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Investigating the Potential of MOOCs in K-12 Teaching and Learning Environments

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The massive open online course (MOOC) is a relatively new concept in K-12 teaching and learning environments. Although significant work has been done with MOOCs since 2008, it has only been recently that MOOCs have been studied with K-12 populations. The purpose of this study was to further examine the motivation of K-12 students enrolled in a MOOC about teaching in the 21st century. This article provides both quantitative and qualitative evidence that suggests MOOCs can be effectively integrated with high school students. The paper concludes with a discussion of the potential value of using MOOCs and other technologies to provide experiences to students they might not currently have in traditional, blended, or online environments.

INTRODUCTION

Online learning has been touted as an educational innovation with tremendous potential for producing a more personalized pedagogy as well as productive new school models (Horn & Stalker, 2011). Much of the conversation about online and blended learning at the K-12 level has seemed to focus on practices such as completely online courses (e.g. supplemental or full-time online programs), flipping the classroom (e.g. watching video-based lectures at home and doing hands-on, supported work during school time), developing rotation models (e.g. students do some work online and some face-to-face), and integrating flex models (e.g. the curriculum is mostly delivered online) (Ferdig, Cavanaugh, & Freidhoff, 2012). Massive Open Online Courses (MOOCs), a relative newcomer to the discussion surrounding online learning opportunities, have been gaining significant amounts of press. However, conversations surrounding MOOCs seem to be contained to the university setting for reducing college costs or at the non-credit-bearing level for personal fulfillment and enjoyment. Although there has been some work done on MOOCs in grades K-12, more work is necessary to explore the ways in which they can be successfully implemented into existing and often traditional infrastructures (Ferdig, 2013).

A Massive Open Online Course can be easily understood by the words that make up the acronym. They are online courses that typically last anywhere from 2-15 weeks and they enroll a large number of students. Enrollment is customarily free, although some courses provide a surcharge for continuing education hours, K-12 or post-secondary credit, or certification (Ferdig, 2013).

A deeper dive into the literature, however, reveals more complexity in this simple definition. For example, how massive is massive? Does open always or only mean free? What are the pedagogical beliefs that informed the creation of the course and its delivery? An important outcome from these conversations and a lesson for all educators is that not all MOOCs are the same, particularly in their instructional strategies.

During the fall of 2013, researchers from Kent State University collaborated with Michigan Virtual School to create a MOOC for in-service teachers, preservice teachers, and K-12 students interested in teaching (http://www.mivu.org/mooc). The team also included 14 partners (e.g. Educator Innovator, PBS WVIZ Ideastream, 8 virtual K-12 schools, etc.) and 10 co-facilitators from various institutions. The five-week course focused on connectivist learning principles while posing the question: "What does K-12 teaching look like in the 21st century?" Each week participants watched videos, read articles, had conversations in discussion forums, created artifacts, attended chats and webinars, and provided peer feedback around top-

ics central to teaching. The facilitators, as well as the participants, responded on forums, blogs, and social media sites like Twitter and Facebook.

The purpose of this article is to explore the potential uses of MOOCs in K-12 teaching and learning environments. The paper specifically focuses on the motivation levels of high school students who participated in the MOOC, and their participation throughout the online experience. Finally, the discussion provides an opportunity to continue to investigate and redefine MOOC outcomes and their relationship to K-12 classroom implementation.

THEORETICAL PERSPECTIVE AND RELATED LITERATURE

As a relatively recent educational phenomenon, MOOCs are opening doors to educational experiences in new ways. MOOCs are conducted online within a flexible environment and are typically open to anyone wanting to participate. Additionally, MOOCs utilize classic course materials such as journals, videos, and texts; however, MOOCs are beginning to develop specific distinctions. One of these distinctions is that of a cMOOC, based on the philosophy of connectivism (Siemens, 2005).

Connectivism is a theory that attempts to explain learning in a digital society (Siemens, 2005). Because much of today's knowledge is found in a variety of digital forms, information and knowledge can be located across various networks (Kop & Hill, 2008). Kop and Hill (2008) describe this learning process as "cyclical, in that learners will connect to a network to share and find new information, will modify their beliefs on the basis of new learning, and will then connect to a network to share these realizations and find new information once more" (para. 8). Therefore, "the capacity to know is more critical than what is actually known" (Siemens, 2008, para. 6).

The goal of a cMOOC, a MOOC based on connectivism, is not to disseminate information; rather, facilitators take on the role of connecting people around an idea for the purpose of bettering one's understanding of the idea. A connectivist-based MOOC draws on the extensive number of participants as well as the existing open repository of content to develop an experience. Participants are both teachers and learners in a process. Ebben and Murphy (2014) explain:

> In cMOOCs, the learner has freedom to use, create, and share materials without restriction. Learner autonomy is privileged and learner-to-learner networking and communication is encouraged – not just for discussion, but also for essential practices that constitute learning in Connectivist theory (p. 336).

