Emotional and Social Engagement in a Massive Open Online Course: An examination of Dino 101

Lia M. Daniels

Ph.D., Associate Professor, Department of Educational Psychology, University of Alberta,

lia.daniels@ualberta.ca, Telephone # 780-492-4761

Catherine Adams

Ph.D., Associate Professor, Secondary Education, University of Alberta,

cathy.adams@ualberta.ca, Telephone # (780) 492-3674

Adam McCaffrey

M.Ed., Department of Educational Psychology, University of Alberta

ajmccaff@ualberta.ca, Telephone # 587-985-2652

Please direct all correspondence to the first author Lia M. Daniels at lia.daniels@ualberta.ca

Abstract

Broadly defined as the connection between the learner and his or her learning, student engagement is a motivational construct involving behavioral, cognitive, emotional (Fredricks, Blumenfeld, & Paris, 2004) and social (Klassen, Yerdelen, & Durksen, 2013) components. Although all four components of engagement have been linked to greater effort, persistence, enjoyment, interest, and achievement (e.g., Fredricks et al., 2004), emotional and social engagement may be particularly influential in the massive open online course (MOOC) environment because literally tens of thousands of people participate resulting in countless opportunities for both pleasant and unpleasant emotions and social connections. In this chapter we use quantitative and qualitative data to describe MOOC learners' emotional and social engagement, pointing out places of convergence and divergence with theory.

Keywords: Social Engagement, Emotional Engagement, Students, Massive Open Online Course, Online Learning

Emotional and Social Engagement in an xMOOC: An examination of Dino 101

Massive Open Online Courses (MOOCs) are a relatively new phenomenon that has left an unprecedented mark on the ideology of online learning (Liyanagunawardena, Adams, & Williams, 2013). In their short five-year history, MOOCs have attracted learners from around the world and gained notoriety at world-class educational institutions (Clarke, 2013). Some have argued that the MOOC movement represents a revolution in teaching that frees information from the barriers of paying for expensive courses to now providing classes from the most prominent professors at no cost (Cusumano, 2013). Others, in contrast, see the MOOC movement as a reinvention of old classroom-learning theories being enacted in new ways involving students networking across the world and engaging in new forms of acquiring knowledge (Siemens, 2004). To date, it seems that MOOC designers, instructors, and researchers are undecided on the extent to which MOOC learners can be considered "students" like those found in face-to-face, blended, or other less massive or open online learning environments (Kolowich, 2014). Like Kolowich, we argue that indeed today's MOOC learners are not traditional students: For the most part, they appear unconcerned with grades, credits, or even completion. MOOC learners engage in learning to be exposed to material that they always wanted to learn with the bonus of accessing world-renowned experts (Hew & Cheung, 2014). By extension they may have very different expectations of how they will engage in their learning. If this is indeed the case, one psychological principle that needs to be considered is engagement. It is our intention to examine students' perceptions and experiences of engagement, focusing specifically on social and emotional engagement, in one xMOOC: Dino 101.

A Brief Primer on MOOCs

Siemens (2012) differentiated between connectivist massive open online courses

(cMOOCs) and later edX and Coursera-type massive open online courses (xMOOCs). cMOOCs were originally developed based on connectivist pedagogies that take advantage of the online environment for connecting students (Siemens, 2012). With this theory in mind, the first MOOC was designed to provide students with an array of resources and without any particular structure to what they should learn. Students were asked to learn based on their own interests and to build on their knowledge from others within the class. Siemens and Downes, the pioneers of the cMOOC, argued that learning online could not be fully explained by the previous behaviorist, cognitivist, or constructivist ideas, and that there were different theories of learning that can be harnessed within the online environment (Liyanagunawardena, et al., 2013).

Historically the design of MOOCs emerged from a variety of these learning perspectives including objectivism, pragmatism, interpretivism, and connectivism (Kop & Hill, 2008). Objectivism sees reality as being external and knowledge is experientially acquired, whereas pragmatism sees knowledge as an experience of inquiry, reflection and action. Interpretivisim sees knowledge as an internal construction of ideas that is tested through socialization. Connectivism postulates that students learn best when they are able to engage socially with the material to build and share their ideas with others. It is the connections and networks that the student creates with others that broaden knowledge. This sharing of ideas from one person to another has the potential for ideas to be critically thought about many times over and for ideas to be re-developed through the use of socializing in online learning. The construction of ideas is similar to Vygotsky's theory of scaffolding and proximal learning (Nassaji & Swain, 2000). Vygotsky's theory states that people learn best when they are exposed to those who know slightly more than them and they can scaffold to a greater level of understanding as knowledge is built in among each other. Therefore the uniqueness of each person's opinions can be expressed

about the material they are learning and new ideas can form. This sort of connectivist, spontaneous, and practical sharing of ideas was the foundational philosophy guiding the initial cMOOCs.

