

Self-Directed Learning in MOOCs: A Disconnect Between Theory and Practice

Achraf TOUATI

Boise State University

achraftouati@boisestate.edu

Abstract

Massive open online courses (MOOCs) have grown exponentially in recent years. Since research in MOOCs is still an emerging field, investigating the application of adult learning theory principles within the MOOC paradigm is very much needed. Participants in MOOCs have a considerable flexibility to organize their learning; however, as adult learners, these participants do not effectively engage in self-directed learning in MOOC settings. This article is directed toward a twofold aim: to review the theoretical foundation of self-directed learning, and to provide framework for future designs of MOOCs to ensure the application of adult learning theory principles-notably self-directed learning. Lastly, this article proposes focusing future research on an emergent type of MOOC- called mini-MOOC- which can potentially provide a more realistic platform for the application of adult learning theory principles.

Keywords

MOOCs; adult learning; self-directed learning; online learning; higher education; adult learning theory; informal learning

Introduction

Higher education institutions are under increasing pressure to adopt technology and innovation as alternatives to existing systems of education. In the recent years, massive online open courses (MOOCs) have captured the interest of educational institutions, general public, and even some politicians. A MOOC differs from a traditional online course in several ways. MOOCs not only enroll “massive” number of participants, they are also free and open to geographically dispersed students around the world. MOOCs are perceived to be free from the institutional constraints that are imposed by the traditional schooling system (Burd, Smith, & Reisman, 2014) which may include formal admission process and prior learning requirements. Overall, MOOCs present an opportunity to reduce cost of

education through inexpensive and low-risk experimentation (Carey, 2013) and to expand higher education globally. However, most MOOCs have a very low completion rate (around 10 %), which raises questions about the courses' pedagogy, design, and overall effectiveness.

In general, recent studies have investigated different aspects of MOOCs including instructional design, instructors and participants' perceptions of the course, technical and social tools, and assessment features. Yet, many of these studies have not addressed the application of adult learning principles in MOOC courses. Since adult learners are the main audience for MOOCs, it is crucial to draw attention to the different models that define an adult learner in the context of MOOCs, particularly self-directed learning (SDL). On that account, this article will provide a theoretical background on self-directed learning as well as the common challenges in online learning settings. Finally, different design and pedagogical issues within MOOCs will be discussed and solutions from empirical research will be analyzed and selected for implementation in the proposed design framework which aims to promote SDL in MOOCs.

Self-directed learning (SDL)

Defining SDL

Self-directed learning (SDL) is evident in the daily life of adults. Knowles (1975) defines SDL as "the process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating those learning outcomes" (p. 18). In the context of adult learning, Knowles (1983) considers learning optimal when the learner is self-directed, autonomous, and mindful of own experience as a learning resource. Although self-directed learning can be unintentional at times, this type of learning is systematic yet not dependent on instructor (Merriam, 2001). Knowles (1975) believes that a person becomes increasingly self-directed as he matures. Evidently, maturity, as an advanced stage in our psychological development, entails an increasing responsibility in managing and controlling different aspects of our lives. Therefore, it is within reason to assume that SDL is most significant and meaningful in the context of adult learning. In literature, SDL has been used interchangeably with independent teaching, self-teaching, independent learning, autonomous learning, self-study, and learning projects (Merriam & Bierema, 2014). Nonetheless, these often used terminologies explicitly highlight the importance of adult learner's autonomy while taking control and responsibility of own learning.

Based on the aforementioned definition of SDL, Knowles (1975) proposed a six-step process which Merriam and Bierama (2014) suggest could be used as a contract for instructors and students to follow when adopting a SDL approach. The proposed process suggest that learners can effectively engage in SDL when a) an atmosphere of mutual respect and support is created, b) learning needs are diagnosed, c) learning goals are created, d) human and material resources for learning are identified, e) appropriate learning strategies are implemented, and f) learning outcomes are evaluated (**Figure. 1**). Tough (1978) later presented a fairly similar process from the perspective of learning projects (Merriam & Bierema, 2014). In Tough's proposed process, learners first decide what to learn, what resources to use, where to learn, and how to maintain motivation for learning. In addition to setting goals and timetables, a setting that promotes SDL, according to Tough (1978), provides opportunities for learners to assess their current skills and knowledge and to evaluate learning so that obstacles are clearly identified to allow learners to adjust learning

strategies accordingly (**figure. 2**). Although it is unclear what type of learning environments best help adults achieve significant learning and personal growth, adult learners typically have a wealth of knowledge, established values, and opinions that need to be acknowledged in all settings. Deciding what to learn is another attribute that distinguishes adult learners. In fact, considering that children are often told what to learn and that most of the learning decisions are made for them, adults, however, are responsible for self and are purposeful. In many cases, and as mentioned earlier, this decision of what to learn is unintentional. For instance, a loss event such as loss of job might impact an adult's decision and interest in what to learn in order to pursue an alternative career opportunity. Diagnosis of a disease is another situation that may force an adult to seek information about this particular condition and work toward a change in behavior. Nonetheless, SDL can be a mandated learning or completely voluntary (Clardy, 2000) depending on life or work-related situations that also present a meaningful framework for adult learning.