Within cMOOCs, four key experiences are present. These four experiences include: 1) aggregation, which means that course resources are constantly being updated, 2) remixing, which is networking through virtual means, 3) repurposing, which is when learners create their own connections with materials and resources and, 4) feeding forward, which is when participants share their expertise and new learning with others (Yeager, Hurley-Dasgupta, & Bliss, 2013). In general, cMOOCs attempt to empower learners in their individual creation of knowledge and understanding (Milligan, Littlejohn, & Margaryan, 2013).

Motivation

Individuals hold a unique range of factors that are important in regard to what motivates them to achieve, excel, commit, and produce—particularly when it involves endeavors of educational value (Spinath, Eckert, & Steinmayr, 2014; Guthrie, Klauda, & Ho, 2013; Kizilgunes, Tekkaya, & Sungur, 2009). According to Bruning, Schraw, and Norby (2011), aspects of motivation need to be taken into account for student learning because "successful learning involves not only comprehending content, but also learning to become an active, motivated, and self-regulated learner" (p. 8). When individuals are motivated to learn and engage in an experience of educational value, there is a significant impact on performance, learning is of higher quality and overall is more enjoyable (Rau, Gao, & Wu, 2008). Additionally, when an experience is characterized by these factors, it is more likely that the experience will be repeated in the future.

Research has demonstrated that motivation can be either external or internal (Bruning et al., 2011). External sources of motivation refer to a tangible influence, for example, a grade. In contrast, the internal source of motivation refers to something from within the self such as beliefs, feelings, or values. It is engaged in experience for pleasure and satisfaction (Deci, Vallerand, Pelletier, & Ryan, 2011). Though both forms of motivation serve a purpose, it is understood that internal motivation has been more strongly linked to positive educational outcomes (Deci et al., 2011).

Educational motivation has received a great deal of attention; however, 21st century educational contexts are providing rich opportunities to examine the role of motivation through a new lens. How though does the field's understanding of motivation, both external and internal, apply to 21st century learning models, such as MOOCs? What motivates students to engage in e-learning experiences, sustain involvement, and repeat a similar experience at a later time? Presently, little is understood about learners and their motivation when participating in MOOCs (Milligan et al., 2013).

Though limited, research does allude to MOOC participants being highly motivated individuals. For example, San Jose State and Udacity studied three online, credit-bearing MOOCs and found that students who were successful were highly motivated, despite a lack of human interaction that took place in the MOOCs (Ferdig, 2013). According to Kizilcec, Piech, and Schneider (2013), MOOC participants also come from a "wide range of backgrounds and intentions, as well as personal or technical constraints to participation" (p. 170). Additionally, MOOC factors that might appear to correlate with participant characteristics, such as low completion rates (Kizilcec et al., 2013), are not necessarily accurate. For example, in furthering the point about completion rates, these statistics are typically based on earning course certificates or badges. Often, however, MOOC participants choose to take on the role of a passive participant (Ferdig, Pytash, Merchant, & Nigh, 2014). This role is assumed when a participant does not appear to engage (i.e. earning badges, contributing to message boards) in the course, but is actively logging in. One might then assume that this person is unmotivated, technologically inept, or even has limited proficiency on a topic. Though this type of participant may truly identify with these characteristics, the contrary can also hold true. Perhaps, the passive participant is consuming information only for the achievement of their personal goals. Due to the innate heterogeneity of MOOC participants it is then difficult to fully identify what the typical MOOC participant looks like other than the fact that he or she is typically a highly motivated individual.

Since motivation appears to be the defining characteristic that identifies a successful MOOC participant, it is necessary to go deeper into understanding participant motivation to better understand what MOOCs are truly capable of. It is further necessary to uncover what types of motivational factors correlate to a successful MOOC experience and how these factors can be used in the design and implementation of future MOOCs. This article describes a research study that took place during the implementation of a cMOOC. The article highlights findings and provides suggestions for those interested in developing and utilizing this form of technology for student learning.

METHODOLOGY

cMOOC Instructional Context

During the Fall 2013 semester, we (the authors in collaboration with organizations) developed and implemented a cMOOC on K-12 Teaching in the 21st century. This cMOOC was open to high school students, preservice teachers, in-service teachers, and other individuals interested in

education. Our purpose for the inclusion of high school students was based on the desire to contribute to the field's limited knowledge base about how MOOCs can engage the K-12 population.