The problem with the original ideas for cMOOCs was that they expected knowledge to be created, shared, and collected – this is a tall order in any learning environment never mind one with thousands of learners who may never share the same physical space. Thus, with the increase in popularity of MOOCs in general, a shift occurred towards xMOOCs, or MOOCs that follow a more conventional and structured method like traditional university courses. Although both are massive, open, and online, xMOOCs are philosophically different than cMOOCs. xMOOCs focus less on sharing ideas and building information and more on traditional models of providing materials for students to learn, encouraging discussion, and even assessing learning through quizzes or tests (Clarke, 2013). In this sense, learners do not necessarily go into these courses to share their ideas and develop material together, but instead they are interested more in learning from a leading professor online for free and usually through the segments of pre-recorded videos. xMOOCs still involve discussion forums and shows evidence of a spontaneous creation of groups or artifacts, but ultimately the xMOOC platform is not driven by the underlying philosophy of connectivism. From our perspective this raises a question related to engagement more than ever, because now tens of thousands of people may simply be exposed to "good" or "bad" xMOOCs the same way traditional students have slogged through "good" and "bad" lectures, seminars, and labs. Thus, the question becomes to what extent can engagement be leveraged in an xMOOC, particularly given the unique motivations of its learners.

Engagement as a Social-Psychological Construct

When MOOC developers talk about engagement, they are talking about completion and

participation rates: how many people registered, logged on, want a certificate, etc. This is a very different definition than a social psychological approach to engagement in learning. Although many working definitions exist (Appleton et al., 2008; Furlong et al., 2003), most researchers agree engagement is a multidimensional construct most commonly broken down into three components:

- cognitive engagement (regulation).

- behavioral engagement (effort, participation, following rules)

- emotional or affective engagement (positive attitude, interest)

Recently, Klassen, Yerdelen, and Durksen (2013) proposed that social engagement is critical in learning environments because learning is a social task. This may be particularly true in MOOCs because their massiveness provides an unprecedented opportunity for social connections.

- social engagement (connections, belonging)

Thus, for the purposes of this paper we adhere to this modified four-component operationalization of engagement (Fredricks, Blumenfeld, & Paris, 2004; Klassen et al., 2013) and thus review each of these in some detail now.

Cognitive engagement looks at the level of investment learners put into thinking about their tasks. It incorporates the investment of intentional thought required to comprehend complicated ideas and to master the content presented (Fredricks et al., 2004). Some definitions emphasize the importance of psychological investment in learning, while others emphasize a variety of cognitive processes such as problem solving, positive coping, and desire for learning. (Connell & Wellborn, 1991; Newmann et al., 1992; Wehlage et al., 1989). Cognitive engagement is seen as being quite similar to other constructs in motivation literature such as intrinsic motivation and cognitive engagement positively predicts outcomes such as goal setting

and self-regulation (Boekarts, Pintrich, & Zeidner, 2000; Harter, 1981; Zimmerman, 1990). High cognitive engagement in a MOOC may involve seeking out additional information on the material or preparing for and completing quizzes. Behavioral engagement is often defined in three ways. The first way is a definition of positive demeanor (e.g., following rules, school attendance, etc.; Finn, 1993; Finn & Rock, 1997). The second is the effort towards paying attention and concentrating on the learning experience (Birch & Ladd, 1997; Skinner & Belmont, 1993). The third is the participation in school-related events (Finn, 1993; Finn et al., 1995). Empirically, behavioral engagement has been positively associated with students' on task-behaviors and following rules (Karweit, 1989; Peterson, Swing, Stark, & Wass, 1984). This is the psychological element of engagement that is most similar to the notion of engagement discussed currently in the MOOC literature. Although the expectations for behavior in a MOOC may look different than in a traditional classroom, they still exist. For example, a student may be able to stay focused on the video or become distracted and surf the web - each represents a qualitatively different level of behavioral engagement.

Emotional engagement relates to the student's feelings of interest, pleasure, sadness, boredom, and anxiety in the classroom (Fredricks, et al., 2004). In other words, emotional engagement looks at the positive or negative reactions that extend from the social and learning environment. Emotional engagement has been positively related to student outcomes including attitudes, emotional experiences, values and interest (Epstein & McPartland, 1976; Yamamoto, Thomas, Karns, 1969; Eccles et al., 1983). An example of emotional engagement is the feeling of excitement a student may feel when watching the lectures or participating in the forums.

