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Closing the Loop: Building Synergy for Learning through a Professional Development MOOC about Flipped Teaching

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CLOSING THE LOOP: BUILDING SYNERGY FOR LEARNING THROUGH A PROFESSIONAL DEVELOPMENT MOOC ABOUT FLIPPED TEACHING

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ABSTRACT

This case study describes how a MOOC, funded through an NSF grant, was used to create and assess faculty professional development. The MOOC, designed and developed using a backward design process, guided participants through an online project-based learning experience that integrated learning about the flipped classroom and about how to flip a classroom as the participants designed flipped teaching materials. The course structure involved an introduction to flipped teaching and learning content, experimented with flipped ideas and concepts, and emphasized reflection and sharing of experiences with peers.

Although mentoring faculty in flipped pedagogical design was the primary MOOC goal, the project also provided insights about assessing the MOOC and the personal learning experiences of MOOC participants. MOOC developers concluded that, depending on the purpose of the MOOC, course designers and instructors may need to rethink what they are assessing, and broaden their perspectives regarding how to assess what is important. Closing the assessment loop and monitoring continuous improvement may be alternative strategies for assessing learning, boosting MOOC effectiveness, and documenting conceptual change.

KEYWORDS: MOOC, faculty development, flipped classroom, flipped teaching, course design, backward design

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INTRODUCTION

Higher education in the US is often criticized for being too embedded in tradition and therefore lacking the ability to change or innovate (Chandler, 2013; Deneen & Boud, 2014; Lucas, 2000). However, one factor prevalent in the higher education change literature is that successful change demands that active and engaged faculty be included in the planning and implementation of university change initiatives (Gaff, 2007; Ferren, Dolinsky, & McCambly, 2014; Kezar, 2012). This case study presents a technology-based professional development project that was spearheaded by one such engaged faculty member who led a change initiative through a National Science Foundation (NSF) grant on our campus. This faculty member, Dr. Cynthia Furse, the Associate Vice President for Research and a professor of electrical and computer engineering, had experience in flipping her courses. Unable to personally sustain providing support for the increasing number of faculty interested in teaching in a flipped format, she had reached a tipping point.

A flipped classroom is a hybrid course environment in which the classroom-homework paradigm is reversed. Students watch lectures online and read materials for homework before coming to class. Preparing in advance enables students to participate in active learning activities such as homework problem-solving, group projects, and analyzing case studies (Bishop & Verleger, 2013; Hwang, Lai & Wang, 2015; Roehl, Reddy & Shannon, 2013). Relative to standard classroom practices, a flipped classroom strategy requires a more engaged and self-directed learner, one willing to accept more responsibility for personal learning outside the classroom and willing to be an engaged participant in active learning activities during class.

In order to create a sustainable flipped classroom adoption model, Dr. Furse reached out to a librarian, another local institution, and several campus support units to collaborate on creating a local campus STEM faculty professional development seminar. This seminar eventually evolved into an interdisciplinary

online Massive Open and Online Course (MOOC) course engaging thousands of international faculty and staff. Our interest in extending the conversation beyond the STEM community to include additional international, K-12, and corporate training perspectives in the MOOC led us into a rich discourse around the challenges and opportunities of the flipped classroom.

Integrated course design with a focus on assessment was one of our primary goals of the Flipped Teaching MOOC project. The backward course design model used to create the Flipped Teaching MOOC is the same model faculty and staff participating in the MOOC used as they designed their own flipped instruction. Unlike traditional xMOOCs (Taneja & Goel, 2014), which are designed to manage the movement of a very large number of students through linear course content using quizzes and tests, this MOOC was designed as a project-based cMOOC (Cochrane, Narayan, & Burcio-Martin, 2015) with the purpose of engaging faculty and staff in the authentic task of designing flipped instruction. Documenting MOOC course improvement, participants' flipped teaching practice, and reflections about change in teaching, this project uncovered needs and strategies for alternative MOOC evaluation, led to the development of flipped teaching assessment tools, and exposed alternative instruments to measure and monitor faculty growth and change. MOOC participants took a pre- and post-course survey using an instrument called the CBAM, or Concerns-Based Adoption Model (Hall & Hord, 2015; Hord, 1987; Horsley & Loucks-Horsley, 1998), to measure how their thinking and concerns about flipping changed throughout the course. Data collected with this instrument has been used in both K-12 and higher education contexts to plot a visual CBAM profile that demonstrated to participants how their concerns about flipping changed during the MOOC. (Hodges & Nelson, 2011; Marcu, 2013).