Participants took part in this cMOOC for the duration of five weeks. Each week, with the exception of the fifth, was designed around a topic of educational interest. These topics included: 1) Connectivism, 2) Personalization, 3) Collaboration, and 4) Reflection. The fifth week was devoted to the implementation of the acquired knowledge. During each of these modules, the participants were able to read or watch various resources that had been selected by the course facilitators or shared by other participants. These resources included videos, websites, wikis, texts, webinars, and blogs. After the participants consumed selected resources, collaboration took place. Participants collaborated with one another and the facilitators through an online message board and other social media outlets (i.e. Twitter, FaceBook, Delicious) with the purpose of merging new knowledge into real world teaching and learning. During the collaboration phase, the participants and facilitators posed questions, shared ideas and expertise, and responded to one another in order to expand understanding on the week's topics.

The final stage of each module included an opportunity to create an artifact that could represent new learning. This artifact utilized the theme covered during the module, was personal to the participants' needs and interests, and incorporated 21st century technologies. For example, for many participating high school students, this artifact was a lesson plan or unit on a subject that they might want to teach some day. These artifacts were then shared with course facilitators and other participants for feedback and recommendations with the goal "to continually develop and sustain a community of active and engaged learners" (Ferdig, Pytash, Nigh, & Merchant, 2014, p. 7).

Participants

Though our population of participants and results were expansive, for the purpose of this article, we will focus only on our high school population. In our cMOOC, we had a total of 94 high school student participants, which approximated to 22.7% of the total cMOOC population. The mean of the high school students' ages was 16.2 years and 88.3% were female. Additionally, 78.8% of high school participants identified as Caucasian, 10.6% identified as African American, 6.4% identified as Hispanic, and 4.3% identified as Asian/Pacific Islander/Others.

Data Collection and Analysis

Through the duration of our cMOOC, data were collected in order to better understand this e-learning platform in relation to K-12 teaching and learning. We collected data through Blackboard's Coursesites course management system (CMS). This management system provided a sustained opportunity to observe participants' online interactions, artifacts, and time spent online.

Pre-Survey

In conjunction with Coursesites, we also collected survey data. This pre-survey contained questions about demographics as well as a set of motivation questions adapted from the Motivated Strategies for Learning Questionnaire (MSLQ). Of the subscales available, intrinsic motivation, extrinsic motivation, task value, control of learning, self-efficacy, and critical thinking were included to assess the students as they entered into the MOOC. All scores were established in a one to seven scale with one indicating the lowest amount of the self-reported disposition, and seven the greatest.

Post-Survey

The electronic post-survey was open to all high school participants at the end of the fifth week of the course; however, only 40 students elected to complete the survey. This survey allowed for an understanding of the trends, attitudes, or opinions of a sample population. This purpose guided the use of this instrument and its goals, which was to better understand how the sample population of high school students experienced a cMOOC.

The post-survey contained a modified version of the Experiences of Teaching and Learning Questionnaire (ETLQ). Developed in 2002 by Entwistle, McCune, and Hounsell, the ETLQ contains multiple subscales used to evaluate various components of how students perceive and reflect on an educational experience. We modified the instrument to measure surface and deep learning; perceptions of course organization, alignment, integration of teaching materials, student choice, encouraged learning, staff support, fellow student support, and enjoyment; demands of the course regarding acquiring knowledge and organizing/communicating information; and learning achieved in overall knowledge gained and organizational skills gained.

Data Analysis

Through our analysis of audience we were able to look closely at the 94 students who enrolled in the MOOC and completed the pre-survey and the 40 high school participants who completed the post-survey. The data

collected and analyzed from both surveys was a key aspect to our understanding as it allowed us to conduct a more thorough audience analysis of perceptions, beliefs, and motivations regarding the cMOOC.

Much of the data that was collected and reported in this analysis is demographic and descriptive in nature. Frequencies, means, and standard deviations are reported for most participation, motivation, and perception values. When comparisons were conducted between groups, multiple t-tests were conducted with significance being adjusted using the Bonferroni Correction. This technique was chosen because the sample size available was not great enough to satisfy the requirements of a multiple analysis of variance (MANOVA). K-12 students were compared across the groups of those who would be interested in participating in a MOOC in the future and those who would not—one of the factors related to motivation.

FINDINGS

What kind of student enrolled?

For a majority of students (64.9%), this was their first time participating in an online learning experience. Almost 30% had participated in an online experience with a majority (75%) of those students having completed their course. However, none of the participants surveyed had participated in a MOOC prior to enrolling in this course.