Social engagement refers to a willingness one feels to socialize with others and the feeling of belonging. Although social engagement is an emerging construct in the student

engagement literature, it has been discussed in the eLearning literature pertaining to social media and Web 2.0 technologies for quite some time (See Rennie & Morrison, 2013 for a more thorough review). From a theoretical perspective several achievement motivation theories stress some component of social connectedness. For example, Self-Determination Theory (Deci & Ryan, 2000) argues that relatedness is one of three basic psychological needs that when met leads to optimal motivation. Similarly, Butler (2012) has recently incorporated relational goals into her achievement goal framework. Specific to online learning, Siemens' (2004) theories on connectivism make these arguments even more forcefully and suggest that the future of learning online lies with the connections we make and the process of socializing knowledge and information so that students can think critically and contribute to knowledge on a global level. Although xMOOCs do not emanate from the connectivist paradigm described above, psychological theory and eLearning pedagogy reinforce that engaging learning environments of any type should indeed be social (Rennie & Morrison, 2013).

Let's consider an example. In a traditional classroom we may determine evidence of engagement when a student asks questions in class (cognitive), completes assignments (behavioral), appears excited about the content (emotional), and shares information with her peers (social). In an xMOOC we may infer engagement when a student starts a debate on the forums (cognitive), logs on regularly to watch full video segments (behavioral), expresses that the content is relevant (emotional), and joins a related Facebook group (social). From a psychological perspective, this four-pronged operationalization of engagement can be applied to face-to-face and online learning environments without much difficulty. A similar argument was made for transitioning other social psychological theories to help explain and design online learning environments (see Daniels & Stupnisky, 2012).

Engaging MOOCs

Hew and Cheung (2014) suggest that instructors attempt to engage students in xMOOCs by relying on a familiar structure much like traditional higher education courses and participating to some extent in online interactions. Neither of these strategies aligns with a social psychological approach to student engagement – which is well established in face-to-face research and we hypothesize can be translated into xMOOCs. In particular we focus on emotional and social engagement because these two components stand to make a particularly meaningful contribution to MOOC design because the "massiveness" of the MOOC offers countless opportunities for connection as well as unique opportunities to feel isolated. According to Jacobs (2013), student-to-student interactions across 11 MOOCs warrant an overall grade of B- and are described as "merely decent to unsatisfying." Jacobs is even harder on teacher-to-student interactions giving a final grade of D. Summing across the current literature, Hew and Cheung (2014) suggest that one of students' major frustrations stemmed from poor quality of discussions and slow responses. It seems that despite the range of opportunities to interact, no platform has, as of yet, successfully brought about the same sense of interaction or conversation that is part of high quality face-to-face delivery. With MOOCs understood to be in the early stages of development, research on engagement may play a pivotal role in shaping the successful improvement of MOOCs for a different type of learner. This is an important caveat: MOOC learners are a different type of student and thus may enter their MOOC with uncommon expectations for learning (Kolowich, 2014). Just as we expect the social psychological perspective on engagement to function in a MOOC, so too should we remember countless pieces of educational evidence that students' expectations influence their effort and learning (e.g., Eccles & Wigfield, 2002). Thus, learners who go into the MOOC for social engagement reasons

may engage in their learning differently than those who expect their learning to come from the experts they are able to access through videos.

Engagement with the Instructor. Jacobs (2013) has suggested that there is a very low level of interaction between students and the instructor in MOOCs: "When it comes to Massive Open Online Courses…you can forget about the Socratic method. The professor is, in most cases, out of students' reach, only slightly more accessible than the pope or Thomas Pynchon" (para. 2). The high student-instructor ratio is perceived as especially problematic in xMOOCs. In cMOOCs, students are intended to be learning primarily via making multiple and varied connections with their peers, so this ratio is not considered a significant issue in connectivist environments. Ebben & Murphy (2014) contend that "most MOOCs are constructed in a unidirectional manner… epitomizing a narrow view of teaching and learning" (p. 14), and thereby severely limit the potential for student engagement with the instructor.

Anderson (2013) compared cMOOCs to xMOOCs using his three distance education interaction modes (student-student, student-content, student-teacher). Via their extensive use of digitized lectures and machine-scored quizzes, xMOOCs' achieve scalability by "morphing… student-teacher interaction into student-content interaction" (p. 4). He noted that this cognitive-behaviorist approach has been successfully employed by higher education as well as by distance education for decades. In cMOOCs, student-teacher interaction is substituted for student-student interactions. While claiming a course may succeed by relying solely on one mode of interaction, Anderson recommends a balance of all three to achieve high levels of learning. Finally, Kolowich (2013) indicated that MOOC instructors hold a type of superstar status. Such an elevated and inaccessible position may create a very different type of emotional or social engagement than the one convened with a traditional instructor.

