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Beyond the Click: Rethinking Assessment of an Adult Professional Development MOOC

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The purpose of this study was to evaluate the design and implementation of an international faculty development MOOC about flipped teaching. Qualitative and quantitative data, such as traditional MOOC analytics, interviews, and Concerns-Based Adoption Model (CBAM) survey data, were collected as participants learned how to flip instruction. This study indicates that measures of online engagement, such as number of clicks and number of online discussion posts, do not necessarily translate to a change in attitudes about teaching practice. Adult participants (teachers, faculty, and researchers) in this MOOC presented as strategic learners and applied personalized approaches for their own teaching development while learning in a MOOC.

Massive open online courses (MOOCs) attract participants from a multitude of backgrounds with a variety of motivations and purposes (Kizilcec, Piech, & Schneider, 2013; Wang and Baker, 2014), including professional development (Ziegenfuss, 2016). This paper explores the experience of faculty and K-12 teachers in a professional development MOOC designed to help instructors learn how to implement the flipped (inverted) classroom (Furse, Ziegenfuss & Bamberg, 2014). In this study it quickly became apparent that the participants were not just interested in flipping. Most were seeking a change in teaching methods and were interested in general teaching improvement. The MOOC was learner-centered, allowing participants to choose a variety of learning activities and content depth. We found that traditional benchmarks of course engagement, such as linear progression through a curriculum and number of "clicks" on course content, were not good indicators of course engagement (Perna et al., 2014). In this paper we will explore a more learner-centered assessment strategy that includes how individual learner goals impacted MOOC participation and resultant change in concerns and teaching conceptions.

Literature Review

Faculty Development and Conceptual Change

Learning how to invert instruction in which pre-class recorded lectures or reading material provide the foundation for in class active learning requires more than just knowing how to create online videos (Bishop & Verleger, 2013). Testing out and adapting new teaching pedagogies requires re-thinking how students learn (Ambrose, Bridges, DiPietro, Lovett & Norman, 2010), acquiring new course design strategies (Fink, 2013; Ziegenfuss & Lawler, 2008), and developing new conceptions about teaching practice (Ho, Watkins & Kelly, 2001). This transformation of personal teaching and learning beliefs is crucial to instigate a shift in teaching practice and is commonly aligned to a model of conceptual change (Åkerlind, 2008; Ho et al., 2001) that extends beyond application of pedagogical techniques to include reorienting assumptions and frameworks about teaching and learning. The conceptual change process involves exploring alternative frameworks that trigger a paradigm shift in thinking rather than just the addition of techniques to existing frameworks (Ho et al., 2001).

A conceptual shift can be triggered through course designs that integrate opportunities where participants reflect and connect their prior experiences, their new knowledge, and the application of new knowledge to change their practice (Taylor & Cranton, 2012). After reviewing 250 different studies, Kasworm and Bowles (2012) concluded, "[T]ransformative learning represented a learner or environmental process focused on learner change in perspective, worldview, and/or sense of self … most often based in a self-reported shift from previously held beliefs and assumptions about self and world" (p. 389). Wenger, Trayner, and de Laat (2011), who have developed a framework for assessing the value of communities and networks, concur and state, "[C]ommunity and network members need to recognize their own experience of participation in the results and the process of evaluation if they are to use it for reflection and guidance" (p. 7). These studies indicate that a transformational experience is not about quantity of engagement, but rather the quality of engagement. Therefore, the problem of assessment of quality engagement becomes evident. Wenger et al. (2011) also contend that qualitative and quantitative measures from both personal and collective narratives at five different levels are needed to evaluate the value of a community experience: activities and interactions, knowledge capital, changes in practice, performance improvement, and the redefining of success (pp. 19-23).

