlier study (Zhu & Bonk, 2019b). Leaders in the field of distance education—like Garrison (1997)—emphasized that external feedback from instructors is needed to support learners’ self-monitoring. Therefore, MOOC instructors or other educators involved in the online course could possibly facilitate self-monitoring by providing immediate and constructive feedback to MOOC learners.

## **Limitations and Implications**

This study provided in-depth insights into the MOOC learners’ SDL experiences and strategies. Nevertheless, there were several key limitations in this study. First, the participants of this study were voluntary and as such, may indicate a particular bias. For example, the MOOC learners who have strong self-directed learning skills may have been more inclined to participate in our study. Second, this study only included learners’ self-reported interview data. We are not sure to what extent the strategies mentioned by learners reflect their real learning experiences. In addition, we did not collect the learning outcomes in MOOCs. Consequently, we could not verify whether certain strategies were effective in improving the learning outcomes. We should also point out that while the MOOC learners we interviewed came from 11 different countries, no participants were from South America, Central America, or Africa, where access, bandwidth, and language issues may have more negatively impacted the motivation and SDL strategies of MOOC participants. Finally, all interviews were conducted in English, thereby limiting participants in this study.

Future research could include learners’ MOOC log data and grades to triangulate the self-reported interview data. Such research could also explore how motivation for MOOC learning influences their self-monitoring and self-management strategies. Despite the various limitations stated above, the present study is an important contribution to the research on MOOC learners’ motivation and SDL strategies. Follow-up research could extend to other countries and regions of the world. In the coming years, research might also explore how prior MOOC experience impacts one’s motivation to take future MOOCs as well as how SDL skills and competencies can be extended and enhanced from completing numerous MOOCs.

## **Conclusion**

This study provides insights regarding learners’ motivations for enrolling in MOOCs and SDL strategies. In addition, the instructional elements that support SDL were also revealed. The findings of this study inform both instructors and instructional designers of learners’ experiences and perceptions of the design elements in MOOCs that support SDL. Given that the authors’ prior survey research (Zhu et al., 2020), as well as the current study, showed that different aspects of motivation influence learners’ self-monitoring and self-management strategies in MOOCs, MOOC instructors and instructional designers might consider getting to know diverse; learner motivations for enrollment in MOOCs and how these motivations can be leveraged to facilitate SDL.

Notetaking is one of the most effective skills for task strategies in MOOCs. Future research could focus on different degrees of scaffolding regarding effective ways of taking notes digitally or on hardcopy notebooks to enhance SDL. Tools and resources could be developed to enable learners to take digital notes effectively on the platform or when using a mobile device. There also might be ways to share such notes across participants enrolled in a MOOC, as well as

from participants of previous iterations of a MOOC with new enrollees. Given the importance of notetaking in this study as well as previous ones, the best notetaking practices and examples might be explored in future research.

Among the critical components of SDL for cognitive learning are self-monitoring strategies. As MOOC offerings and enrollments expand (Lohr, 2020; Shah, 2019, 2020), it is vital to explore cognitive and metacognitive strategies to enhance learners' self-monitoring skills in MOOCs in the future. At the same time, given the proliferation of learning from MOOCs during the past decade, enhanced understanding of the extrinsic or intrinsic motivational elements involved in MOOCs is critical.

## **Acknowledgements**

The authors wish to thank MOOC learners who participated in this study.

### **Declarations**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

The author(s) received approval from the ethics review board of Indiana University, USA for this study.

The author(s) received no financial support for the research, authorship, and/or publication of this article.

The data of this study is not open to the public due to participant privacy.