Dino 101: Dinosaur Paleobiology

Dino 101, Dinosaur Paleobiology, was developed on the Coursera Platform in 2013 by the University of Alberta to provide students from around the world an opportunity to learn from Canadian paleontologist and renowned dinosaur museum curator, Dr. Philip J. Currie. Within the MOOC there were four distinct groups of students: (1) University of Alberta students enrolled in PALEO 200 who completed the MOOC for credit at the university, (2) University of Alberta students enrolled in PALEO 201 who completed the MOOC plus a weekly face-to-face seminar and laboratory with Dr. Currie, (3) students on the Coursera "signature track" who earned a certificate by completing the 12 quizzes, a midterm, and a final exam, and (4) those on a non-credit track. The course itself consisted of 12 weekly lessons with an estimated workload of 3-5 hours/week for non-credit participants, and 7-10 hours/week for credit. In September 2013, all 12 lessons were released at the start of the course, and although students were encouraged to follow the prescribed timeline, they were free to complete the course at their own pace. The online format consisted of a variety of learning tools including video lectures that were 3-16 minutes long with formative quizzes integrated into the videos, as well as other means of learning such as discussion boards and online student Wikis. The topics for the course included dinosaur appearances, anatomy, death, fossilization, eating, movement, birth, growth, reproduction, attacking and defending, evolution, extinction, and geologic time (Chesney, 2013). In its initial offering Dino 101 attracted more than 23 thousand participants from around the world representing a wide range of ages, educational backgrounds, social economic standards, and so on (Chesney, 2013). Unlike many other MOOCs (Ho, Reich, Nesterko, Seaton, Mullaney, Waldo, & Chuang, 2014), Dino 101 was equally attractive to male and female learners (Chesney, 2013).

Data Sources

The results described herein pertaining to social and emotional engagement in Dino 101 come from two very different sources. First, we obtained quantitative data from 1,005 Dino 101 participants who were willing to complete an online survey distributed via email. Anyone who registered in Dino 101 could complete the survey regardless of whether they completed the entire course or not. The sample of 1,005 appeared to represent the group well in terms of demographic information. For example, in line with a "getting to know you survey" administered by the course designers (Chesney, 2013) our sample was 50% male, 49% female, 1% undisclosed, the modal age was 25-34, 57% had participated in a MOOC before, and 35% had completed a bachelor's degree. In terms of education, 34% of the sample reported having completed an undergraduate degree, 25% a Master degree, 9% a college diploma, 8% having some undergraduate or college training, 9% having highschool and 4% having less than high school.

Second, we obtained qualitative data via phenomenological interviews with 32 Dino 101 "completers." Completers were defined as Dino 101 registrants who either successfully completed the twelve quizzes (non-credit track), or the twelve quizzes, a midterm, and a final exam (credit track). Ten of the completers were campus-based (credit track) University of Alberta students, ten were coursera "signature track", and the remaining twelve participated for free. Of the ten University of Alberta students, five took part in PALEO 200; the other five were enrolled in PALEO 201. The interviews were 1-1.5 hours in length and were held in-person (for University of Alberta students) or via an online communications facility (e.g. Skype) since most Dino 101 participants hailed from across the world.

Together the quantitative and qualitative data reveal interesting dynamics of learners' social and emotional engagement in Dino 101. We consider the results from the two data sources

together as they pertain to peer-to-peer feelings of engagement. However, each type of data also provides unique information in regards to student outcomes and perspectives on the instructors.

The Learning Climate Shared with other Students

Hew and Cheung (2014) conclude that student satisfaction in MOOCs is mixed. In our sample, 51% of respondents indicated that they strongly agreed with the statement "I was satisfied with how much I learned in Dino 101." However, what contributes to students' satisfaction remains a question. Thus, we aimed to get a sense of students' emotional and social engagement and their expectations as psychological indicators that may contribute to satisfaction. Overall, pleasant emotions dominated unpleasant. For example, 92.5 % of participants said that they were not at all upset, 76% were not at all nervous, almost no one reported feeling ashamed (93% not at all), and 71% were not at all bored. In comparison, 72% said they felt quite a bit or extremely inspired, 65% alert, 82% attentive, and 61% enjoyed their time online. Overall, the mean emotional engagement score was 6.23, *SD* = .95 (min score = 1; maximum possible score = 7). From these responses it seems that Dino 101 represented a largely emotionally pleasant learning environment (Figure 1).

[Figure 1 approximately here]

In contrast to the emotional climate of Dino 101, respondents were less positive about the social environment. In fact the most common response to all the items we asked regarding a sense of belonging or collegiality in Dino 101 was "neutral" (or the midpoint of the scale). Most respondents indicated they were neutral to feeling friendship (60%), feeling like part of a team (47%), and remembering their classmates affectionately (59%). This overall trend may also be

reflected in the fact that only 16% of respondents expected interacting with other students to contribute to their learning in comparison to the 77% who expected the videos to be the main source of their learning (i.e., scored above the neutral midpoint). Overall, the mean social engagement score was 3.61, $SD = 1.25$ (min score = 1; maximum possible score = 7) – this was nearly half the rating level of emotional engagement and thus shows us that social engagement was lacking in comparison. One place we would expect to see social engagement in an xMOOC is in the discussion forums offered.