K-12 students had various reasons for participating in this course, and they were able to select more than one reason. The majority (71%) claimed to have signed up due to an interest in 21st century teaching topics. For others, the decision to enroll was related to other courses, either as a mandatory assignment (38.3%) or for extra credit (10.6%). Some enrolled on the advice of another (9.6%), an interest in MOOCs (6.4%), or an interest to meet others (5.3%).

On a scale of 1 to 7, with 1 indicating little to no technology expertise and 7 being highly skilled, at the pretest, K-12 students yielded a mean of 4.82 (SD=1.18). The mean for amount of time spent daily online was 4.32 hours (SD=3.01); however, interpretation of the graphical distribution of values indicates a bimodal distribution with most answers being around two hours a day or five and greater. Overall, students felt technology was critical to education, reporting a mean of 5.32 (SD=1.56; 1=no importance and 7=extremely important).

Entering participants were asked to complete selections from the Motivated Strategies for Learning Questionnaire (MSLQ). Their mean intrinsic motivation score of 4.8 (SD=1.1) indicated that students were driven to

complete class material based on personal satisfaction gained from learning. Students' extrinsic motivation scores, 4.85 (SD=1.2), also suggested that factors such as getting a good grade and demonstrating knowledge gained were important. Based on a mean score of 5.5 (SD=1.2), students were also encouraged to learn based on their perceived value of the MOOC and the learning experience it would provide. Student scores on the Control of Learning subscale (M=4.9, SD=1.0) suggested that they tended to take responsibility for how much they gained from their courses rather than place that burden on the MOOC alone. In a similar fashion, students were also highly self-efficacious, indicating their ability to do well (M=5.2, SD=1.0). Lastly, results from the MSLQ showed that incoming student participants were prepared to think critically and try and understand things on their own terms before moving on with the material, (M=5.1, SD=.9).

Table 1
Internal Motivation

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
Mean Intrinsic Motivation	94	1	6.75	4.7642	1.09867
Mean Extrinsic Motivation	94	1.75	7	4.8493	1.22159
Mean Task Value Motivation	94	1	7	5.5287	1.19937
Mean Control Learning	94	1.75	7	4.9167	1.01666
Mean Self Efficacy	94	2.63	7	5.1529	0.95528
Mean Critical Thinking	94	3.2	7	5.0665	0.89543

Experiences of Students

According to the post-test data, students rated their technology expertise slightly higher than at the beginning of the MOOC and with less variation (M=5.13, SD=.966). This was expected; if we provide students experiences with technology, we expect their expertise to grow. Overall, K-12 students enjoyed the MOOC. Enjoyment of student participation of the MOOC was rated on a one to seven scale with 1 indicating no enjoyment at all and 7 suggesting extremely enjoyable. The average score was 4.86 (SD=1.19). There was no significant change in whether students thought technology was critical to education (M=5.36, SD=1.33).

The amount of time spent online on the MOOC was recorded for all participants. Over the complete duration of the program, K-12 students spent an average of 9.6 hours each (SD=4.5) with a minimum of 3.3 and a maximum of 24.3 hours total.

Would K-12 students enroll in another MOOC?

Of the 94 K-12 students, 40 completed the post-survey. On this survey, participants were asked if they would enroll in another MOOC. An independent samples t-test was conducted to determine if those who stated that they would participate in another MOOC in the future were different from those who would not in light of their perception of the MOOC and their level of participation in the MOOC. All subscales from the ETLQ were included as dependent variables as well as student age, technology expertise, and their opinion on technology being critical to education.

Results from the independent samples t-tests indicate that there appear to be several significant differences ($p<.05$) between those who would elect to participate in another MOOC and those who would not.

- Deep vs. Surface Learning. Those who would take a MOOC again showed significantly higher levels of deep learning. Deep learning is a subscale of the ETLQ and references a participant's tendency towards learning that extends beyond the basic requirements of a course. Deep learning is characterized by items such as "I've looked at evidence carefully to reach my own conclusion about what I'm studying" and "I have usually set out to understand for myself the meaning of what we had to learn". Those who indicated that they would not participate in another MOOC scored significantly higher on surface learning. This construct is composed of items reflecting a tendency to learn what is required to pass the course and nothing more. For example, "I've just been going through the motions of studying without seeing where I'm going" or "I've tended to take what we've been taught at face value without questioning it much."
- Perceptions of the Course. Students who stated that they would participate in another MOOC in the future also had significantly higher perceptions of the quality of the course. Subscales where these differences could be seen occurred in perceptions of the organization, structure and content of the course, alignment between requirements and material taught, integration of teaching and learning materials, choice over individual direction with material, staff enthusiasm and support, support from other students, and overall enjoyment of the course.
- Participation in the Course. Those participants who would elect to do another MOOC spent significantly more time working online on course related tasks and also completed more course unit badges.