Figure 1. Knowles (1975) six-step process of SDL

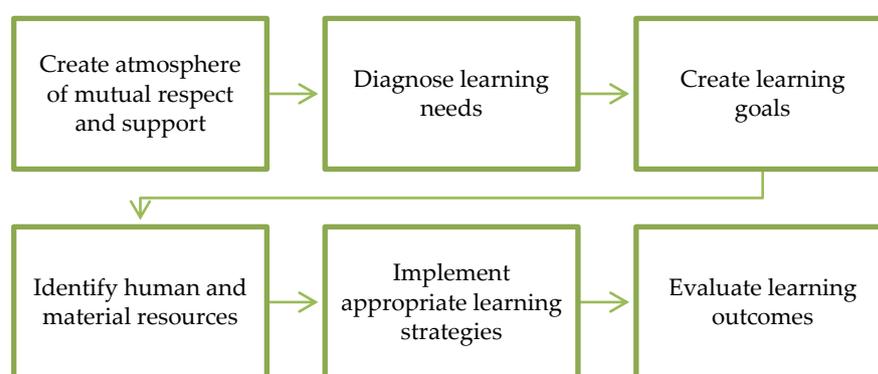
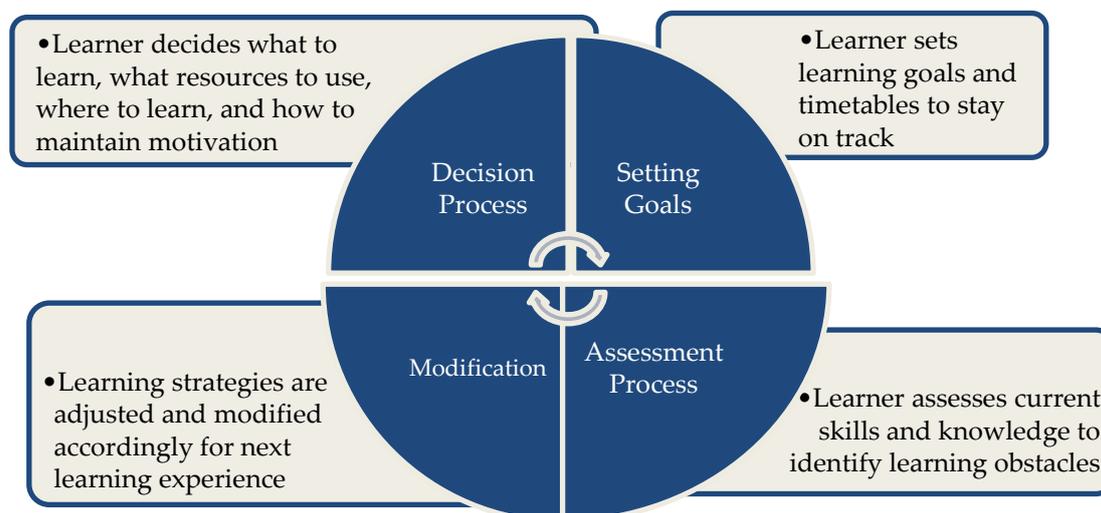


Figure 2. Tough's (1978) proposed process to engage in SDL



Critiques of SDL

The assumption that all adult learners are capable of engaging in self-directed learning is problematic. As each learner is different and has different needs, capabilities, and expectations, Brookfield (1984) raises the issue of ignoring the cultural and contextual

aspects in SDL. Merriam and Bierema (2014) further discuss how different cultures perceive the concept of self-directed learning differently by suggesting that SDL is a Western teaching method that may conflict with the expectations of learners from other cultures. This was also confirmed in the study by Wang and Farmer (2008) who surveyed Chinese instructors and adult students and concluded that the Chinese education adopts a teacher-centered, test-driven, and information-based instructional approach that differs from the Western approach which promotes "self-directed, self-motivated, independent learners who are able to critique and direct their own work with critical thinking and rational judgment" (Lee, 2012, p. 395). Consequently, as today's classrooms are becoming increasingly multicultural, especially in the context of open online environments, learners from different parts of the world are participating and engaging in a self-directed learning experience that is not only new to them but also challenges their cultural perceptions and beliefs of how learning at adulthood should occur.

Challenges of Online learning for adults

Although online learning is proving effective (Merriam & Bierema, 2014), there are still challenges that can potentially hinder learning among adults who participate in online learning. Online learners are expected to self-direct their own learning; however, many adults find it difficult to manage their work, study, and family obligations. In fact, these challenges become evident when considering the social, economic, and gender roles of adults. In terms of gender roles, Zembylas (2008) indicates that studying at home presents a conflict between the values of gender equality and old values of mothering and family responsibilities which can lead to heavy emotional demands among adult women. Moss (2004) also highlights contradictions and discontinuities in adult women's identity once they become students as this identity must fit with the pre-existing social roles. As a result, adult women experience a much greater challenge to find a balance between their perceived social roles and their roles as online students as opposed to men. In other words, engaging in an online learning experience does not relieve women from their family responsibilities and other obligations. Despite these challenges, female participants tend to find the convenience and flexibility of online learning invaluable considering the alternative which is to attend a traditional college that requires commuting and scheduling classes around inflexible personal schedules, especially for working women who are committed to their old family obligations. Nonetheless, female students may show more online participation in online learning than their male counterparts (Chyang, 2007) despite their perceived role in society and the responsibilities that come with such a role.