Examining the analytical processes involved in arriving at new understandings is key (Ambrose et. al, 2010). Higher education faculty often receive little or no formal training in how to teach (Fink, 2013), and the occasional teaching workshop may not spark a teaching paradigm shift (Herman, 2012). The faculty development literature recommends a more sustained experience where faculty are able to integrate theory and practice, interact with peers, and reflect on their own practice (Ho et. al, 2001; Marton & Ramsden, 1992). This paradigm shift in thinking integrated with a conceptual change approach, has been documented and validated in the literature (Ho et al., 2001; Vosniadou, 2003). Emerging models for community building and online delivery of faculty development may also help elicit this type of significant impact (Siller, Bastian, Muus-Mehrholz, & Siebertz, 2014). This paper will focus on assessing the impact of our MOOC through changes in attitudes of the participants.

MOOCS for Rethinking Faculty Development

Conventional MOOC assessment strategies use the binary measure of completer/non-completer or counting page views ("clicks"). These have significant limitations for capturing course efficacy or learner engagement (Sharples, McAndrew, Weller, Ferguson, Fitzgerald, & Hirst, 2012; Kizilcec et al., 2013). Many students who enroll in MOOCs have no intention of actually finishing the course (Kolowich, 2014). Rather, they are there to explore a particular topic and then move on to something else. This is especially the case for faculty/professional development MOOCs (Lane, 2013).

However, an emerging body of research has begun to propose a more nuanced assessment of learner engagement, needs, and preferences by creating statistical-probabilistic engagement models (Ramesh, Goldwasser, Huang, Daumé & Getoor, 2013), mechanisms to monitor social media (Koutropoulos, Abajian, Hogue, Keskin & Rodriguez, 2014), and adaptive learning modules (Sonwalkar, 2013). Research by Kizilcec and his colleagues (2013) also bolster this premise and move beyond the binary of completer/non-completer. Instead, they argue that there are four prototypical engagement trajectories amongst MOOC students: completing, auditing, sampling, and disengaging. Many participants in MOOCs (auditors and samplers) would most likely have been considered non-completing under the binary model, yet this may be exactly the engagement these learners sought. Kizilcec et al. (2013) also concur and suggest that further investigation into learner preferences and needs would help uncover points of disengagement and inform course design changes to meet individual needs of all learners.