One of the most popular and rewarding aspects of the MOOC was providing support and feedback for two components of flipping instruction: creating online lecture videos, and designing engaging active learning activities for applying course content. MOOC participants shared ideas, experiences, and expertise and provided peer feedback for others testing the waters of online video creation. By learning more about faculty needs, motivational triggers, and mind-sets that impacted learning, we uncovered new ways to steer the synergy toward the ultimate goal of engaged teaching and hopefully improved student learning in the future. One participant commented, "… I've been aware for a long time that I have not received enough education in teaching, and I've wanted to address that. … In some ways, this material helped me improve on things I didn't know I needed to improve, like learning outcomes taxonomies! Who knew!"

This case study will present the process for using the MOOC as a professional development learning environment for instructors testing the boundaries between teaching pedagogy, technology tools, and active learning

environments / communities. As participants reflected on their teaching practice and interacted with other faculty rethinking their teaching practice, they discussed how they were developing a more holistic perspective of their teaching. One participant said, "I have a better understanding of how I would like to change my teaching system." In the MOOC discussed in this case study, entitled *Teaching Flipped (*http://teach-flip.utah.edu/), the parallel paths of pedagogical teaching approaches, educational technology implementation, and being part of a community of international learners created a synergy for learning that would not have been possible in a traditional local and face-to-face professional development workshop format.

RELEVANT LITERATURE

Before moving on to a more detailed discussion about the process of the MOOC design and participant experience, it is useful to review some of the most seminal and relevant teaching and learning trends contributing to the synergy of this MOOC project. The two main trends in the teaching and learning literature relevant to this MOOC are: (1) the pedagogical foundations of teaching and learning (including paradigm shifts, course design and active learning), and (2) the emerging technology-enhanced learning environments and tools.

PEDAGOGICAL FOUNDATIONS

Designing content, contexts, and environments for learning engagement at multiple levels requires a rigorous approach to instruction design. Emerging interests in course and curriculum design, instructional design, and assessment are inspiring new ways of thinking about teaching pedagogy and how students learn (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010; Beetham, & Sharpe, 2013). Many examples of instructional design models exist in the literature and provide conceptual frameworks for the process of designing instruction such as the ADDIE model (Allen, 2006), the understanding-by-design model of Wiggins and McTighe (2005), and the model of constructive alignment (Biggs & Tang, 2011). However, the backward design model of Fink (2003, 2013) that focuses on the alignment of learning outcomes, assessment, and teaching and learning activities is the model used for the designs of the MOOC and the participants' flipped learning activities. In *Creating Significant Learning Environments: An Integrated Approach to Designing College Courses*, Fink claims that "faculty knowledge about course design is the most significant bottleneck to better teaching and learning in higher education" (p. 26). My experience in working with many faculty across a variety of disciplines supports Fink's claim. Fink's book and the concept of backward design and alignment have drastically changed my own conceptions about teaching and learning both as an instructional designer helping others design courses, and when designing my own courses. A course

using the Fink model designed for graduate students on how to design online courses (www.youtube.com/watch?v=qqHXczNYtlg) is now used as the foundation for building an institution-wide model of course design on our campus. This adapted Fink model, the QCF, or Quality Course Framework, (http://qcf.utah.edu), was used to design, develop, and implement this MOOC. It is also used to teach MOOC participants how to flip their courses and instruction.

Technology-based flipped instruction, which originated in the K-12 context in 2006 (Bergmann & Sams, 2008), was one of the *Important Developments in Educational Technology for Higher Education* spotlighted in the 2014 New Media Consortium Report (Johnson, Becker, Estrada & Freeman, 2014) available online at http://www.nmc.org/publication/nmc-horizon-report-2014-higher-education-edition/. However, flipping the classroom, although considered a new teaching strategy, is really not new at all because instructors have always expected students to come to class prepared to engage in the course content. A seminal article by Barr and Tagg in 1995 used the phrase "shifting from an instruction paradigm to a learning paradigm" and refers directly to this new flipped classroom paradigm in which students are expected to take more responsibility for their own learning and "discover and construct knowledge for themselves" (p. 15).