Another challenge that may negatively impact the learning experience among adults, both male and female, is familiarity and comfort levels in using technology. Prensky (2001) sparked a debate when he introduced the designation of "digital natives" to refer to students of this generation who grow up with new technology and use technology the same way they speak their native languages. On the other hand, "digital immigrants" learn technology similarly to how they would learn a new language (Prensky, 2001). More importantly, Prensky argues that some digital immigrants learn to adapt to new technologies better than others, but will never reach a similar mastery level as that of the natives. Consequently, the way adults perceive and interact with technology in online learning settings can in many ways shape the learning outcome. For instance, using asynchronous communication tools in an online class can be an overwhelming experience for many adults considering that they socialized differently from students of this generation who have grown accustomed to communicating via text and emails. Bottom line, technology is not just a tool in the hand of its users, it has rather "infused every aspect of

society to essentially change the thought process in learning” (Parker, 2013, p. 55). In general, one of the biggest challenges for adults who participate in online learning is to adapt to this new, unfamiliar culture where technology has redefined how learners acquire knowledge, socialize and collaborate in an educational setting. Moreover, Sonwalker (2008) notes other barriers, mainly pedagogical, to effective online teaching and learning. Sonwalker argues that course management systems may support information exchange but lack the pedagogical framework for online learning. Interestingly, Sonwalker (2008) also boldly questions the effectiveness of computer in learning and stated that “the computer as learning platform is proving to be ineffective and boring medium” (p. 45). In a general sense, this view summarizes how a large body of adults may perceive technology as a medium for learning that has challenged and supplanted the “sage on stage” teaching method that is most familiar to adult learners.

Using the internet and computers in learning is not only changing the traditional methods of teaching, it is also producing a different kind of thinking. In fact, Carr’s (2008) article “*Is Google Making Us Stupid?*” argues that media are not neutral information channels. In his argument, Carr claims that his mind now “expects to take in information the way the Net distributes it: in a swiftly moving stream of particles” (p. 90) and that his ability to concentrate is diminishing due to accessing online materials. In other words, as Merriam and Bierema (2014) point out, one’s capacity for deep reading and reflection is challenged by scattered distractions such as pop up ads and text crawls while reading online books, blogs, or articles. Thus, since online learning involves accessing these online materials regularly, adult learners are at risk of losing the quiet spaces that promote deep reading and deep thinking (Merriam & Bierema, 2014).

SDL in Massive Open Online Courses (MOOCs)

Overview of MOOCs

For the last few years, massive open online courses (MOOCs) have gained much attention and popularity in the realm of higher education. A MOOC is an online course that provides participants with free and open registration as well as a publicly shared curriculum. These types of e-learning courses integrate video lectures, social networking, discussion forums, and other online resources that can be accessed and shared by all participants. Participants in MOOCs are expected to self-direct their learning experiences based on their prior skills and interests. In fact, because the number of participants can reach thousands in a single course, SDL is a requirement in a MOOC setting due to the lack of teacher support and interaction.

Participation in MOOCs does not require students to go through an application or registration process. In other words, learners cannot be rejected and it is up to them to decide whether they meet the prior learning requirement to successfully complete the course, unlike in traditional online courses. Another main difference between a MOOC and a traditional online course is that students who are enrolled in a traditional online course have to register to a particular institution of study whereas MOOCs are made available to anyone (Burd et al., 2014). Although some types of MOOCs are closely similar in design to traditional online course, which will be discussed later, the general perception is that MOOCs are free from the institutional constraints imposed by the traditional schooling system (Burd et al., 2014). As such, a MOOC offers a suitable learning opportunity for adult learners who are intrinsically motivated to engage in a learning experience about different subjects or topics that pique their interest.

While MOOCs can be seen as an opportunity to reduce the cost of education through inexpensive and low-risk experimentation (Carey, 2013), it is yet unclear what financial strategies will take place in case educational institutions move toward a large-scale adoption of MOOCs. At this stage, Burd et al. (2014) identify generating revenue from supplementary services and certificates and linking students with potential employers as the most cited business motivations for offering MOOCs. EDUCAUSE (2012) on the other hand highlighted the current reasons for higher education institutions to offer MOOCs as access, experimentation, and brand extension. In any case, most participants in a MOOC intend to explore the topic and not complete the course, which can disrupt the current business model in a sense that most participants do not complete the course to pay for a certificate, not to mention that the high dropout rate may deter others from participating in MOOCs in the future. Nonetheless, there is still a level of skepticism about the potential of MOOCs in higher education.

Yuan and Powell (2013) reported a study which was conducted in the UK and was commissioned by the Joint Information Systems Committee (JISC) that warned about certain aspects of MOOCs. In fact, the JISC cautioned about the fact that MOOC as a new phenomenon “opens up the risk that decisions will be made in a fragmented way by different unconnected groups without a deep understanding or clear analysis of MOOCs and other potential education delivery models” (Yuan & Powell, 2013, p. 5). On that account, the next sections will provide an analysis of the pedagogical and technological aspects implemented in the MOOC design as well as some of the most common challenges to determine whether MOOCs can effectively engage adults in self-directed learning.

Types of MOOCs

In 2008, George Siemens and Stephen Downes introduced the term MOOC and since then this term has gained popularity in the United States when a Stanford professor, Sebastian Thrun, offered a free artificial intelligence course to the public (Hu, 2013). Coursera, which is one of the well-known international MOOC providers, has university partners such as Princeton, Brown, Columbia, Duke, and Stanford (Woo, 2013). Another key international provider of MOOCs is edX which is a non-profit corporation governed by MIT and Harvard. The majority of MOOCs provided through Coursera and edX follow a specific schedule and start delivery at a specific date and time (Burd et al., 2014). One of the providers that follow a student-led approach is Udacity. In this model, students can define the pace of learning and courses can be assessed at any time instead of having to wait for the course to start (Burd et al., 2014).