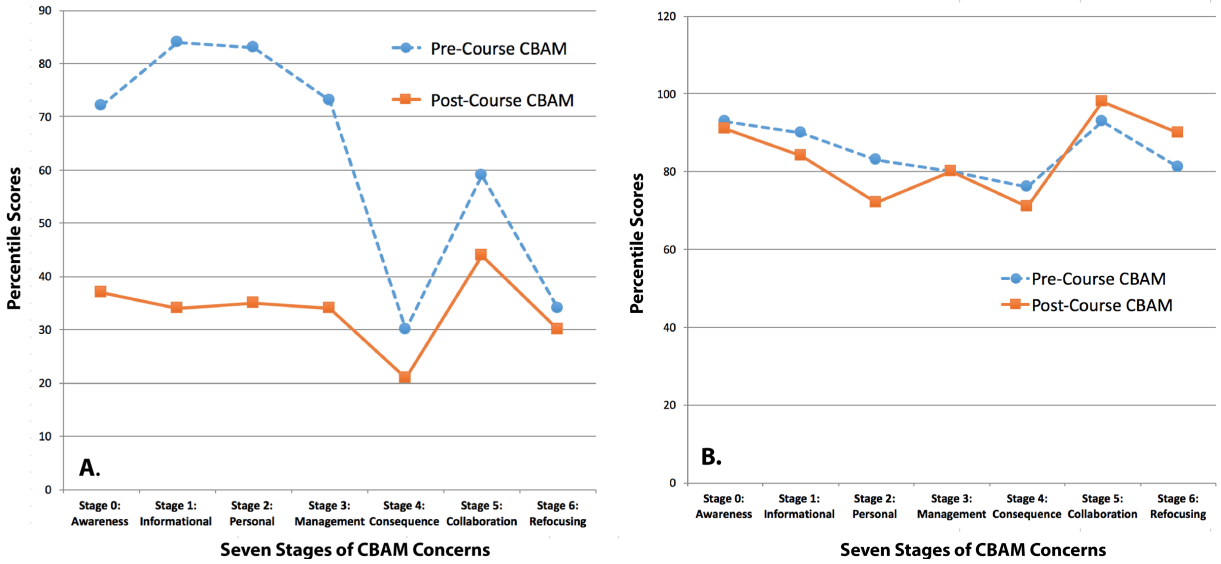
One validated model for measuring conceptual change when rethinking teaching practice is to measure change in concerns through the pre- and post-Concerns Based Adoption Model (CBAM) survey (Hall & Hord, 1987). The CBAM measures faculty/teacher concerns and perceptions as they approach teaching innovations. It has been used in both K-12 and higher education contexts (Dell, 2004). The CBAM identifies seven stages of concern that people move through as they become aware, implement, and rethink their practice when learning a new innovation. *Awareness (Stage 0)*, is where there is little concern or interest in a particular innovation or practice. In our case, a teacher who knows little about flipped instruction would have a high concern Stage 0 score. A teacher with interest in gaining more information about a teaching innovation would have a high *Informational (Stage 1) score*. A teacher with a high *Personal (*S*tage 2) score*, would be concerned about impacts from adopting this new method. High *Management* (*Stage 3*) scores, show concern about managing time and resources to adopt the method or innovation. High *Stage 4 or Consequence scores* indicate concerns about how this new innovation may impact students. Those interested in sharing experiences with others would have a high *Collaboration (Stage 5) score*, and as a teacher begins to think about improving or customizing methods, *Refocusing (Stage 6)* becomes the main focus. The CBAM scores presented in a chart form to teacher participants for reflection is a way to compare pre- and post-professional development and evaluate how a participant's concerns have changed. Although the CBAM can be used as a quantitative pre- and post survey (Ward, West & Isaak, 2002), this study used the CBAM instrument in a more qualitative way to visually provide a profile to teacher participants that demonstrates how their concerns changed across the MOOC (Evans & Chauvin, 1993). We expect participants in a faculty development MOOC to begin at various places on the stages of concern continuum and for these concerns to evolve across the course. Our goal was to use the CBAM profiles to help participants visualize and reflect on personal changes in their thinking and concerns across time, not to statistically quantify the change (see Figure 1 on pg. 15).

The Flipped Classroom MOOC

The Teach-Flip MOOC (http://teach-flip.utah.edu) was developed by Dr. Cynthia Furse (professor of Electrical & Computer Engineering) and Dr. Donna Ziegenfuss (associate librarian) at the University of Utah as part of a National Science Foundation (NSF) grant for Transforming Undergraduate Education (TUES) in STEM (Science Engineering Technology & Math). Three modules (*Gathering Information:*

Figure 1

CBAM profiles of 2 participants: (A) who reported substantial change in their concerns about the flipped classroom and (B) a participant who participated and demonstrated minimal changes in concerns



Introduction to Flipping, Engaging Students Online: Creating Video Lectures, and *Engaging Students in Class: Active Learning*) were developed. Each module included three levels: A: Basic (introductory knowledge), B: Intermediate (first attempts at integrating the concepts in their classroom), and C: Advanced (more complete, advanced integration into their classroom).

The data for this paper was collected in one iteration of the MOOC taught across 6 weeks as a public and free course through Canvas.net with over 850 enrolled higher education and K-12 teachers from every continent and grade level, as well as across a variety of disciplines. In the pre-course demographic survey, which 259 participants completed, 45% self-identified as active participants, 30% as passive, 11% as observers, and 10% as drop-ins. Actual participation was defined and analyzed through the course by using analytics data, which tracked individual participation.