Table 2
ETLQ Data

Do Another MOOC		N	Mean	Std. Deviation	t	df	Sig. (2-tailed)
Enjoyment of this MOOC	Yes	17	5.56	.864	3.515	37	.001*
	No	22	4.36	1.177	3.656	36.930	.001
Deep Learning	Yes	16	4.2083	.50369	2.828	34	.008*
	No	20	3.6567	.63634	2.903	33.999	.006
Surface Learning	Yes	16	2.4531	.93193	-2.320	34	.026
	No	20	3.1250	.80500	-2.282	29.854	.030
Perception Organized	Yes	16	4.3958	.51953	2.244	34	.031
	No	20	3.8667	.81936	2.356	32.499	.025
Perception Choice	Yes	16	4.4375	.54391	3.862	34	.000*
	No	20	3.6250	.68585	3.964	34.000	.000
Perception Staff Support Enthusiasm	Yes	16	4.5313	.50724	3.145	34	.003*
	No	20	3.8625	.71853	3.267	33.553	.003
Perception Student Support	Yes	16	4.5625	.48257	3.134	34	.004
	No	20	3.8750	.76257	3.291	32.475	.002
Perception Enjoyment Relevence	Yes	16	4.4000	.44422	3.039	34	.005*
	No	20	3.7600	.74155	3.207	31.771	.003
Demands Aquiring Knowlege	Yes	16	4.0500	.48166	1.909	34	.065
	No	20	3.6450	.73016	1.996	32.945	.054
Learning Achieved Aquired Knowlege	Yes	16	4.0000	.68853	1.238	34	.224
	No	20	3.7167	.67776	1.235	32.060	.226
Course Activity in Hours	Yes	17	11.4439	4.98182	2.229	37	.032
	No	22	8.3259	3.76201	2.150	28.928	.040

There was no significant difference in average age between the two groups or in how they rated their own levels of technology expertise, opinion of technology being critical for education, perceptions of being in an encouraged learning environment during the MOOC, the demands of the course with regards to material and expectations, and in perceptions of actual learning achieved.

DISCUSSION AND IMPLICATIONS

Students who entered into the course were extrinsically or intrinsically motivated, were relatively skilled with technology, and spent time online. This matches existing research on teaching and learning in K-12 online environments (Ferdig, 2010). Overall student enjoyment of the MOOC was a positive outcome as online learning was a new experience for a majority of these users.

The t-test results suggested that students who enjoyed the course and wanted to take another MOOC were those who practiced deep learning in the course, had a positive perception of the course quality, and spent more time in the course. Obviously this raises questions. Did the students enjoy the course content and thus spend more time in the course, increasing deep learning? Or, did the fact that they practiced deep learning, either as a taught strategy or a personality characteristic, mean they spent more time in the course and have a positive perception of their time? Since our pre-survey data indicated that there were variations of students' intrinsic and extrinsic motivation, we examined K-12 student participation in order to dig deeper into these issues. Data suggested that students broadly fell into one of three categories. Provided below are detailed narrative descriptions of individual high school students to guide this discussion.

Student Participation

Teachers that will probably never be. Every Monday around 12:45, Josh logged onto Coursesites. He was completing the MOOC as part of a course requirement in a high school educational technology class. Josh's teacher was a participant in the MOOC and enrolled his students so they could participate in an online experience that would expose them to new digital tools and a possible career choice. Throughout the five-week course, Josh only posted six times. He posted three times about particular online tools and three times in response to students also enrolled in the educational technology class. The digital tool posts featured descriptions of Instagram combined with Storybird, Weebly, and Popcorn. His descriptions were mostly overviews of the tools, rather than explanations of how the tool could be applied in teaching or learning settings. For example, during the week focused on personalization, he wrote:

> *Instagram is a great way to connect with friends, family, and etc. It lets you upload photos of whatever you want and also videos. People can comment on them and like them. Storybird is a good way for visual storytelling. So it's not just paper or-somebody talking. I would recommend Storybird for middle school ages.*

His responses to classmates could be described as generic. For example, some of his responses included, "sounds like a good website" and "very well described." These posts seemed to be superficial without any evidence of deep thinking about course materials or discussions. In addition, while Josh wrote posts describing the digital tools, he did not actually create artifacts to showcase his learning. He also did not respond to course readings, videos, and did not participate in any social media.