There are two types of MOOCs that are generally recognized. The first one is a connectivist MOOC or (cMOOC), which draws upon connectivism. According to Siemens (2005), and in reference to how learning occurs within the connectivist approach, “learning is a process of connecting specialized nodes or information sources” (p. 3). Bell (2010) also highlights that cMOOCs are directed by explicit principles of connectivism: autonomy, diversity, openness and interactivity. In terms of the four principles of connectivism, learners are *autonomous* as they can choose the content they wish to learn, and thus making learning personal without a formal curriculum. Participants in cMOOCs are also *diverse* both in knowledge and culturally. Learning how to effectively utilize the online resources such as social networking sites varies among adults not to mention that participants in MOOCs virtually come from all the parts of the world making a MOOC a culturally and linguistically rich setting. *Interactivity*, as a third principle of connectivism, highlights the importance of learner collaboration and communication that can result in emergent knowledge (Bates, 2014). In fact, one of the goals of MOOCs is not only to establish a connection between participants but also extend such a connection to beyond the life of the course. Lastly, *openness* simply

characterizes how learners can access content of the course freely and openly including lessons, activities, and assessment. However, assessment in these types of MOOCs is mostly done informally by seeking feedback from more knowledgeable participants or simply by allowing participants to decide for themselves if they have met their learning objectives.

The second commonly known type of MOOCs is the institutionally- focused MOOC or the xMOOC. This type of MOOCs takes a different pedagogical direction and is more traditional by following a behaviorist approach (Daniel, 2012). XMOOCs are also characterized by breaking down the content into smaller steps, limited feedback and interaction, pre-determined office hours for student questions, and criterion-referenced based assessment (Ebben & Murphy, 2014). More specifically, xMOOCs present the course through a list of topics, readings, and pre-recorded lecture videos. The commonly used assessment methods in xMOOCs are quizzes, assignments, and final exams, and the format of the exam is mostly multiple-choice it short-answer questions (Admiraal, Huisman, & Pilli, 2015). In general, xMOOCs are often criticized for being a similar version of a traditional online course but without the teacher interaction. Therefore, many may view xMOOCs as less open than cMOOCs given the restrictions imposed by the course providers regarding the sharing of the course materials and resources. Overall, while it's important to highlight the key differences between cMOOCs and xMOOCs, there are some MOOCs that include characteristics of both of these types of MOOCs considering the fast changing landscape of the MOOC design (Bali, 2014).

Participation in MOOCs

Participants in MOOCs are adult learners with different motives for participation. According to Hew and Cheung (2014), participants' motives to enroll in MOOCs include interest in the topic, desire to increase knowledge, curiosity, seeking new challenge, and even winning course certificates. Professional development is also considered a motive for participating in a MOOC (Gillani & Eynon, 2014). However, since these courses attract a very large number of participants from different parts of the world, various technical, pedagogical, and cultural challenges are evident across many of the MOOCs. For instance, the majority of participants are from the Western World (Gillani & Eynon, 2014) thus challenging the core concept of MOOCs which is to expand learning across the globe. In addition, most of MOOCs are provided in English, thereby creating a language barrier for participants in other parts of the world where is English is not commonly spoken. Learner's autonomy and how it's perceived in other parts of the world is another obstacle that may influence learners' decision to enroll and actively participate in a MOOC. As mentioned previously, adult learners, especially in the Eastern World, consider teacher's presence and interaction consequential and necessary to engage in learning.

MOOC participants show different learning and study habits as a result of the freedom aspect of the course. Some of the course participants view the majority of MOOC learners as lurkers who only view resources produced by others (notably blog posts and videos) without making valuable contributions, not to mention that many participants only take a particular interest in certain topics within the course and drop out as soon as those topics are covered (Hew & Cheung, 2014). This issue of lurking and the presence of occasional observers who do not actively engage in learning was also highlighted by Loya, Gopal, Shukla, Jermann, and Tormey (2015) who questioned how the dropout rate is being calculated in the MOOC setting. Loya et al. suggest that the dropout rate should not take into consideration those who register and do not actively participate. However, this suggested improvement to the completion rate does not conceal the fact that some aspects of MOOCs are poorly designed. Evidence shows that many MOOCs lack effective design strategies and implementation (Margaryan, Bianco, & Littlejohn, 2015) and as a result, such

poor design strategies have a direct impact on learners' decisions to stay engaged throughout the course. Hew and Cheung (2014) also highlights other challenges including lack of incentive, insufficient prior knowledge, lack of focus, failure to understand content, lack of support, ambiguous course expectations, and lack of time due to other commitments as contributing factors to the high dropout rate.

The online learning environment in MOOCs is nearly always asynchronous due to the massive number of participants (Spector, 2014) particularly through discussion forums. In some instances, participants are overwhelmed by the amount of posts they have to read, not to mention that these discussions tend to become messy and chaotic prompting participants to seek outside social platforms (Zutshi, O'Hare, & Rodafinos, 2013). Interestingly, participating in asynchronous social platforms also highlights some of the difference in communication styles and preferences between men and women in a MOOC setting. For instance, Kop, Fournier, and Mak (2011) found that women sought similarities with other participants that could become a source of bonding whereas men had a tendency to view other participants as competitors and sought to keep a step ahead. Consequently, this tendency to compete with other participants conflicts with the core value of MOOCs which revolves around sharing resources and collaborating with others.

Social Media in MOOCs

Social networks offer myriad opportunities for learners to create and share information, network with others, as well as engage in informal learning opportunities. The *2014 NMC Horizon Report* considers social media a fast trend in higher education and an opportunity for institutions to amass broader audiences. The *NMC Horizon Report* also indicates that adults between the ages of 45 and 54 are the fastest growing group on Facebook and Google+. Twitter, another commonly used social platform in MOOCs, is experiencing a similar trend, especially with adults between 55-65 years of age, as indicated by the same report. In the recent years, social media has not only grown across all age groups, adults and older users have been particularly keen about embracing new networking tools for various reasons. Older users of social media are more likely to use Facebook or Twitter to reconnect with people from the past or to seek support and information about a particular health condition. In any case, using social networks for informal activities and informal learning makes these social platforms suitable tools that allow MOOC participants to connect with others as well as to seek and share information. However, research exposed various issues pertaining to how social media tools are implemented within MOOCs and the overall perceptions about using social media in an open learning environment. For instance, a study by Kop et al. (2011) revealed that while MOOC participants created Facebook groups to self-organize their learning experience, only a limited number of participants joined these groups as there were concerns about privacy and security. Participants who didn't join the Facebook groups also considered the course Moodle as the better option to learn about other participants, yet perceived Twitter as their preferred social media platform to use outside the course (Kop et al., 2011). In another study, MOOC participants also considered Google+ Community as a favorable platform to build a learning community outside the course (Zutshi et al., 2013).