During the first week of the course the average number of participations (actions, as distinguished from number of participants) was 116. This participation dropped to 25 after the first week. This drop in participation is typical of MOOCs (Khalil & Ebner, 2014) and was, in fact, anticipated by the participants themselves. Of participants who completed the post-MOOC survey, 77% gave the course a 4- or 5-star rating (on a scale of 1-5) and indicated they were satisfied with the course. Given this, we pondered how to measure success.

Conceptual Framework

This study is grounded in a framework of conceptual change and premised on the thesis that change through transformation of personal practice extends beyond mere techniques. It includes a reorienting of one's underlying assumptions and frameworks about teaching and learning (Akerlind, 2008). When an alternative framework for teaching (in this case, flipped instruction) is presented, different conceptual elements prompt a rethinking of practice. The goal of this project was to spark a paradigm shift in thought (e.g. learner-centered teaching) rather than just the addition of a new teaching technique (e.g. active learning) onto an existing practice framework (e.g. sage-on-the-stage). In many cases, the participants had other ideas.

Method

To explore the relationships among participants' changes of thought as they engaged in the different modules, we employed quantitative and qualitative methods to collect and analyze data. Information was gathered through (1) online analytics data (module and page clicks); (2) pre- and post-course surveys administered by the Learning Management System vendor to gauge participants' demographics, information on previous MOOC experience, course expectations, rationales for taking this MOOC, and their satisfaction with the MOOC; (3) interviews with participants who disengaged with the course; (4) online discussion forums where participants discussed their

teaching dilemmas and responses to the course content; and (5) a pre- and post-Concerns Based Adoption Model (CBAM) survey (Hall & Hord, 1987) to assess change in thinking and concerns about flipping a course; and (6) a final feedback survey, intended to guide course improvement, administered in the last module. Quantitative analysis involved comparing the learning analytics data (i.e., frequency of each participant's individual page visits, their total time spent on the site, as well as the content accessed), pre-course survey about expectations for the MOOC, and pre- and post-course CBAM concerns.

The CBAM Stages of Concern (SoC) survey includes 35 Likert-scale questions (scale of 1-7), with five questions for each of the seven stages of concern, and it is used to explore concerns about adoption of new teaching methods and technology. Score of the questions for each stage are summed, and then the stage sum is aligned to a percentile score, which is obtained from a conversion table that is used for each of the stages of concern. The percentile scores on the y-axis are plotted against the seven stages of concern on the x-axis. In this study, the pre- and post-CBAM plots are charted together to create an individual profile that visually illustrates how a participant's concerns may have changed throughout the course. The purpose of the profile was to provide a tool that participants could use to reflect on their change of concerns across the MOOC. This survey was developed in the mid-1970s, and it has been verified and widely used in educational research at both higher education and K-12 levels.

We were also interested in the reasons participants disengaged from the course. After the first module at the end of week 2, we saw the greatest number of participants cease to engage (230 participants). We interviewed fifteen participants who had initially engaged in the course and viewed at least two modules, but then dropped off in their engagement. Semi-structured interviews were conducted by telephone/skype, audio-recorded, and transcribed. The questions were built around factors that were participant controlled (e.g., time, motivation, foundational knowledge), instructor controlled (e.g., scope of course, disciplinary focus, curricular sequence, pedagogy, flipped conceptual model), and technologically controlled (e.g., support and hardware).

The interviews, as well as online reflections and comments from the pre- and post-surveys, were analyzed using an inductive thematic method (Marshall & Rossman, 2014). Constant comparative methods were used to code and categorize the data. Factors causing participants to disengage with the course were clustered thematically. The qualitative data of individuals who emerged as having high levels of CBAM change, yet whose participation analytics indicated a low quantity of engagement, were further analyzed to determine and interpret what factors contributed to their framework shift. From there, we honed in on current and active participants in order to get a sense of overall activity and what completion of course work looked like. Based on individual learning analytics (total number of modules, activities, and discussions viewed), post-course completion was coded as completing, disengaging, auditing and sampling, and then compared to pre-course intention survey data.