Forum participation. Successful xMOOC students are reported to participate in discussion forums at much higher rates than their non-completing counterparts (Breslow, Pritchard, DeBoer, Stump, Ho & Seaton, 2013; Gillani & Eynon, 2014; Kizilcec, Piech & Schneider, 2013). However, the overall participation rate on these forums tends to be low. Examining the communication patterns in one xMOOC, Gillani and Eynon (2014) concluded that MOOC learners tend to form crowds, not communities, in discussion forums. Such an analysis suggests that, even among those who contribute to the forums, students may be experiencing qualitatively different forms of social engagement in this context. Only a few of the Dino 101 completers that we interviewed reported that they had contributed to a discussion forum. Some said that they had paid little or no attention to them. One student told us that she was amazed at the depth of the forum discussions, and that she once found herself "spellbound" by a heated argument that had ensued in one of the threads. However, she never ventured a post herself. Another student described feeling overwhelmed by the sheer volume of forum threads, and being deluged daily by email notices of new forum posts.

Lars, a "free Dino 101 student" and grade school teacher who had previously completed five other MOOCs, described spending considerable time trying to locate his own post in a busy

forum thread hoping to see if anyone had responded, only to discover that no one had. Over the following week or two, he continued to navigate to his post. Lars also recalled another moment when, while perusing a forum thread about others being inspired to visit local museums, he realized that "*this* is what MOOCs are really about." While he received no direct response to his own post, Lars nonetheless felt moved by the excitement generated in one of the forum threads.

The quantitative results suggest that overall the discussion forums did not provide significant opportunities for social engagement and the qualitative data appears to align with this result. However, the qualitative data showed that the discussion forums were a significant source of emotional engagement for some students.

Social engagement at home together and apart. One unexpected finding from our qualitative interviews was the occurrence of students taking Dino 101 with members of their household, specifically, with a spouse, roommate, or even one's child. Cameron and her partner, both university students, decided to sign up for PALEO 200. She described a moment early on in the course:

> *I am sitting with my partner in our living room. We decide to login to my account and watch the videos together on the TV. As soon as the first video starts we find the first problem. I want to pause the video, recap what I've just seen, and scribble down a few notes. He doesn't and seems annoyed! We tried to mesh our learning styles together and it just didn't work. (Cameron, "PALEO 200 student")*

On the one hand, taking a MOOC "together" seemed to offer new possibilities for learning: sharing the comfort of ones living room while watching the videos, pausing to discuss key understandings or confusions with one another, keeping one another on task. On the other hand, the couple quickly discovered that each had different ideas and preferences about how best to proceed through the course. So while a MOOC affords new opportunities to learn together

locally and globally, it may also present unexpected relational challenges and learning compromises that may sway learners' overall satisfaction.

Effort and satisfaction. In addition to relational challenges and learning compromises, satisfaction and effort may be adjusted in a MOOC environment. Thus we correlated emotional and social engagement with learners' expectations and effort and satisfaction. Expectations can be considered a precursor to engagement whereas effort and satisfaction are common outcomes. We highlight five particularly interesting correlations (Table 1). For example, only expectations that interactions with students would contribute to learning was positively related to both emotional and social engagement. In fact, an expectation that videos contribute to learning was negatively related to social engagement. In other words, learners' expectations were linked to the quality of their social and emotional engagement in the course. Learners who expected to learn from videos were uninterested in social engagement, whereas those who approached the course with social expectations benefited in terms of both type of engagement. This is important because both emotional and social engagement were positively correlated with satisfaction and effort. From a practical perspective this means that as MOOC developers look to create courses that are satisfying and motivate learners to work hard, they need to provide opportunities for social and emotional engagement and attract students with matching expectations.

[table 1 approximately here]

Expanding on the correlations, we conducted two regression analyses, one for each of the outcomes: satisfaction and effort. In Step 1 we controlled for age and biological sex. In Step 2 we entered expectations, and in Step 3 we entered emotional and social engagement (Table 2).

The final model explained 44% of the variance in satisfaction ratings, $F(6, 861) = 115.295$, $p < .001$ and 23% of the variance in effort $F(6, 861) = 43.38$, $p < .001$. Both age and sex emerged as important predictors with older students reporting higher levels of satisfaction and effort than younger, and males reporting less satisfaction and effort than females. As foreshadowed by the correlations, expectations that interactions would contribute to learning positively predicted effort and negatively predicted satisfaction – perhaps suggesting that those who expected this did not find it and thus were less satisfied. In contrast expectations related to the videos positively predicted satisfaction but not effort – perhaps suggesting that the videos were of high quality but not requiring much effort. Both emotional and social engagement contributed positively to students' satisfaction and effort, although arguable emotional engagement was a more influential predictor.