One of the promises of connected learning is to build connections with other participants that will endure beyond the course. Social media platforms not only allow to start and expand these connections, they also have the potential to help establish communities of learners who share similar interests, values, or beliefs. In MOOCs, however, communication and collaboration with other participants tend to decline significantly over time while groups that form around a topic come together and disperse as crowds and not communities, thus suggesting that MOOCs are unsuccessful in creating a community of

learners (Gillani & Eynon, 2014). Moreover, whether social media platforms offer a satisfying social experience for most of adult learners who participate in MOOCs is yet unclear. For instance, a study by Bulger, Bright, and Cobo (2015) addressed the reasons for face-to-face meetings between MOOCs participants and found that about 70% of the meetings were about discussing course related activities. Bulger et al. (2015) also concluded that such meetings can potentially provide a sense of belonging to participants. This exemplifies the importance of face-to-face social interactions for adult learners and how socializing through social media may not be the most efficient way to minimize student isolation.

Perhaps one of the biggest challenges for adult learners using social media in MOOCs is that they see the boundary between their private and public lives blurred. Although adults are the fastest growing age group to use social media platforms, most of the older users are still skeptical about how much to share about themselves, especially in an educational setting with a massive number of participants. In other words, socializing online through social media, a comparatively new technology, is still a fairly new concept for many adults and some will adapt better than others (Prensky, 2001).

Instructor's role in MOOCs

The obvious challenge in a MOOC is for the course instructors to establish one-to-one interactions and provide quality feedback to all participants. In fact, due to the massiveness in course participation, expert human feedback is seen as trivial within the instructional design process of a MOOC (Margaryan et al., 2015). Consequently, alternative instructional strategies are implemented within MOOCs to make up for the lack of instructor feedback and presence in general. Some of these strategies include using automated feedback, peer feedback, and teaching assistants to overcome the massiveness in course participation (Haavind & Sistik-Chandler, 2015). Yet, most participants prefer the presence of MOOC instructors because of instructors' ability to add more information and perspective to the online discussion as well as to keep the discussions on track (Hew, 2015).

To explore the role and perceptions of course instructors in MOOC settings, Haavind and Sistik-Chandler (2015) interviewed eight MOOC instructors from different countries and found that some instructors who were interviewed used automatic reply on their emails and intentionally avoided advertising their email addresses on course websites to avoid receiving large number of emails each day. One of the instructors in this study also revealed that he perceived himself as a significantly better instructor in a MOOC than in an in-person setting since the bar was set low for MOOC instructors. As previously indicated, one of the current reasons for higher education institutions to launch MOOCs is experimentation, naturally, setting a lower bar of instruction as opposed to traditional online courses is to be expected. But most importantly, the overall impression of the instructors interviewed was that a MOOC instructor is merely a designer and producer of content and less of a teacher (Haavind & Sistik-Chandler, 2015).

Haavind and Sistik-Chandler's study further highlights some concerns among MOOC instructors including personal safety and negative reputation. In fact, some of the instructors interviewed voiced their concerns about student identities and how easy it is for a banned student to re-enroll under a different identity. Participation in a MOOC does not require the formal registration and enrollment process, thereby allowing participants to re-enroll without any restrictions. In terms of reputations, some instructors reported how MOOC participants take to social media to publicly express their frustration and dissatisfaction with the course and instructor thus negatively impacting the instructor's reputation.

There are different motives that drive instructors to participate in MOOCs. Hew and Cheung (2014) explored the reasons behind instructors' participation in MOOCs and revealed that both altruistic and egoistic motives were present. In addition to teaching and connecting with larger audiences, Hew and Cheung indicated that some of instructors' motives were to enhance their reputation among their colleagues or help to get tenure. Altruistic motives were also evident in some instructors' desires to increase access to higher education globally.

Assessment in MOOCs

Another aspect of the MOOC design that is challenged by the massive number of participants is assessment. Since providing learners with high quality feedback is seen as trivial in how a MOOC is designed (Margaryan et al., 2015), alternative assessment methods and strategies have been implemented which include automated quizzes and tests, peer-assessments, and self-assessments. However, MOOC students come from different academic backgrounds and lack the skills and knowledge to deliver an accurate assessment of their peers' work (Luo, Robinson, & Park, 2013). Similarly, research also found that a self-assessment strategy may not be a valid way to assess students' performance in MOOC settings (Admiraal et al., 2015). Overall, research studies remain unclear about how students perceive peer-assessments. For instance, Luo et al., reported a positive perception towards the peer grading strategy whereas Admiraal et al. indicated that peers only perceived peer grading positive to a limited degree. Nonetheless, lack of an expert feedback in MOOC settings will continue to be one of the least attractive features for adult learners who participate. In any case, when dealing with adult learners, most forms of assessments in MOOCs should focus on project-based assessment strategies that will allow learners to apply and demonstrate knowledge through projects rather than tests and quizzes that have minimal impact on knowledge retention.