Results

Pre- and Post-survey Results

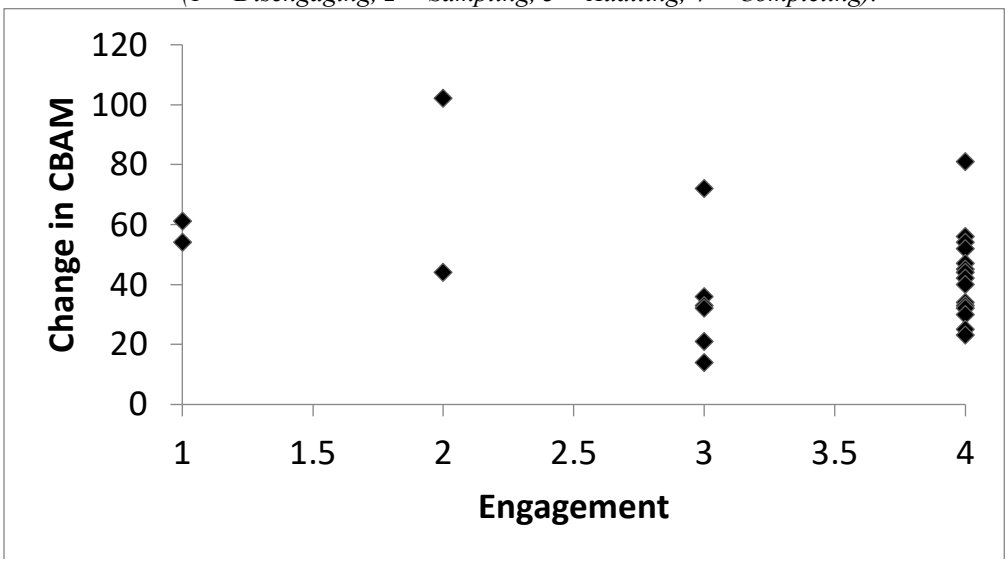
Of the participants who took the pre-course survey, 48% reported they were taking the MOOC because they enjoyed learning about interesting topics, 13% said they were curious about MOOCs, and 10% just wanted to try out Canvas (the MOOC LMS). Others reported they hoped to gain skills for a new career or promotion or that they were considering going back to school. When asked what professional or personal goals they had for the course only 38% were interested in learning about the flipped teaching strategy, 30% hoped to improve their general teaching practice, 10% wanted to learn about how to teach others, and 8% considered the course as professional development. Others were conducting MOOC research or were interested in integrating technology into teaching.

In the post-course survey, when asked how this MOOC helped them reach their goals, they reported a variety of outcomes. Some noted they now had a broader understanding of flipping the classroom, and they reported more confidence in doing it. Others said they learned to create videos or had better ideas for changing their teaching practices. Those interested in research said the course clarified research questions for them and compelled them to further explore flipping.

The final course survey also indicated that the participants found value beyond just "how to flip." One participant said, "I've been aware for a long time that I have not received enough education in teaching, … In some ways, this material helped me improve on things I didn't know I needed to improve, like learning outcomes taxonomies! Who knew!" A comment about the broader impact of the course was, "I have a better understanding of how I would like to change my teaching system." Another participant stated the following:

> It made me stop and reflect on teaching; here in Italy we are talking/discussing a lot about key competencies for life, assessment/evaluation of our teaching activity/ the whole system of education; what's behind flipping is of great value and benefits my students.

Figure 2
CBAM concern change plotted against the pre- and post-course engagement for 25 participants (1 = Disengaging, 2 = Sampling, 3 = Auditing, 4 = Completing).