## References

- Abdullatif, H., & Velázquez-Iturbide, J. Á. (2020). Relationship between motivations, personality traits and intention to continue using MOOCs. *Education and Information Technologies*, 25(5), 4417-4435. <https://doi.org/10.1007/s10639-020-10161-z>
- Alario-Hoyos, C., Estévez-Ayres, I., Pérez-Sanagustín, M., Kloos, C. D., & Fernández-Panadero, C. (2017). Understanding learners' motivation and learning strategies in MOOCs. *The International Review of Research in Open and Distributed Learning*, 18(3). <https://doi.org/10.19173/irrodl.v18i3.2996>
- Barba, P., Kennedy, G., & Ainley, M. (2016). The role of students' motivation and participation in predicting performance in a MOOC. *Journal of Computer Assisted Learning*, 32, 218–231. <https://doi.org/10.1111/jcal.12130>
- Beaven, T., Hauck, M., Comas-Quinn, A., Lewis, T. & de los Arcos, B. (2014). MOOCs: striking the right balance between facilitation and self-determination. *MERLOT Journal of Online Learning and Teaching*, 10, 1, 31–43.
- Bonk, C. J. (July 2009). *The world is open: How Web technology is revolutionizing education*. Jossey-Bass
- Bonk, C. J., & Lee, M. M. (2017). Motivations, achievements, and challenges of self-directed informal learners in open educational environments and MOOCs. *Journal of Learning for Development*, 4(1), 36-57.
- Bonk, C. J., Lee, M. M., Kou, X., Xu, S., & Sheu, F. R. (2015). Understanding the self-directed online learning preferences, goals, achievements, and challenges of MIT OpenCourseWare subscribers. *Journal of Educational Technology & Society*, 18(2), 349-368. [http://www.ifets.info/journals/18\\_2/26.pdf](http://www.ifets.info/journals/18_2/26.pdf)
- Bonk, C. J., Lee, M. M., Reeves, T. C., & Reynolds, T. H. (Eds.). (2015). *MOOCs and open education around the world*. Routledge.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Braun, V., Clarke, V., & Rance, N. (2014). How to use thematic analysis with interview data. In A. Vossler & N. Moller (Eds.), *The counselling & psychotherapy research handbook*, 183–197. Sage.
- Brockett, R. G., & Hiemstra, R. (1991). *Self-direction in adult learning: Perspectives on theory, research, and practice*. Routledge.
- Brookfield, S. (2013). *Powerful techniques for teaching adults*. Jossey-Bass.
- Businesswire, (2020). New Udemy report shows surge in global online education in response to COVID-19. <https://www.businesswire.com/news/home/20200430005243/en/>
- Butler, D. L., & Winne, P. H. (1995). Feedback and self-regulated learning: A theoretical synthesis. *Review of Educational Research*, 65(3), 245–281. <https://doi.org/10.3102%2F00346543065003245>
- Candy, P. C. (1991). *Self-direction for lifelong learning. A comprehensive guide to theory and practice*. Jossey-Bass. <https://eric.ed.gov/?id=ED353470>
- Chang, M. M. (2007). Enhancing web-based language learning through self-monitoring. *Journal of Computer Assisted Learning*, 23(3), 187–196. <https://doi.org/10.1111/j.1365-2729.2006.00203.x>