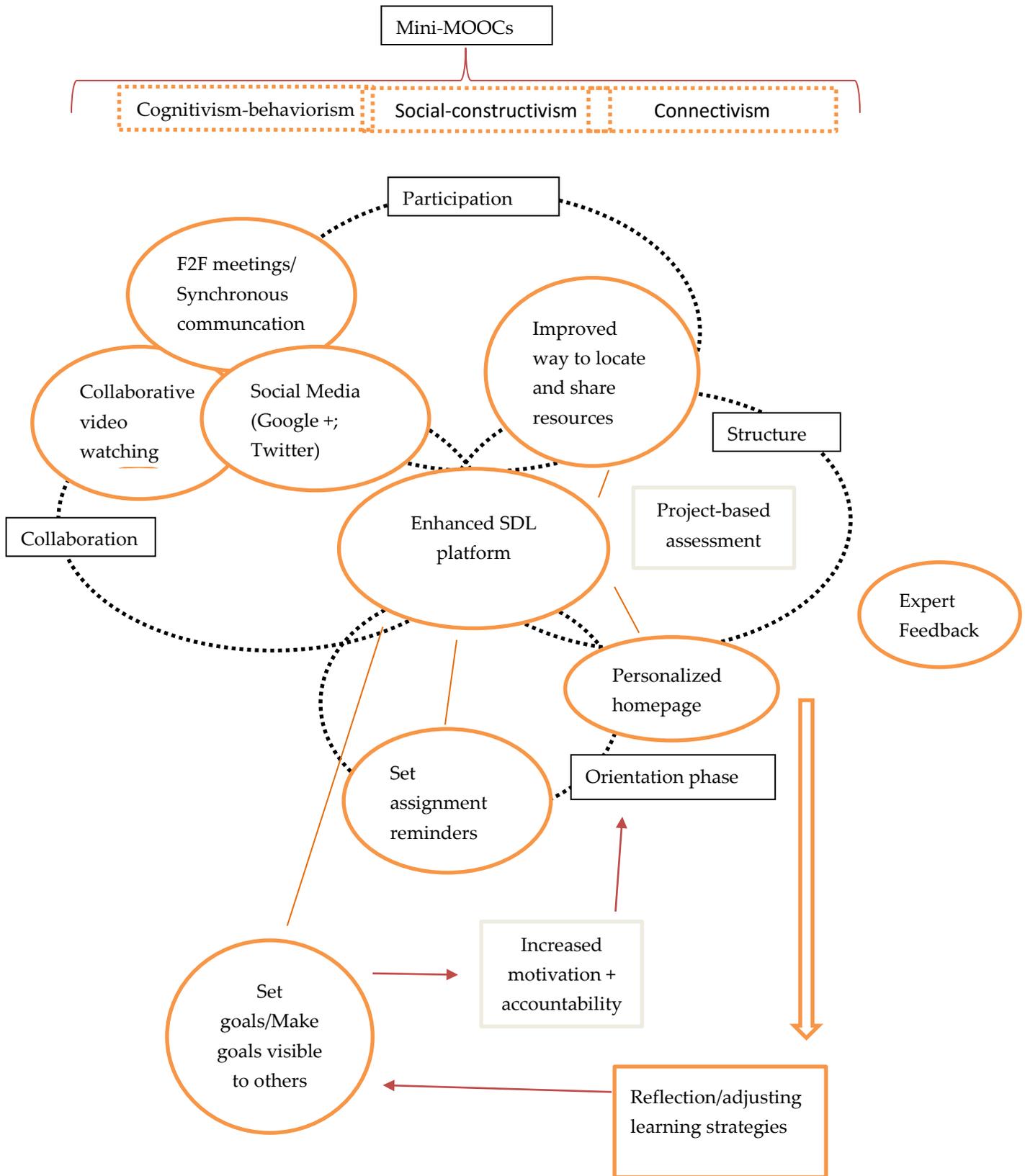
SDL-MOOC proposed framework

Recent studies of MOOCs have suggested myriad strategies to ameliorate the learning experience for MOOC participants. For instance, a study by Li, Verma, Skevi, Zuffery, Blom, and Dillenbourg (2014) explored the potential of collective video watching and found a positive impact on student engagement. This idea was also mentioned in the study by Bulger et al. (2015) which revealed that several invitations for face-to-face meetings by MOOC participants proposed collective video watching activities. Bulger et al. also suggest that face-to-face meetings may promote a sense of belonging among MOOC participants. Since popular MOOC platforms do not currently support a synchronous online collaborative video watching experience, it is recommended that MOOCs designers should encourage face-to-face meetings and collaborative video watching activities among participants in close geographic proximity. However, while this approach may not be feasible for many participants either due to their locations or other circumstances, implementing synchronous communication in MOOCs may be effective in connecting individuals to the group (Hrastinski, 2008), notably in smaller groups. Apropos of smaller settings, recent studies have highlighted an emerging type of MOOCs called mini-MOOC (known as mMOOC). A mini-MOOC is generally known to have fewer than 500 participants (Haavind & Sisteck-Chandler, 2015). More importantly, mini-MOOCs can potentially provide a much more manageable and realistic setting to apply adult learning principles that can make the instructor (and teaching assistants) more active and involved throughout the course.