When shifting from a paradigm of teaching to learning, the learning environment also demands a more active approach to learning that engages students in the learning process and assesses outcomes, not inputs. Emerging literature is documenting the success of active learning strategies in the classroom, especially in the sciences (Freeman, Eddy, McDonough, Smith, Okoroafor, Jordt, & Wenderoth, 2014). Literature on classroom strategies that engage students actively in the learning process is becoming more critical to the success of the flipped classroom, which calls for new standards of teaching practice. Those standards include additional options for engagement and assessment of learning. (Bonwell & Eison, 1991; Silberman, 2007). Transitioning to an active teaching approach, and moving responsibilities for learning course content out of class and onto the student, require adjustments to assessment and evaluation strategies such as a shifting from summative to formative assessment. They also require measuring performance and application, not just knowledge, as well as implementation of rubrics and learning reflections.

TECHNOLOGICAL CHANGES

Tied closely to these evolving pedagogical approaches are emerging technology tools and solutions designed specifically to enhance the classroom experience, facilitate more efficient and effective teaching environments, and engage students in the learning process. Emerging technologies, tools, and online learning environments are creating new opportunities for experimentation and innovation (Siemens, 2013). Over the past several decades, learning technology has steadily been evolving and emerging as a driving force for change in higher education.

Although technology develops and grows independent of pedagogical change, the parallel paths often intersect and work to amplify each other. The literature frequently refers to these innovative technology-based tools and learning environments as "disruptive forces" in higher education (Christensen & Eyring, 2011; Christensen, Horn, & Johnson, 2008; Conole, DeLaat, Dillon & Darby, 2008; Hyman, 2012). New and innovative technologies such as gamification, mobile learning, and personalized learning technologies are enabling new ways to look at formative and summative assessment tools, research tools, animated learning activities enhancements, and the integration of social media into teaching and learning. Technology-enabled learning environments such as online learning, massive open online courses (MOOCs), hybrid or blended courses, and the hyflex classroom (Beatty, 2007), where online and face-to-face learning experiences take place simultaneously, all coexist in this exciting and technologically charged educational context. In addition, technology tools and online learning environments are being heralded as possible solutions to make teaching and learning more efficient, effective, interactive, and collaborative (Breen, Lindsay, Jenkins & Smith, 2001).

One fairly recent innovation especially relevant to this project are Massive Open Online Courses, commonly known as MOOCs. MOOCs have intrigued many instructors in both the K-12 and higher education contexts and have been hailed early on as a possible magic bullet remedy for higher education challenges. Some have touted the MOOC as the innovation that would change higher education forever (Harde, 2013; Leckart, 2012). Described as the ultimate "educational disruptor," MOOCs have received a lot of attention, criticism, and praise; however, the literature around these technology tools or learning environments is still too new to measure if the initial hype and claims are really true (Kelly, 2014). MOOCs can serve as a test tube environment for helping faculty mix together other emerging technologies, such as Open Educational Resources (OERs) (Shank, 2013) and automated assessment systems (Balfour, 2013). Institutional and state financial constraints, often resulting in diminished physical learning spaces, have also contributed to the increased interest in online and hybrid course alternatives to allow for more effective campus classroom space utilization and new tuition revenues, as well as the sharing and reuse of educational content (Moore, 2005).

Research, case studies, and narratives about MOOCs in a variety of disciplines, circumstances, and learning contexts are emerging in the online learning, teaching, and disciplinary literatures (Kim, 2015; Liyanagunawardena, Adams, & Williams, 2013). Although the claims about MOOCs becoming the most important educational innovation of all time have not come to fruition as predicted (Bartholet, 2013; Kim (Ed.), 2014; Kolowich, 2013), MOOCs have sparked innovation in online learning and practices, and triggered a revived

interest around pedagogy and instructional design. Kim (2015) states, "Even though MOOCs may not live up to all of the initial hype that accompanied them, and we are still trying to figure out the best way to use them, there is no doubt that they are an important new innovation with the potential to have a large impact" (p. 9). MOOCs have also generated new technology tools, technology companies, and business models (Haggard, Brown, Mills, Tait, Warburton, Lawton, & Angulo, 2013).