- Chang, R. I., Hung, Y. H., & Lin, C. F. (2015). Survey of learning experiences and influence of learning style preferences on user intentions regarding MOOCs. *British Journal of Educational Technology*, 46(3), 528-541. <https://doi.org/10.1111/bjet.12275>
- Chen, P. J., & Chen, Y. H. (2014). Facilitating MOOCs learning through weekly meet-up: A case study in Taiwan. *Proceedings of the first ACM conference on Learning@ scale conference*, 183–184. ACM. <https://doi.org/10.1145/2556325.2567872>
- Chuang, I., & Ho, A. (2016). HarvardX and MITx: Four years of open online courses--fall 2012-summer 2016. <https://dx.doi.org/10.2139/ssrn.2889436>
- Clow, D. (2013, April). MOOCs and the funnel of participation. In *Proceedings of the third international conference on learning analytics and knowledge*, 185-189. <https://doi.org/10.1145/2460296.2460332>
- Conole, G., & Brown, M. (2018). Reflecting on the impact of the open education movement. *Journal of Learning for Development*, 5(3), 187-203. <https://jl4d.org/index.php/ejl4d/article/view/314/346>
- Delclos, V. R., & Harrington, C. (1991). Effects of strategy monitoring and proactive instruction on children's problem-solving performance. *Journal of Educational Psychology*, 83(1), 35. <https://psycnet.apa.org/buy/1991-19728-001>
- Durksen, T. L., Chu, M. W., Ahmad, Z. F., Radil, A. I., & Daniels, L. M. (2016). Motivation in a MOOC: A probabilistic analysis of online learners' basic psychological needs. *Social Psychology of Education*, 19(2), 241–260. <https://doi.org/10.1007/s11218-015-9331-9>
- edX (2020). 2020 impact report. <https://www.edx.org/assets/2020-impact-report-en.pdf>
- Garrison, D. R. (1997). Self-directed learning: Toward a comprehensive model. *Adult Education Quarterly*, 48(1), 18–33. <https://doi.org/10.1177/074171369704800103>
- Glynn, S. M., Brickman, P., Armstrong, N., & Taasoobshirazi, G. (2011). Science motivation questionnaire II: Validation with science majors and nonscience majors. *Journal of Research in Science Teaching*, 48(10), 1159-1176. <https://doi.org/10.1002/tea.20442>
- Grow, G. O. (1991). Teaching learners to be self-directed. *Adult Education Quarterly*, 41(3), 125-149. <http://journals.sagepub.com/doi/pdf/10.1177/0001848191041003001>
- Guest, G., Bunce, A., & Johnson, L. (2006). How many interviews are enough? An experiment with data saturation and variability. *Field Methods*, 18(1), 59-82. <https://doi.org/10.1177/1525822X05279903>
- Haney, W., Russell, M., Gulek, C., & Fierros, E. (1998). Drawing on education: Using student drawings to promote middle school improvement. *Schools in the Middle*, 7(3), 38-43. <https://eric.ed.gov/?id=EJ561666>
- Hew, K. F., & Cheung, W. S. (2014). Students' and instructors' use of massive open online courses (MOOCs): Motivations and challenges. *Educational Research Review*, 12, 45-58. <https://doi.org/10.1016/j.edurev.2014.05.001>
- Jordan, K. (2014). Initial trends in enrolment and completion of massive open online courses. *The International Review of Research in Open and Distributed Learning*, 15(1), 133–160. <https://doi.org/10.19173/irrodl.v15i1.1651>
- Kauffman, D. F. (2004). Self-regulated learning in web-based environments: Instructional tools designed to facilitate cognitive strategy use, metacognitive processing, and motivational beliefs. *Journal of Educational Computing Research*, 30(1-2), 139-161. <https://doi.org/10.2190%2FAX2D-Y9VM-V7PX-0TAD>