In terms of pedagogical design of MOOCs, there are typically three pedagogies that are integrated in within MOOCs: cognitive-behaviorist pedagogy, social constructivist pedagogy, and connectivist pedagogy (Anderson & Dron, 2011). But, in order for mini-

MOOCs to be effective, it is important that all three pedagogies are used to address the full spectrum of learning needs (Anderson & Dron, 2011). Enhancing the current MOOC platform is also essential in promoting SDL. For instance, Kim, Olfman, Ryan, and Eryilmaz (2014) studied the effect of using a personalized and enhanced self-directed learning system in an informal learning setting and found noticeable improvement to the level of self-directed learning in an online environment. Kim et al. (2014) concluded that allowing participants to set goals and making them visible to self and others helped participants build a sense of accountability. Another attractive feature in the enhanced self-directed learning system is allowing participants to create and personalize their profile pages. While such feature is not new to many who are active in social media platforms such Facebook, Twitter, or Google + , it is important to take into consideration that adults are the fastest growing age group in social media; thus replicating certain design features from social media into the MOOC platform may be both attractive and engaging. Moreover, an enhanced platform should not only allow improved ways to access and share resources, but also include a calendar feature to help participants to be constantly reminded of upcoming assignments (Kim et al., 2014). On that account, and based on findings from research studies of MOOCs, this article proposes the following SDL-MOOC framework that implements effective technical and pedagogical strategies for future MOOC designs (see **Figure. 3**).

Figure 3. SDL-MOOC design framework



Conclusion

Massive open online courses (MOOCs) have captured the interest of higher education institutions and the general public but at the same time remain a topic of speculation in terms of possible business models and future impact in higher education. This article looks more deeply into the extent to which these types of courses have been effective in supporting self-directed learning. In order for learners to effectively engage in SDL, Knowles (1975) proposed a) creating an atmosphere of mutual respect and support, b) diagnosing learning needs, c) formulating learning goals, d) identifying human and material resources for learning, e) choosing and implementing appropriate learning strategies, and f) evaluating learning outcomes in desired settings. A literature review of both theoretical foundation of self-directed learning and most recent research on MOOCs clearly shows lack of application of adult learning principles within the MOOC paradigm, notably SDL. More particularly, the assessment strategies implemented in MOOC settings are unsuccessful in evaluating learning outcomes more effectively. Moreover, the fact that MOOCs lack of both instructor guidance and a valid community of learners means that there are limitations in creating an atmosphere of mutual respect and support for adult participants within MOOCs. Based on an analysis of SDL theory and current practices in MOOCs, this article proposes an improved design through the implementation of SDL process proposed by Knowles (1975) and later by Tough (1978) as a way to promote SDL in future MOOCs. The proposed model comprises enhanced technical strategies to improve participation and collaboration as well as pedagogical solutions.

Advocates of MOOCs believe that these types of courses are driven by altruistic goals to democratize learning and make learning accessible by everyone thus overcoming the geographical boundaries and financial limitations. However, MOOCs have not been successful in addressing important principles of adult learning theory principles, particularly SDL. Engaging in SDL does not imply learning in solitary. In fact, solitary learners and self-directed learners are different in many ways. A self-directed learner is capable of identifying knowledge he/she wishes to acquire and the necessary steps to reach the goals. More importantly, having support and guidance along the way are essential to effectively engage adults in SDL. In order to take a more supportive approach, MOOC providers should look into alternative settings to overcome the massive number of participants, and at the current stage, mini-MOOCs are more suitable settings that can allow better interactions with instructors and participants and provide an opportunity to create a community of learners rather than scattered groups. Finally, at the present time, it is obvious that many higher education institutions are unlikely to create full degree MOOCs since that could disrupt their existing business models (Burd et al., 2014). In the meantime, MOOCs will remain a platform for institutional experimentations and a setting to engage its participants in informal learning. However, in order for a MOOC to reach its full potential and promote lifelong learning, certain pedagogical and technical issues should be carefully addressed, particularly the application of key theoretical principles such as SDL.

References

- Admiraal, W., Huisman, B., & Pilli, O. (2015). Assessment in massive open online courses. *Electronic Journal of e-Learning*, 13(4), 207-216.
- Anderson, T., & Dron, J. (2010). Three generations of distance education pedagogy. *The International Review of Research in Open and Distributed Learning*, 12(3), 80-97.

- Bali, M. (2014). MOOC pedagogy: Gleaning good practice from existing MOOCs. *MERLOT Journal of Online Learning and Teaching*, 10, 44– 56.
- Bates, T. (2014). Comparing xMOOCs and cMOOCs. Philosophy and practice. *Online Learning and Distance Education Resources*. Retrieved from <http://www.tonybates.ca/2014/10/13/comparing-xmoocs-and-cmoocs-philosophy-and-practice/>
- Bell, F. (2010). Connectivism: Its place in theory-informed research and innovation in technology-enabled learning. *The International Review Of Research In Open And Distributed Learning*, 12(3), 98-118.
- Brookfield, S. (1984). Self-directed adult learning: A critical paradigm. *Adult Education Quarterly*, 35(2), 59-71.
- Bulger, M., Bright, J., & Cobo, C. (2015). The real component of virtual learning: Motivation for face-to-face MOOC meetings in developing and industrialised countries. *Information, Communication & Society*, 18(10), 1200-1216.
- Burd, E. L., Smith, S. P., & Reisman, S. (2014). Exploring business models for MOOCs in higher education. *Innovative Higher Education*, 40(1), 37-49.
- Cafarella, R. S. (2000). Goals of self-directed learning. In G. A. Straka (Ed.), *Conceptions of self-directed learning: Theoretical and conceptual considerations* (pp. 37-48). Berlin, Germany: Waxmann.
- Carr, N. (2008). Is Google making us stupid?. *Yearbook of the National Society for the Study of Education*, 107(2), 89-94.
- Carey, K. (2013). Obama, Rubio agree on one thing: Technology could fix the higher ed mess. Retrieved from http://www.slate.com/blogs/future_Tense/2013/02/13/state_of_union_moocs_obama_rubio_agree_on_using_tech_to_fix_higher_ed.html
- Chyung, Y. S. (2007). Invisible motivation of online adult learners during contract learning. *The Journal of Educators Online*, 4, 1–22.
- Clardy, A. (2000). Learning on their own: Vocationally oriented self-directed learning projects. *Human Resource Development Quarterly*, 11(2), 105- 125.
- Daniel, J. (2012). Making sense of MOOCs: Musings in a maze of myth, paradox and possibility. *Journal of Interactive Media in Education JIME*, 2012(3), 18-30.
- Ebben, M., & Murphy, J. S. (2014). Unpacking MOOC scholarly discourse: a review of nascent MOOC scholarship. *Learning, Media and Technology*, 39(3), 328-345.
- EDUCAUSE (2012, December 20). *What campus leaders need to know about MOOCs: An EDUCAUSE executive briefing*. Louisville, CO: EDUCAUSE Publications.
- Gillani, N., & Eynon, R. (2014). Communication patterns in massively open online courses. *The Internet and Higher Education*, 23, 18-26.
- Haavind, S., & Sistek-Chandler, C. (2015). The emergent role of the MOOC instructor: A qualitative study of trends toward improving future practice. *International Journal on E-Learning*, 14(3), 332-350.
- Hrastinski, S. (2008). The potential of synchronous communication to enhance participation in online discussions: A case study of two e-learning courses. *Information & Management*, 45(7), 499-506.