The teacher that might be. At the time of the MOOC, Sarah was a freshman in high school and was aspiring to be an elementary school teacher. The popular adage, "you never know until you try" seemed to apply to Sarah's participation in the MOOC. While she did not specifically state if she was enrolled in the MOOC as part of a course or on her own accord, she did mention her desire to be a teacher in two of her posts. For example, in one post she wrote:

> *Being a freshman in high school, I want to have as much experience as I can with creating lesson plans and learning how to communicate with other aspiring teachers and students as well.*

Sarah seemed to be an engaged participant. Over the course of five weeks, she posted 12 times. Interestingly, during the course she posted a response to every course reading or video; however, she only created one artifact, a Prezi. Sarah also was active on the discussion boards, posting responses to teachers and preservice teachers. Her responses to others' posts were typically 3-4 sentences and included information about what she liked and thought they did well. In addition, she occasionally responded to people directly about the comments they made on her work. For example, during an exchange with a teacher, Sarah wrote, "Thanks so much for your input! I'll be sure to take your advice and apply it to future projects as well. I also think letting the students have choice is a great idea and I am so glad you mentioned it. Thanks again!" While Sarah wasn't fully engaged in every aspect of the course, she was an active participant when discussion involved classroom practices.

Figure 1. Sarah's Prezi Artifact.

The teacher that was. Shayla was a high school senior when she was enrolled in the MOOC. Shayla could be described as an engaged participant in that she posted to the discussion board 21 times, created five digital artifacts to showcase her learning, and designed a lesson plan geared toward middle school students learning about the solar system for her final learning assignment.

Her posts on the discussion board provided insight into her thinking about the readings and videos. In addition, Shayla often personalized the course materials by connecting them to her experiences as a student. For example, after watching a video on the Khan Academy for the week focused on personalization, part of her response included the following statement:

> *As a student, I often feel the pressure to have to work at a faster pace than what I feel comfortable doing. The Khan Academy could allow me to work at my own pace while enhancing my education.*

Similarly, in response to a post by Anne, a teacher, about How Thinking Works (Cabrera, 2011), she was metacognitive about her learning, writing:

> *As a student, I couldn't agree more with you. I am that type of student who can easily ace any test or assignment, but can I really think? This video has allowed me to understand that I need to learn how to think more and not just be able to follow directions.*

In response to other participants, Shayla did not seem to hesitate to provide feedback, even to preservice and inservice teachers. For example, after reading a lesson plan designed by a practicing teacher she wrote:

> *Amy, your ideas are a great start, but maybe you could allow students to collaborate more. Especially at the end of the lesson. You could have the students discuss what they learned at the end of their project.*

One of the interesting aspects of the MOOC was that participants could create, make, and distribute their learning across multiple platforms. Shayla created five digital artifacts including a Prezi, Padlet, and Popplet, in addition to showcasing her learning about connected learning on a blog, and using Twitter throughout the five weeks. Shayla used Twitter to share the course materials and write a short, initial response to the videos before engaging in conversation on the discussion board. Shayla was an active participant in the course in every aspect. In addition, to completing a response to every course reading, completing every artifact, and being active on the discussion board, she used social media to distribute her knowledge and connect with others.

Figure 2. Shayla's Prezi Artifact.

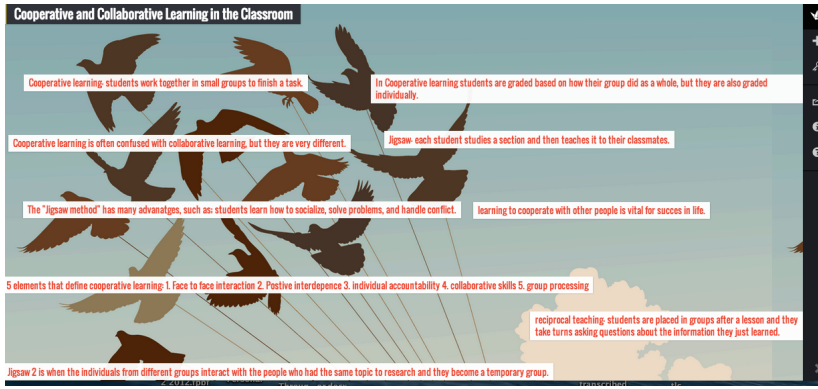

Figure 3. Shayla's Padlet Artifact.

How Should Success Be Defined?

Lack of Engagement. The finding that Josh's lack of engagement may have been influenced by his forced participation is not a new finding in research related to online learning; however, it does provide implications specifically for teachers interested in integrating online experiences into their classroom instruction.

Students may not see the potential benefits in online experiences, which could potentially limit their active engagement in the experience. Students are most motivated and engaged when content is relevant to their lives, and relevance is often tied to choice and ownership. While the students may not necessarily have choice about participating in the MOOC, a teacher can provide choice in other ways, either through the types of assignments they can submit for the MOOC or the types of tools or platforms they can use during the MOOC.