In post-course follow-up email correspondence, some participants reported similar reflections about what they had learned. One participant reported, "I have learned so much that I feel more secure using flipping in my classes … I plan to give a mini-workshop to my adjuncts about the flipped classroom." Another response was, "I am already doing some flipping with one class." In addition, when we interviewed participants who demonstrated low levels of course engagement after 2 weeks, they identified time and lack of interest as major factors:

- "I teach in a middle school … and September is always the busiest time not only for me professionally but personally."
- "I was also enrolled in another online course and did not have time for both."
- "Now, my problem is that my schedule is hectic. I have to move over to the self-pace."
- "Yes, … I plan on going back to it in order to grasp it when I have more time and can handle it."

CBAM Profiles as a Visual Representation of Change in Concerns and Thinking

CBAM profiles provided a qualitative picture of changes in concerns participants had about flipping their classes from the start to the end of the MOOC. Figures 1 A. and B. demonstrate two examples of CBAM profiles from this MOOC experience. Participant A was concerned about what flipping the classroom was and what it entailed (high percentile scores in stages 0-3) in the pre-CBAM, but less concerned about this in the post-CBAM. We would interpret this to mean that the participant learned about flipping and what it entailed from the MOOC because the post-course concerns were lower. In the post-CBAM, this participant's concerns progressed to being concerned about sharing information with others, which we would interpret to mean she was now interested in sharing what she had learned with others in her sphere of influence. Participant B, however, self-reported as an observer in the pre-course survey, and participated only minimally. Therefore, there is little change in the pre- and post-survey CBAM percentile results.

Participation Data and Conceptual Change

The two CBAM examples in Figure 1 could lead us to believe that greater engagement in the course led to a higher level of conceptual change for participant A vs. participant B. However, as we examined more of the CBAM results, we found numerous cases where participants with low or moderate levels of engagement exhibited higher levels of change in thinking, and vice versa. Figure 2 shows both CBAM and engagement data for the 25 participants who completed all surveys, participated in learning modules, and completed a pre- and post-CBAM survey. Engagement was measured by module and learning activity clicks. We defined the level of engagement from the total number of module webpages viewed, the number and type of modules

Table 1
Definition of Levels of Engagement Based on Course Analytics

	Engagement Level	# Modules (of total of 6)	# subsections (of total of 18)	# discussion posts (of total of 18)
4	Completing	5	10	3
3	Auditing	4	6	1
2	Sampling	1	2	0-1
1	Disengaging	Clicked on at least 1 item		

viewed, and the number and type of discussions in which the person participated. The MOOC course design included 3 modules, and each module had an overview and 6 subsections. Each subsection also had an associated discussion. Levels of engagement were defined from these "clicks," as in Table 1. We gave discussions less weight, as not all participants chose to engage publically in this way. Comparing engagement defined as in Table 1 to pre-survey responses, we found that 60% of the participants engaged at the level they originally intended. Of the original 250 participants who signed up for the course, 119 introduced themselves in the online discussion forum at the beginning of the course. For module 1, 84 completed the basic material, 56 completed the intermediate, and 20 completed the advanced material. For module 2, basic, intermediate, and advanced materials were completed by 25, 19, and 5 participants respectively. For module 3, basic, intermediate, and advanced materials were completed by 11, 9, and 9 participants respectively.

Next, we compared the levels of engagement with the change in concerns, as measured by subtracting the difference in pre- and post-CBAM percentile scores. Figure 2 shows that participants with high levels of engagement had a wide variation in their levels of CBAM change. This is not particularly surprising, as people learn and experience the world differently. What was perhaps more surprising was that even minimal indication of engagement could provoke a substantial CBAM shift for some participants. For the seven low engagers in our sample who viewed seven or fewer webpages and discussions, five experienced changes in their CBAM percentile score. No one single factor could be attributed to prompting a change in attitudes about the flipped classroom. The bottom line was that quantity of "clicks" did not translate to participants' perceived change. CBAM change in this figure was measured using the differences in the pre- and post-CBAM scores for the seven stages of concerns summed together for each participant (high numbers indicate higher levels of change).