- Kauffman, D. F., & Kiewra, K. (2010). What makes the matrix so effective: An empirical test of indexing, extraction, and localization effects. *Instructional Science*, 38(6), 679–706. <https://doi.org/10.1007/s11251-009-9095-8>
- Kauffman, D. F., Zhao, R., & Yang, Y. S. (2011). Effects of online note taking formats and self-monitoring prompts on learning from online text: Using technology to enhance self-regulated learning. *Contemporary Educational Psychology*, 36(4), 313-322. <https://doi.org/10.1016/j.cedpsych.2011.04.001>
- Kiewra, A. K., DuBois, N. F., Christian, D., McShane, A., Meyerhoffer, M., & Roskelley, D. (1991). Note-taking functions and techniques. *Journal of Educational Psychology*, 83(2), 240–245. <https://psycnet.apa.org/doi/10.1037/0022-0663.83.2.240>
- Kim, M., Jung, E., Altuwaijri, A., Wang, Y., & Bonk, C. J. (2014, Spring). Analyzing the human learning and development potential of websites available for informal learning. *International Journal of Self-Directed Learning*, 11(1), 12-28.
- Kizilcec, R. F., & Halawa, S. (2015). Attrition and Achievement Gaps in Online Learning. In *Proceedings of the Second ACM Conference on Learning @ Scale*. <http://dx.doi.org/10.1145/2724660.2724680>
- Kizilcec, R. F., Pérez-Sanagustín, M., & Maldonado, J. J. (2016). Recommending self-regulated learning strategies does not improve performance in a MOOC. In *Proceedings of the third (2016) ACM conference on learning@ scale*, 101-104. <https://doi.org/10.1145/2876034.2893378>
- Kizilcec, R. F., & Schneider, E. (2015). Motivation as a lens to understand online learners: Toward data-driven design with the OLEI scale. *ACM Transactions on Computer-Human Interaction*, 22(2), 1-24. <https://doi.org/10.1145/2699735>
- Kobayashi, K. (2005). What limits the encoding effect of note-taking? A meta-analytic examination. *Contemporary Educational Psychology*, 30(2), 242–262. <https://doi.org/10.1016/j.cedpsych.2004.10.001>
- Koller, D., Ng, A., Do, C., & Chen, Z. (2013). Retention and intention in massive open online courses: In depth. *EDUCAUSE Review*, 48(3), 62–63.
- Kop, R., & Fournier, H. (2010). New dimensions to self-directed learning in an open networked learning environment. *International Journal for Self-Directed Learning*, 7(2), 1–19. [https://docs.wixstatic.com/ugd/dfdea\\_f\\_b1740\\_fab6a\\_d144a\\_980da\\_17036\\_39aee\\_b4.pdf](https://docs.wixstatic.com/ugd/dfdea_f_b1740_fab6a_d144a_980da_17036_39aee_b4.pdf)
- Kop, R., Fournier, H., & Mak, J. S. F. (2011). A pedagogy of abundance or a pedagogy to support human beings? Participant support on massive open online courses. *International Review of Research in Open and Distributed Learning*, 12(7), 74-93. <https://doi.org/10.19173/irrodl.v12i7.1041>
- Lan, W. Y. (1998). Teaching self-monitoring skills in statistics. *Self-regulated learning: From teaching to self-reflective practice*, 86-105.
- Littlejohn, A., Hood, N., Milligan, C., & Mustain, P. (2016). Learning in MOOCs: Motivations and self-regulated learning in MOOCs. *The Internet and Higher Education*, 29, 40-48. <https://doi.org/10.1016/j.iheduc.2015.12.003>
- Liu, M., Kang, J., & McKelroy, E. (2015). Examining learners' perspective of taking a MOOC: reasons, excitement, and perception of usefulness. *Educational Media International*, 52(2), 129–146. <https://doi.org/10.1080/09523987.2015.1053289>
- Lohr, S. (2020). Remember the MOOCs? After near-death, they're booming. *The New York Times*. <https://www.nytimes.com/2020/05/26/technology/moocs-online-learning.html>