Teachers interested in integrating online experiences, such as MOOCs, should also be aware that students need scaffolding during these experiences. One of the benefits of the Teaching in the 21st Century MOOC was that teachers and students could both be active participants in the course. This potentially could allow teachers to be active members of a community with students.

One of the signals that Josh did not seem motivated or engaged in the course content was from his interactions with others in the course. He only responded to those participants that he knew from his class, and he only responded with statements such as "great job" or "nice work." While we assume his responses indicated a lack of engagement, or a lack of motivation to actively participate in the course, they might also indicate a lack of

knowing how to respond to others on an online forum. Even when teachers know students use technology for personal use, teachers should not assume their students are prepared to engage in online experiences for their educational needs. Josh's teacher could have modeled appropriate online interactions, as well as how to learn the content by using online tools. For those MOOCs in which teachers cannot actively participate in the course, teachers can encourage or require students to respond to participants who are not their classmates. And finally, teachers may consider contacting the MOOC facilitators and ask for ideas or suggestions to increase engagement or to build a community within the MOOC.

Engaged Students. One of the benefits of joining the MOOC was that it gave students an opportunity to sample what being a teacher might be like. They watched videos and read articles about the latest research, best practices, and trends in education. They gained insight into the issues and tensions surrounding education, as well as the current policies impacting education and the implications of those policies. They also learned the language and terminology specific to education, which helped them participate in conversations with preservice, inservice, and school district personnel. Through these discussions they learned about teachers' daily experiences. The creation of artifacts, such as lesson plans, engaged students in teacher practices. Being a participant allowed them to join a community of teachers and gain intimate knowledge about the community.

For students wavering about college or future professions, teachers can incorporate MOOCs or other online experiences in the curriculum as a way to help students gain experiences and knowledge that might help shape their goals and future plans. Through MOOCs, teachers can introduce students to new topics that they may not have previously considered and engage students in conversations as to why this may be something they want to continue to learn about. It is equally important to recognize that students may find out they aren't as interested in the topic or that this is not an avenue they would like to pursue. Participating in MOOCs can provide students with a range of in-depth experiences in which they have the opportunity to try new roles, learn new information, and imagine themselves in certain professions.

By joining a community of learners, students become acquainted with knowledgeable others. This may spur additional motivation to participate in future online experiences. In our experience, the MOOC community welcomed students into the conversations and saw their interactions as a way to mentor young people interested in the field. This exposure can provide students with insight into the day-to-day practices valued in the field. For some students the most valuable aspect of participating in a MOOC isn't necessarily the subject matter learned, but the experience of gaining insight into a specific community in order to inform future decisions.

For educators considering incorporating a MOOC into the K-12 curriculum, it is important to recognize that not only did the MOOC community appreciate the students' participation, their involvement was also a benefit to their learning as well. By participating in online experiences, such as a MOOC, students become metacognitive about learning. In order to engage in discussions with other members of the community, students have to first reflect on and understand their own learning. Then, they must interpret their thinking for a community of experts interested in engaging in dialogue. Online experiences, such as MOOCs, also provide students with a voice to express their educational wants and needs. Having opportunities to discuss, debate, and ask questions about learning, while also sharing thoughts and opinions, can help students feel like valued members of communities. Finally, students have opportunities to learn new digital tools and how they can help facilitate learning in various subject areas.

Teachers can find MOOCs that might appeal to students as a way to encourage them to pursue their passions and future career interests. Students can engage in communities with shared interests and common goals, which potentially allows students to begin developing their identities within these communities. However, educators might assume that the best thing they can do is allow their students to participate with limited interference. And yet, while there were students, like Shayla, who were self-motivated and self-determined, they may have still benefited from a teacher who was willing to guide them through the experience.

When students are passionate about the subject matter, they do not necessarily need additional motivation; however, they might still benefit from additional support and guidance about how to best interact in an online space and how to maximize the experience. While students may not necessarily need teachers to support learning of subject matter, educators who conceive of MOOCs as a way to prepare their students for future opportunities should consider their roles as mentors during students' experiences.

Difficulties associated with defining success. Connectivism has discussed the notion of "openness" as the "sharing of resources, ideas and expertise, and communicating and creating new information, and insights through networks" (Tschofen & Mackness, 2012, p. 136). According to Tschofen and Mackness (2012) this can also be tied to personal control as participants enter and leave the MOOC. While we classified Josh, Sarah, and Shayla into broad categories based on our perception of their participation in the MOOC, one of the difficult aspects is how to measure success in this online network. Completion rates are not necessarily indicative of success, particularly because we 'allowed' people to be passive participants. For this MOOC, while we actively encouraged participants to create artifacts, join discussion boards, and engage using social media, we also recognized that some participants may have joined simply to learn more about tools and readings related to teaching or to experience a MOOC. Posted on our Coursesites page was the announcement:

> If you are a passive participant, feel free to browse the Consume content as well as the tools in the Create folder. If you have other resources you found or use regularly, please feel free to share those in your blog or in the discussion for this week. If you have questions about the topic, about what you consumed, or want feedback on what you created, also feel free to use the discussion forum.