[table 2 approximately here]

Together these results support the overarching picture that suggests Dino 101 was a pleasant learning environment but not necessarily an overly social one – at least between students. It is important to note that the one perspective lacking from the quantitative results is the relationship between the students and the instructor. However, we were able to capture this perspective in our qualitative data.

A warm, pedagogical sphere or a predetermined script? A previous phenomenological study revealed that some xMOOC students developed an on-going sense of an intimate, tutorial relation with their instructor in the context of the teaching videos, even though they were participating in a course with thousands of others (Adams, Yin, Madriz Vargas & Mullen, 2014). Andy, a "free student" from Europe, described his perceptions of the two main Dino 101 instructors, Philip Currie and Betsy Kruk:

In the early days of Dino 101, Dr. Currie, but Betsy especially, talked very quickly—often too quickly—in the videos. Over time though, she started talking at a more natural pace. It helped me to have a sense of relationship with her. They became very human to me, and very warm. I remember thinking, "Oh yeah, she's really getting the hang of this." (Andy, "Dino 101 free student")

Over the course of the MOOC, Andy recalled developing a surprisingly warm and "human" connection with both Kruk and Currie. Though initially he was worried about the pace and tempo of the instructors' lectures, he soon acclimatized to their teaching styles; he came to perceive that they too were learning, becoming more experienced, relaxed, and able to find "a more natural pace" in their videos. So while xMOOCs may be characterized in the literature as "unidirectional" and lacking significantly in student-instructor interactions, it is possible for students in these massive learning spaces to experience a warm and on-going connection with their instructor(s).

Other completing students struggled to establish and maintain a connection with the Dino 101 instructors. Anky, a lawyer, found herself initially and occasionally distracted by "Betsy and Dr. Currie reading a script." She remembered having to push herself past the sense of scripted-ness in order to attend to what was being said. Once she had succeeded, she immediately began the video over to catch what she had missed. Here, the student found it difficult to establish a sense of rapport with an instructor who appeared not to be speaking to her extemporaneously. One might imagine a similar scenario in a film where an actor appears to be reading his or her lines: the viewer is similarly distracted from experiencing the movie itself. Lars recalled a different MOOC where, during one of the video lectures, the instructor made reference to a forum discussion: "From that moment on, I knew he was paying attention to the course, and to us." For him, the Dino 101 videos were missing this palpable sense of "immediacy and instructor engagement" with the goings-on in the MOOC.

A sense of relationship with the instructor also inhered beyond the video lectures. For example, George was impressed by and looked forward to receiving Dr. Currie's weekly emails in her inbox. But another student wondered if the weekly emails were "automated" and written by someone else. In both cases, Dr. Currie has attained a kind of superstar status. For the first student, he appears unexpectedly open and considerate; for the second, the student suspects that like other celebrities someone else is writing his fan mail.

Conclusion

The purpose of this chapter was to bring psychological theory to bear on the notion of engagement in the case of one xMOOC: Dino 101. We focused on emotional and social engagement because of the unique opportunities for MOOCs to support or neglect these specific types of engagement. Overall, it seems that most learners, which in our data largely reflects completers, had an emotionally pleasant experience in Dino 101. They strongly agree with experiencing a range of pleasant emotions and find following forum posts a source of excitement. It is possible that the pleasant emotional environment is one thing that kept these learners coming back to Dino 101. Or, it may simply be that the content itself provided its own pleasant feelings, bringing students to return out of continued interest. Although these assertions are speculative and neither our quantitative nor qualitative data allow us to make either conclusion with confidence, it intuitively makes sense that students are more likely to return to a pleasant, interesting, or even exciting learning environment than one they perceive as unpleasant. What we can say is that these pleasant emotional experiences were not necessarily associated with similarly high levels of social engagement. We have to wonder if higher levels of social engagement would help improve retention of some learners who are looking for more than a unidirectional learning experience. Both of these are questions for future research looking at

students who did not complete the course. It is our assertion that improvements within the MOOC environment should look at how they relate to strengthening the four components of engagement (cognitive, behavior, emotional and social) either separately or together. Our research suggests that while levels of emotional engagement seem to be rated highly at least for Dino 101, this same environment does not currently foster a strong sense of social engagement. Whether our intention is to increase the retention rates or improve the learning experience of completers, Dino 101 appears to have room for improvement in terms of social engagement. We recommend focusing on ways to make the discussion forums more interactive and a place for social interactions to support learning. Additionally, it may be useful to consider course assignments or projects that explicitly require social interactions. Finally, improvements in social engagement should not be limited to students, but should also consider ways students can access the instructor. These recommendations may also be applied to other MOOCs being developed and one option for future research is to directly compare MOOCs that intentionally build in opportunities for social engagement to those that are less intention in this area.