- Hew, K. F., & Cheung, W. S. (2014). Students' and instructors' use of massive open online courses (MOOCs): Motivations and challenges. *Educational Research Review*, 12(6), 45-58.
- Hew, K. F. (2015). Student perceptions of peer versus instructor facilitation of asynchronous online discussions: Further findings from three cases. *Instructional Science*, 43(1), 19-38.
- Hu, H. (2013). MOOC migration. *Diverse Issues in Higher Education*, 30(4), 10-11.
- Johnson, L., Adams Becker, S., Estrada, V., Freeman, A. (2014). *NMC Horizon Report: 2014 Higher Education Edition*. Austin, Texas: The New Media Consortium.
- Kim, R., Olfman, L., Ryan, T., & Eryilmaz, E. (2014). Leveraging personalized system to improve self-directed learning in online educational environments. *Computers & Education*, 70(3), 150-160.
- Knowles, M. S. (1975). *Self-directed learning: A guide for learners and teachers*. New York: Association Free Press.
- Knowles M. (1983). *The modern practice of adult education: From pedagogy to andragogy*. Cambridge: Prentice Hall.
- 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 Distance Learning*, 12(7), 74-93.
- Lee, H. J. (2012). Rocky road: East Asian international students' experience of adaption to critical thinking way of learning at U.S. universities. In J. Buban & D. Ramdeholl (Eds.), *Proceedings of the 53rd Annual Adult Education Research Conference* (pp. 395-397). Saratoga Springs, NY: SUNY Empire State College.
- Li, N., Verma, H., Skevi, A., Zufferey, G., Blom, J., & Dillenbourg, P. (2014). Watching MOOCs together: Investigating co-located MOOC study groups. *Distance Education*, 35(2), 217-233.
- Loya, A., Gopal, A., Shukla, I., Jermann, P., & Tormey, R. (2015). Conscientious behaviour flexibility and learning in massive open on-line courses. *Procedia-Social and Behavioral Sciences*, 191, 519-525.
- Luo, H., Robinson, A. C., & Park, J.-Y. (2013). Peer grading in a MOOC: Reliability, validity, and perceived effects. *Journal of Asynchronous Learning Networks*, 18(2), 1-14.
- Margaryan, A., Bianco, M., & Littlejohn, A. (2015). Instructional quality of massive open online courses (MOOCs). *Computers & Education*, 80, 77-83.
- Merriam, S. B. (June 06, 2001). Andragogy and self-directed learning: Pillars of adult learning theory. *New Directions for Adult and Continuing Education*, 89, 3-14.
- Merriam, S.B., & Bierema, L.L. (2014). *Adult learning: Linking theory and practice*. San Francisco, CA: Jossey-Bass.
- Moss, D. (2004). Creating space for learning: Conceptualizing women and higher education through space and time. *Gender and Education*, 16(3), 283-302.
- Parker, J. (2013). Examining adult learning assumptions and theories in technology infused communities and professions. In V. Bryan, & V. Wang (Eds.), *Technology use and research approaches for community education and professional development* (pp.53-65). Hershey, PA: IGI Global.
- Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the horizon*, 9(5), 1-6. Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional*

- Technology and Distance Learning*, 2(1). Retrieved from http://www.itdl.org/journal/jan_05/article01.htm
- Sonwalker, N. (2008). Adaptive individualization: The next generation of online education. *On the horizon*, 16(1), 44-47.
- Spector, J. M. (2014). Remarks on MOOCS and mini-MOOCS. *Educational Technology Research and Development*, 62(3), 385-392.
- Wang, V., & Farmer, L. (2008). Adult teaching methods in China and Bloom's taxonomy. *International Journal for the Scholarship of Teaching and Learning*, 2(2), 1-13.
- Woo, S. B. (2013). NUS first local varsity to offer free online courses. *Today*. Retrieved from <http://newshub.nus.edu.sg/news/1302/PDF/ONLINE-tdy-22feb-p20.pdf>
- Yuan, L., & Powell, S. (2013). MOOCs and open education: Implications for higher education (2013: WP01). Bolton, UK: JISC Centre for Educational Technology & Interoperability Standards. Retrieved from [http:// www.cetis.ac.uk](http://www.cetis.ac.uk)
- Zembylas, M. (2008). Adult learners' emotions in online learning. *Distance Education*, 29(1), 71-87.
- Zutshi, S., O'Hare, S., & Rodafinos, A. (2013). Experiences in MOOCs: The perspective of students. *American Journal of Distance Education*, 27(4), 218-227.