- Loizzo, J., Ertmer, P. A., Watson, W. R., & Watson, S. L. (2017). Adult MOOC learners as self-directed: Perceptions of motivation, success, and completion. *Online Learning, 21*(2), n2. <https://doi.org/10.24059/olj.v21i2.889>
- Maag, J. W., Rutherford Jr, R. B., & Digangi, S. A. (1992). Effects of self-monitoring and contingent reinforcement on on-task behavior and academic productivity of learning-disabled students: A social validation study. *Psychology in the Schools, 29*(2), 157-172.
- Makany, T., Kemp, J., & Dror, I. E. (2009). Optimising the use of note-taking as an external cognitive aid for increasing learning. *British Journal of Educational Technology, 40*(4), 619-635. <https://doi.org/10.1111/j.1467-8535.2008.00906.x>
- Malone, L. D., & Mastropieri, M. A. (1991). Reading comprehension instruction: Summarization and self-monitoring training for students with learning disabilities. *Exceptional Children, 58*(3), 270-279. <https://doi.org/10.1177%2F001440299105800309>
- Merriam, S. B. (2001). Andragogy and self-directed learning: Pillars of adult learning theory. In S. B. Merriam (Ed.), *The new update on adult learning theory, (Vol. 89)* (pp 3-13). San Francisco: Jossey- Bass.
- Milligan, C., & Littlejohn, A. (2016). How health professionals regulate their learning in massive open online courses. *The Internet and Higher Education, 31*, 113-121. <https://doi.org/10.1016/j.iheduc.2016.07.005>
- Milligan, C., & Littlejohn, A. (2017). Why study on a MOOC? The motives of students and professionals. *International Review of Research in Open and Distance Learning, 18*(2), 92–102. <https://doi.org/10.19173/irrodl.v18i2.3033>
- MIT (2001). MIT to make nearly all course materials available free on the World Wide Web. *MIT News*. <http://web.mit.edu/newsoffice/2001/ocw.html>
- Nawrot, I., & Doucet, A. (2014). Building engagement for MOOC students: Introducing support for time management on online learning platforms. Paper presented at the 23rd International World Wide Web Conference, Seoul, South Korea, 1077-1082. <https://doi.org/10.1145/2567948.2580054>
- Ossiannilsson, E., Altinay, F., & Altinay, Z. (2015). Analysis of MOOCs practices from the perspective of learner experiences and quality culture. *Educational Media International, 52*(4), 272-283. <https://doi.org/10.1080/09523987.2015.1125985>
- Pintrich, P., Wolters, C., & Baxter, G. (2000). Assessing metacognition and self-regulated learning. In G. Schraw & J. C. Impara (Eds.), *Issues in the measurement of metacognition*, 43–97. Buros Institute of Mental Measurements.
- Reich, J., & Ruipérez-Valiente, J. A. (2019). The MOOC pivot. *Science, 363*(6423), 130-131. <https://doi.org/10.1126/science.aav7958>
- Rieber, L. P. (2017). Participation patterns in a massive open online course (MOOC) about statistics. *British Journal of Educational Technology, 48*(6), 1295–1304. <https://doi.org/10.1111/bjet.12504>
- Rohs, M., & Ganz, M. (2015). MOOCs and the claim of education for all: A disillusion by empirical data. *International review of research in open and distributed learning, 16*(6), 1-19. <https://doi.org/10.19173/irrodl.v16i6.2033>

- Romero-Frías, E., Arquero, J. L., & del Barrio-García, S. (2020). Exploring how student motivation relates to acceptance and participation in MOOCs. *Interactive Learning Environments*, 1-17. <https://doi.org/10.1080/10494820.2020.1799020>
- Schrum, L., & Hong, S. (2002). Dimensions and strategies for online success: Voices from experienced educators. *Journal of Asynchronous Learning Networks*, 6(1), 57–67. <http://actxlearning.pbworks.com/f/10.1.1.109.3649.pdf>
- Schunk D. H. (1982). Progress of self-monitoring: effects on children's self-efficacy and achievement. *Journal of Experimental Education*, 51 (2), 89–93. <https://doi.org/10.1080/00220973.1982.11011845>
- Shah, D. (2019). A review of MOOC stats and trends in 2019. *Class Central*. <https://www.classcentral.com/report/moocs-stats-and-trends-2019/>
- Shah, D. (2020). By the numbers: MOOCs during the pandemic. *Class Central*. <https://www.classcentral.com/report/mooc-stats-pandemic/>
- Terras, M. M., & Ramsay, J. (2015). Massive open online courses (MOOCs): Insights and challenges from a psychological perspective. *British Journal of Educational Technology*, 46(3), 472-487. <https://doi.org/10.1111/bjet.12274>
- Titsworth, S., & Kiewra, K. A. (2004). Organizational lecture cues and student note taking. *Contemporary Educational Psychology*, 29, 447–461. <https://doi.org/10.1016/j.cedpsych.2003.12.001>
- Veletsianos, G., Collier, A., & Schneider, E. (2015). Digging deeper into learners' experiences in MOOCs: Participation in social networks outside of MOOCs, notetaking and contexts surrounding content consumption. *British Journal of Educational Technology*, 46(3), 570-587. <https://doi.org/10.1111/bjet.12297>
- Walji, S., Deacon, A., Small, J., Czerniewicz, L., & Czerniewicz, L. (2016). Learning through engagement: MOOCs as an emergent form of provision. *Distance Education*, 37(2), 208-223. <https://doi.org/10.1080/01587919.2016.1184400>
- Wang, Y., & Baker, R. (2015). Content or platform: Why do students complete MOOCs? *Journal of Online Learning and Teaching*, 11(1), 17.
- Weller, M. (2014). *Battle for open: How openness won and why it doesn't feel like victory*. London: Ubiquity Press. <https://doi.org/10.5334/bam>
- Wiley, D., & Hilton III, J. (2009). Openness, dynamic specialization, and the disaggregated future of higher education. *The International Review of Research in Open and Distributed Learning*, 10(5). <https://doi.org/10.19173/irrodl.v10i5.768>
- Winne, P. H. (1996). A metacognitive view of individual differences in self-regulated learning. *Learning and Individual Differences*, 8(4), 327–353. [https://doi.org/10.1016/S1041-6080\(96\)90022-9](https://doi.org/10.1016/S1041-6080(96)90022-9)
- Yin, R. (2013). *Case study research: Design and methods* (5th ed.). Sage.
- Zhang, K., Bonk, C. J., Reeves, T. C., & Reynolds, T. H. (Eds.). (2020). *MOOCs and open education in the Global South: Challenges, successes, and opportunities*. Routledge.
- Zheng, S., Rosson, M. B., Shih, P. C., & Carroll, J. M. (2015). Understanding student motivation, behaviors and perceptions in MOOCs. In *Proceedings of the 18th ACM conference on computer supported cooperative work & social computing*, 1882-1895. <https://doi.org/10.1145/2675133.2675217>
- Zhu, M. (2021). Enhancing MOOC learners' skills for self-directed learning. *Distance Education*, 42(3), 441-460. <https://doi.org/10.1080/01587919.2021.1956302>