Follow-up E-mails

We contacted participants by email several months after the MOOC concluded to learn about the impact of the MOOC on their practices. The main themes from the emails reflect (1) a higher comfort level with the flipped classroom and (2) a realization of the time commitments for taking a MOOC:

- After a couple of weeks I started understanding more of what works for students (i.e. shorter videos which took pressure off me in terms of class prep, so therefore more focus on students' needs/expectations) and what their concerns are, hence the change in my 'concerns'. So now I have less concerns overall about flipping.
- ….[F]irst, I signed up for too many MOOCs, and now I don't have enough time. They all sounded so fascinating! Second, I'm a bit lazy when it comes to actually putting the work in creating videos, etc. I really just wanted to get a feel for flipped learning.

Discussion

This paper compares participant measures of engagement and change in a MOOC faculty development program about the flipped classroom. This free, online, voluntary adult education course included a wide variety of participants: higher education faculty, K-12 teachers, trainers, and professional developers from all over the world with various participation motivations.

Our first finding was that participants' actual participation in the course generally corresponded to their self-reported intended engagement. In the pre-course survey 45% self-identified as active participants, 30% as passive, 11% as observers, and 10% as drop-ins. In analyzing actual engagement of those who persisted, we found that 60% engaged at the level they had planned.

The goal of our course was to teach faculty how to flip their course and to motivate them to move towards rethinking their teaching practice, but participant motivations varied tremendously. Some sought specific skills to flip their teaching, others were seeking broad pedagogical training, and yet others were just sampling and experiencing the Canvas learning management system. When measuring change in concerns and conceptions about flipping

their courses, in using the CBAM measurement we found that the quantity of engagement as measured by content "clicks" did not necessarily translate to conceptual change. Given the variety of learner goals, this should not be surprising. Specific bits of information, online discussion interactions with peers, or just simply being exposed to new ideas had an impact, whether or not the participants completed all of the content in the course. One participant stated, "I now have a better understanding of how I would like to change my teaching system." Consonant with the framework and findings of Kizilcec et. al (2013), the binary of completers and non-completers was not a useful framework for determining course efficacy or participant learning. Instead, participants' preference for a personally relevant and experiential learning environment that could be easily juggled with other life responsibilities seemed to guide how they approached the course (Merriam, Caffarella, & Baumgartner, 2007). Our course was specifically designed so that students could explore each topic at a level that met their individual needs, and participants utilized that structure. Park & Choi (2009) argue that designing relevant and self-directed instruction may increase motivation, especially in online instruction. Therefore, the importance of learner-centered course design to meet the wide variety of participant objectives also underscores the need for learner-centered assessment.

We also found that the quantity of engagement was an ineffective method of measuring the overall impact of this MOOC learning experience and its ability to drive conceptual change. Using "clicks" as an indicator of learning or change in teaching practice would have over-predicted change for highly engaged learners and under-predicted change for low engagement participants. It became clear that assessment needs to move beyond measuring page clicks as a success metric. Instructors/designers need to think of assessment more broadly, incorporating ways to directly measure action, attitude change, or personal goal attainment. Learner-centered course design should be aligned with the myriad of learner participation preferences. As was witnessed in this course, the engagement with one or two modules, or a cursory sampling of the material, may be all participants want and need to fulfill their individual professional goals.

We found that a combination of quantitative and qualitative metrics provided a more comprehensive approach to assessing course effectiveness. We agree with Merriam, Caffarella and Baumgartner (2007) when they purport that, although we often focus on designing and assessing formal education with narrow and defined outcomes, it would also be prudent to consider and support flexible and alternative methods for assessing adult learning.