SPARKING SYNERGY THROUGH COMBINING PEDAGOGICAL DESIGN AND TECHNOLOGICAL TOOLS

PEDAGOGICAL DESIGN COMPONENT

Through the identification of a perceived teaching and learning need, a faculty development project idea emerged on our campus that focused on rethinking how faculty teach STEM courses. Campus conversations about the need to engage students differently in STEM classrooms, improve STEM education outcomes, and engage and retain STEM majors resulted in new partnerships, new skills and tools, and new pedagogical approaches. Dr. Furse experimented with the flipped classroom, recording engineering lectures and making them available online so students could view them before coming to class. This practice freed up in-class time for problem solving, social learning activities, collaborative group interactions, and a higher level of application of the course content. Formative data collected every three weeks documented the value-added advantage of the flipped class format for students. Students reported a richer and more personal connection to the instructor, the added value of video lectures that could be viewed over and over for studying and preparing for exams, and a developing awareness for time management and new study skills. Wanting to share her experience and expertise with other faculty, Dr. Furse brought the author, a librarian with course design and pedagogical experience, into the project to help ground the changing and evolving course in teaching and learning theory. We obtained funding from the National Science Foundation to provide professional development for STEM faculty on how to flip courses based on the flipped experiences of this engineering professor and faculty change advocate.

A MOOC was not in the original grant plan. However, over a two-year cycle of assessment, course re-design and evaluation, a local faculty development plan for helping STEM faculty flip their courses evolved into creating and facilitating an online international learning community of faculty learners flipping instruction from many disciplines and contexts such as K-12, higher education, and corporate training. For this particular case scenario, the MOOC proved to be the flexible experimental context we needed to create our own synergy resulting in new approaches to faculty development, new tools and strategies for teaching, and new partnerships for supporting faculty development on our campus.

This project did not focus just on the technology tools needed to flip the classroom, or just on the MOOC learning environment, or just on the particular pedagogical strategy of flipping the classroom. Instead, the real value of this project centered on building synergy around the benefits of aligning explicit pedagogical outcomes within the technological innovation of a MOOC. The intersection of compelling content grounded in pedagogical principles while supporting and experimenting with technology tools to create online videos magnified the MOOC experience. Both pedagogy and technology must be integrated to have a successful learning experience and technology integration (Laurillard, 2013; Mishra & Koehler, 2006; Moore, Fowler, & Watson, 2007). The need is to "pour a solid pedagogical foundation before adding in the layer of technology" (Ziegenfuss, 2005). The process and strategies we used for designing the MOOC as an online learning community, grounded in the integration of pedagogy and technology, evolved over two years. We collected and analyzed course formative and summative assessment data, redesigned online modules, integrated lessons learned, and focused in on our overarching purpose of providing an experiential learning context for flipping the classroom for faculty who were rethinking their teaching practice and reflecting on how their students learned.

The MOOC Process and Assessment Cycle

As we worked through the process of designing the MOOC for faculty to learn about flipping the classroom, we focused on several topics:

1. A continuous process of piloting and redesigning the online modules that resulted in a continuous cycle for improvement that included formative assessment and summative assessment components.
2. Guiding participants through a project-based learning experience in which they learned about how to flip a classroom as they created flipped classroom materials and activities; reflected on the flipped experience; and shared ideas, strategies, and feedback with peers.
3. Providing a context for experimentation and trial and error.
4. Measuring change in how faculty were thinking about the flipped classroom.

The course structure, similar to the OLDS MOOC structure (Cross, 2013), involved active participation of participants with reflection and sharing of their experiences with peers. We followed an instructional design process developed collaboratively on our campus for course design called the Quality Course Framework, or the QCF, to design the MOOC course. This framework is grounded in the Fink course design model for creating significant learning experiences (2013). The model focuses on these six elements of a quality online course that are embedded into a four-step design process (Figure 1).

1. Course and lesson outcomes stated as measurable objectives.
2. An organization structure that facilitates usability and learning.
3. Learning activities engaging students in a complete learning process.
4. Course content provided in media formats appropriate for the web.
5. A sense of learning community facilitated through specifically planned communication and student support.
6. Assessment, feedback, and evaluation strategies that measure student learning outcomes as well as overall course quality.