- Zhu, M., & Bonk, C. J. (2019a). Designing MOOCs to facilitate participant self-directed learning: An analysis of instructor perspectives and practices. *International Journal of Self-Directed Learning*, 16(2), 39–60. [https://6c02e432-3b93-4c90-8218-8b8267d6b37b.filesusr.com/ugd/6c1db2\\_3ab135498618442abe908811fb68a1b2.pdf](https://6c02e432-3b93-4c90-8218-8b8267d6b37b.filesusr.com/ugd/6c1db2_3ab135498618442abe908811fb68a1b2.pdf).
- Zhu, M., & Bonk, C. J. (2019b). Designing MOOCs to facilitate participant self-monitoring for self-directed learning. *Online Learning*, 23(4), 106–134. <https://doi.org/10.24059/olj.v23i4.2037>.
- Zhu, M., Bonk, C. J., & Doo, M. Y. (2020). Self-directed learning in MOOCs: Exploring the relationships among motivation, self-monitoring, and self-management. *Educational Technology Research & Development*, 68(5), 2073–2093. <https://doi.org/10.1007/s11423-020-09747-8>
- Zhu, M., Bonk, C., & Sari, A. (2018). Instructors' experience of designing MOOCs in higher education: Considerations and challenges. *Online Learning*, 22(4), 203-241. <https://doi.org/10.24059/olj.v22i4.1495>

## Appendix

### Semi-Structured Interview Questions

1. Please introduce yourself briefly.
2. Please tell us your experience in taking this MOOC. Were you successful in what you wanted to accomplish? Why or why not?
3. What are the learning strategies that help you learn best in this MOOC?
4. What motivated you to enroll and stay in this MOOC?
5. What strategies help you manage your learning in the MOOC (e.g., set up specific learning time)?
6. What strategies help you in self-monitoring your learning (e.g., reflection, evaluate learning)?
7. How do you think the design or instruction of this MOOC facilitates your self-directed learning skills?
8. Can you please give us an example of the design or instruction of this MOOC that facilitates your self-directed learning skills? Why?
9. What would you suggest your instructor do to help you develop your self-directed learning skills in this MOOC?
10. In general, what did you learn about self-directed learning (SDL) and about yourself as a learner when taking this MOOC?