From this study, the dimension of adult goal attainment appeared to be a weighty dimension mediating participant engagement. The traditional, linear framework for curricular design does not apply to contexts such as this faculty development MOOC. We found that, although the course was specifically about how to design, create, and implement flipped instruction, only 38% of participants said their goal for taking the course was to learn about flipping. Therefore, more self-directed, incidental, and social, or tacit learning participant needs compel a different sensibility to flexible course design, learning sequencing, and aligned assessments. As noted in Kolowich (2014), most learners enroll in MOOCs to explore the content and then move on to something else. Hence, it seems only appropriate that new MOOC models seize the self-guided and divergent proclivities of learners (Khalil & Ebner, 2014; Leckart, 2012). Along with learner-centered course design, must come learner-centered course assessment.

Conclusion

This article described the assessment of a faculty development MOOC. Comparing the participant engagement (measured by number of module clicks and participation in online discussion boards) and conceptual change across the course using the Concerns Based Adoption Model (CBAM), we found no patterns between the quantity of engagement with the content and conceptual change in participants. Therefore, it is important for faculty developers to consider that quantitative engagement measures ("clicks") alone may not be an effective way to measure the effectiveness of adult professional development. Instead, as indicated in this study, measurement of concerns and change in perceptions, such as that provided by the CBAM, may be a better alternative. The visual CBAM format also created an opportunity for participants to reflect about how their thinking has changed across the course. This is an example of what Schugurensky (2000) calls "retrospective recognition" in which the learner develops awareness that an "unintentional and unconscious learning experience took place" (p. 6).

To build on this research, future research could investigate additional strategies for utilizing the CBAM, or other similar measurements of change, as a formative assessment tool to enhance the visualization of change. It is also worthwhile contemplating if other types of attitude change or knowledge development might be helpful to measure as well, such as Technological, Pedagogical, and Content Knowledge (TPACK), which is a conceptual framework related to the integration of teacher technology skills and pedagogical knowledge (Mishra & Koehler, 2006; Voogt, Fisser, Pareja Roblin, Tondeur & van Braak,

2013). From this research, it is also recommended that longitudinal post-course follow-up be used to evaluate the future activity of these faculty participants to see how successful they were in the implementation of the flipped teaching approach. Additional models and measurements related to measures of conceptual change are also warranted in order to provide a variety of tools for assessing change in teaching perceptions.

In addition to the CBAM Stages of Concern Survey (SoC) which was utilized in this research study, continuing research at the Southwest Educational Development Laboratory (SEDL) has developed a more comprehensive three-pronged framework of instruments for measuring change. This approach for measuring change includes the SoC, as well as the Levels of Use (LoU) survey, which measures how instructors react to change, and Innovation Configurations (IC) for mapping the process of change (Hord, Rutherford, Huling-Austin, & Hall, 2006). A future study could utilize this full framework of tools to develop a richer description for measuring and understanding concerns about adopting innovations. Quantitative CBAM research could also be conducted using statistical methods to analyze the degree of change at each CBAM stage and would be a logical extension to this qualitative CBAM study.

Additional instruments designed to measure teacher perceptions, such as the Teaching Perspective Inventory (TPI) created by Pratt and Collins (2000) or the Teaching Goals Inventory (Angelo & Cross, 1993), could also be used in conjunction with the CBAM for future studies to provide a triangulation of the findings. Other strategies for measuring conceptual change such as participant concept mapping might also be considered as a course assignment and used as an artifact for measuring change in teaching practice (Miller et al., 2009).

The take-away message from this study is that traditional measures of online engagement (number of "clicks," number of online discussion posts, and other course analytics) do not directly align with change for adult professional development. If the objective of the course is to help instructors plan for and, even more importantly, change how they teach, then these attitudinal outcomes need to be measured directly. We used the CBAM and qualitative interviews to measure this shift in concerns, but there are other methods that could be used as well (Schugurensky, 2000). Our experience and findings point to the clear need for more personalized learner-centered assessments of the learning experience and outcomes in online faculty development focused MOOCs (Siemens, 2012). This also surely translates to the need for more personal learning assessments as part of a toolset for assessing learner-centered teaching.

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