References

Adams, C., Yin, Y., Vargas Madriz, F. L., Mullen, C. S. (2014). A phenomenology of learning large: the tutorial sphere of xMOOC video lectures. *Distance Education*, *35*(2). doi: 10.1080/01587919.2014.917701

Anderson, T. (2013, March). Promise and/or Peril: MOOCs and Open and Distance Education. *Commonwealth of Learning*. Retrieved from http://www.col.org/SiteCollectionDocuments/MOOCsPromisePeril_Anderson.pdf

Appleton, J.J., Christenson, S.L., & Furlong, M.J. (2008). Student engagement with school: Critical conceptual and methodological issues of the construct. *Psychology in the Schools, 45*(5), 369-386.

Birch, S ., & Ladd, G . (1997). The teacher-child relationship and children's early school adjustment. *Journal of School Psychology, 35*, 61-79.

Boekarts, M., Pintrich, P. R., & Zeidner, M. (Eds.).(2000). *Handbook of self-regulation: Theory, research and applications.* San Diego, CA: Academic Press.

Breslow, L., Pritchard, D., DeBoer, J., Stump, G., Ho, A., & Seaton, D. (2013). Studying learning in the worldwide classroom: Research into edX's first MOOC. *Research & Practice in Assessment*, 8, 13-25.

Butler, R. (2012). Striving to connect: Extending an achievement goal approach to teacher motivation to include relational goals for teaching. *Journal of Educational Psychology, 104*, 726-742. doi: 10.1037/a0028613

Chesney, J. (2013, December 7). A look at what differentiates Dino 101 from other MOOCs. Retrieved from http://digitallearning.ualberta.ca/digital-learning-at-

ualberta/news-and-events/2013/december/mooc-v2-how-dino-101-is-different-and-what-weve-observed-so-far-part1.

Chesney, J. (2013, December 14). A look at observation of the implementation of DINO101. Retrieved from http://digitallearning.ualberta.ca/digital-learning-at-ualberta/news-and-events/2013/december/mooc-v2-how-dino-101-is-different-and-what-weve-observed-so-far-part2.

Clarke, T. (2013). The advance of the MOOCs (massive open online courses): The impending globalization of business education? *Emerald Insight: Education and Training, 55*(4/5), 403-413

Connell, J. P., & Wellborn, J. G. (1991). *Competence, autonomy, and relatedness: A motivational*

analysis of self-system processes. In M. Gunnar & L. A. Sroufe (Eds.), Minnesota Symposium on Child Psychology (Vol. 23). Chicago: University of Chicago Press.

Cusumano, M.A. (2013). Technology strategy and management: Are the costs of 'free' too high in online education. *Communication of the ACM, 56*(4), 26-29.

Daniels, L. M., & Stupnisky, R. H. (2012). Not that different in theory: A discussion of the control-value theory of emotions in online and face-to-face learning environments. *Internet in Higher Education, 15,* 222-226.

Deci, E.L., & Ryan, R.M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268.

Ebben, M., & Murphy, J. S. (2014). Unpacking MOOC scholarly discourse: a review of nascent MOOC scholarship. *Learning, Media and Technology*, *39*(3), 328-345.

Eccles, J.S. (2009). Expectancies values and academic behaviors. *Univ. Bibliothek Frankfurt am Main,* 75-146.

Eccles J.S., Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review Psychology, 53*, 109-132.

Epstein, J. L., & McPartland, J. M. (1976). The concept and measurement of the qual-ity of school life. *American Educational Research Journal, 13*, 15-30.

Farrell, E. (1990). *Hanging in and dropping out: Voices of at-risk students*. New York: Teachers College Press.

Finn, J. D., & Rock, D. A. (1997). Academic success among students at risk for school failure. *Journal of Applied Psychology, 82*, 221-234.

Finn, J. D. (1993). School engagement and students at risk. Washington, DC: National Center for Education Statistics.

Furlong, M. J., Whipple, A. D., St. Jean, G., Simental, J., Soliz, A., & Punthuna, S. (2003). Multiple contexts of school engagement:Moving toward a unifying framework for educational research and practice. *California School Psychologist, 8*, 99 – 114.

Fredricks, J.A., Blumenfeld, P.C., Paris, A.H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Education Research, 74*(1), 59-109.

Gillani, N., & Eynon, R. (2014). Communication patterns in Massively Open Online Courses. *The Internet and Higher Education*. doi:10.1016/j.iheduc.2014.05.004

Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic motivation in the classroom: Motivational and informational components. *Developmental Psychology, 17*, 300-312.