The autonomous, self-directed learning that took place within the MOOC allowed for participants to document their learning as much or as little as they wanted. This did not necessarily mean they were not engaged or learning, it just meant they were not documenting their knowledge for others within the MOOC community.

This raises important questions when examining the motivation, engagement, and learning of the high school participants. Does the fact that Josh didn't create or share digital artifacts mean he didn't learn about new tools? We assume that Josh may not have been an active participant because his involvement may have been forced since he was in a class where the teacher was participating and interested in the MOOC. However, there could have been multiple reasons he wasn't engaged, or if he was engaged, did not more thoroughly demonstrate his learning. Sarah and Shayla, on the other hand, did not indicate that they were taking the course for any type of credit. Did this make them more engaged and motivated, since they chose to participate in this experience? In addition, it seems as if Shayla only used her blog and twitter accounts for the MOOC. Do we consider her use of social media to be a success, but yet, her subsequent lack of use as a measure of failure? The ways students position themselves in online learning environments may lead one to believe some students are more active, engaged, and motivated than others, but this may not always be the case. Additional long-term research is needed to better understand how participants, particularly young adults, engage in online learning experiences, and how those experiences shape their future learning.

CONCLUSION

The purpose of this article was to more deeply examine a group of K-12 students as they participated in a MOOC. The research presented suggests that MOOCs can be used as an effective instructional strategy in K-12 learning environments for some students. The caveat for these findings match what is typically stated about other educational technology outcomes. First, not all MOOCs are created the same. Any research on MOOCs should begin by clearly defining and stating the theoretical and pedagogical beliefs that went into the construction of the MOOC as a way to further contextualize the research. Second, it is less important to ask if a technology works and better to focus on when a technology works (e.g. under what conditions a technology will produce certain results). The research presented here suggests that

there were both external and internal motivating factors that helped students with varying outcomes of the course interactions and experiences. Finally, we need to better explore student outcomes when engaging in MOOCs. Traditional measures of seat time or course completion rates do not seem to work, or at least work well, in this medium.

There is, perhaps, one additional point that goes beyond traditional, enduring themes of understanding or explaining outcomes related to educational technologies. With many technologies, the goal is to make the classroom practices more efficient or to transform the practices within the classroom. There is much debate as to if and how this happens. The point, however, is that perhaps with MOOCs, we need to think more creatively about the use in K-12 learning environments based on the motivation of those enrolled. This particular MOOC instantiation did not attempt to necessarily improve or transform existing knowledge for K-12 students. The goal was to give K-12 students interested in a teaching a chance to act like a teacher and engage with other teachers until they one day became a teacher (Ferdig, 2002). The goal was to give them access to an apprenticeship model that did not currently exist in their educational domain.

This is not to say that MOOCs are powerless in traditional forms of face-to-face, online, or blended education. There are numerous and diverse examples of integration strategies that vary from having students enroll in MOOCs to having teachers enroll and borrow content to improve their own practice (Ferdig, 2013). The conversation should not end there. There is evidence in stories presented in this article that suggest that some students confirmed their interest in teaching, some students explored a potential new occupation, and still others determined teaching was a career they would undoubtedly not pursue. As educators continue to explore MOOCs as unique learning experiences, it is critical to recognize that not all of students' experiences need to be deemed motivating for them to be beneficial. The goal is to submerge students into the practices of the community. Through this experience students might realize that they enjoy the profession and continue to explore the particular area of expertise. This might spur students to take ownership of their learning and be more motivated to participate in the current MOOC and future MOOCs. Additionally, through participating in the MOOC, students may realize this is not an avenue they would like to pursue. This is equally beneficial as these experiences can shape students' career trajectories.

Given this direction, we conclude with a traditional call for more research on MOOCs and the strategies that are used to produce outcomes in classrooms. This research would include exploring conditions that lead to clearly defined (and redefined) outcomes. However, MOOCs present an interesting opportunity to have students engage in a real-world environment with personnel in existing practice (in our case, teachers). Such a model not only presents new opportunities for learning, it provides businesses a new pipeline into the formal and informal engagement and instruction of tomorrow's workers. Continuing to use these technologies to rethink implementation strategies but also to reconsider achieved outcomes is a goal for all educators.

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