Hew, K.F., & Cheung, W.S. (2014). Students' and instructors' use of massive open online

courses (MOOCs): Motivation and challenges. *Educational Research Review, 12*, 45-58.

Ho, A. D., Reich, J., Nesterko, S., Seaton, D. T., Mullaney, T., Waldo, J., & Chuang, I. (2014). HarvardX and MITx: The first year of open online courses (HarvardX and MITx Working Paper No. 1).

Jacobs, A. J. (2013). Two cheers for Web U! *New York Times, 162* (56113), 1-7.

Karweit, N. (1989). *Time and learning: A review.* In R. E. Slavin (Ed.), School and classroom organization (pp. 69-95). Hillsdale, NJ: Lawrence Erlbaum.

Kizilcec, R. F., Piech, C., & Schneider, E. (2013). Deconstructing disengagement: Analyzing learner subpopulations in massive open online courses. In D. Suthers, K. Verbert, E. Duval, & X. Ochoa (Eds.), *Proceedings of the Third International Conference on Learning Analytics and Knowledge* (pp. 170–179). New York, NY: Association for Computing Machinery. doi:10.1145/2460296.2460330

Klassen, R.M., Yerdelen, S., & Durken, T.L. (2013). Measuring teacher engagement: Development of the engaged teachers scale (ETS). *Front Learning Research, 1*(2), 33-52.

Kolowich, S. (2014). Completion rates aren't the best way to judge MOOCs, researchers say. *The Chronicle of Higher Education.*

Kop, R., & Hill, A. (2008). Connectivism: Learning theory of the future or vestige of the past? International Review of Research in Open and Distance Learning, 9 (3). Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/523/1103.

Liyanagunawardena, T.R., Adams, A.A., & Williams, S.A. (2013). MOOCs: A systematic study of the published literature 2008-2012. *The International Review of Research in Open and Distance Learning. 14*(3), 202-227.

Nassaji, H., & Swain, M. (2000). A Vygotskian perspective on corrective feedback: The

effect of random versus negotiated help on the learning of English articles. *Language Awareness, 9*, 34–51.

Newmann, F., Wehlage,G . G., & Lamborn, S. D. (1992). *The significance and sources of student engagement.* In F. Newmann (Ed.), Student engagement and achievement in American secondary schools (pp. 11-39). New York: Teachers College Press.

Peterson, P., Swing, S., Stark, K., & Wass, G. (1984). Students' cognitions and time on task during mathematics instruction. *American Educational Research Journal, 21*, 487-515.

Rennie, F., & Morrison, T. (2013). *E-learning and social networking handbook: Resources for higher education.* New York: Ruotledge.

Siemens, G. (2004). Connectivism: A learning theory for the digital age. elearnspace. http://www.elearnspace.org/Articles/connectivism.htm.

Siemens, G. (2012). What is the theory that underpins our moocs? Blog Elearnspace. Retrieved from: http://www.elearnspace.org/blog/2012/06/03/what-is-the-theory-that-underpinsour-moocs/.

Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effect of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85*, 571-581.

Wehlage, G. G., Rutter, R. A., Smith, G. A., Lesko, N. L., & Fernandez, R. R. (1989). *Reducing the risk: Schools as communities of support.* Philadelphia: Farmer Press.

Yamamoto, K., Thomas, E. C., & Karns, E. A. (1969). School-related attitudes in middle-school-age students. *American Educational Research Journal, 6,* 191-206.

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview.

Educational Psychologist, 21, 3-17.

Table 1. Correlation Analyses *n* = 862

	1	2	3	4	5
1. Expectation: Interacting	—				
2. Expectation: Videos	-.12**	—			
3. Emotional Engagement	.09**	.14**	—		
4. Social Engagement	.57**	-.10**	.22**[1]	—	
5. Satisfaction	.02	.17**	.64**	.37**	—
6. Effort	.24**	-.01	.19**	.30**	.41**

Note. *p* < .05, ** *p* <.01 *** *p* <.001. [1] n = 924

Table 2. Regression Analyses for Satisfaction and Effort

Predictor Variable	Satisfaction			Effort		
	Step 1	Step 2	Step 3	Step 1	Step 2	Step 3
Age	.05	.13**	.13**	.14**	.13**	.17**
Sex (1 = female; 2 = male)	-.13**	-.09*	-.09*	-.13**	-.14**	-.12**
Expectations						
Interactions		.04	-.09*		.25**	.14*
Videos		.18**	.09*		.04	-.01
Engagement						
Emotional			.62**			.33**
Social			.10*			.16**
Adjusted R^2	.02**	.05**	.44**	.03**	.09**	.23**

$* p < .01, ** p < .001$

Figure 1. Emotional engagement in Dino 101