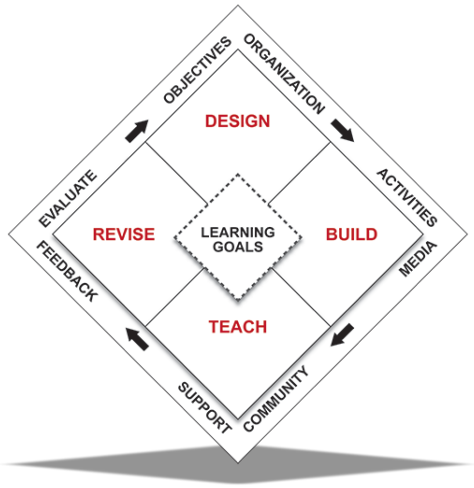

Fig. 1: The Quality Course Framework: Instruction Design Process (http://qcf.utah.edu)

The MOOC was designed in a reading/doing/reflecting framework, or an experiential approach (Kolb, 2014), so that the adult learners could integrate what they were learning with their own personal real-world course design projects. A MOOC originally designed as a 15-week semester-long course eventually evolved to a three-module six-week course based on participant feedback and pre- and post-survey data. The course developed through grant funding has now been handed over to our Teaching and Learning Center where it will continue to be offered. The model of teaching innovation incorporating active learning activities aligns well to their mission and faculty development offerings.

LESSONS LEARNED

RE-ASSESSING WHAT WE WERE ASSESSING

The most important and interesting lesson learned from this MOOC project was that we needed to expand our assessment and evaluation. By gathering pre- and post-course survey data, we discovered the wide range of participants' personal goals and expectations. Rather than measure completion rates or completed

assignments, we focused on measuring conceptual change and how the participants' thinking about "flipping the classroom" changed across the course process. Ho (2000) emphasized in her faculty development research findings the importance of creating learning communities where faculty can learn, try out, discuss, and reflect with peers as they learn about teaching practice and how students learn. We used a pre- and post-course survey called the CBAM, or the Concerns-Based Adoption Model (Conway & Clark, 2003, Hall, 1979; Hall & Loucks, 1978), an instrument that was designed to measure change in perceptions and concerns about technology innovation—or in our case, flipping the classroom. Scores from 35 questions are tallied across six different stages of concern: from stage 0, which means there is little awareness of concern or no interest in the technology innovation, up to stage 6, which is the refocusing stage where the participant reports an advanced level of knowledge about the innovation and is working at customizing or adapting the innovation for personal needs. Percentiles of the six stage scores are plotted on a graph. Below is an example of one CBAM for our MOOC class, which shows the change in thinking from the pre-course survey (red circle) to the post course survey (blue circle) (Figure 2). This CBAM example shows that the participant had overall high concerns about flipping in the pre-survey, but much lower concerns after learning about what flipping the classroom means and how it is implemented. This person now knows the personal impact of flipping and how to manage the flipped classroom, thus decreasing the level of concern in the post survey. The post-survey value that increased is in the stage of collaboration and may indicate more interest in collaborating with others.

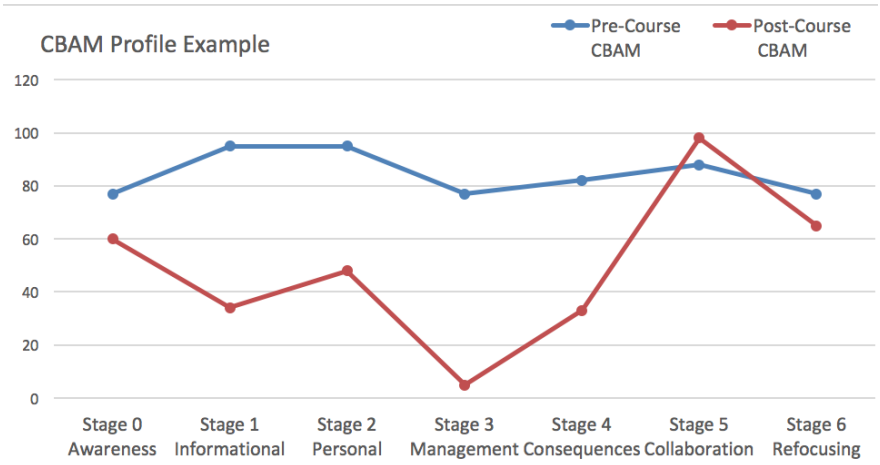

Figure 2: A pre- and post-CBAM profile of a MOOC participant.

This participant depicted in the CBAM profile above followed up with us about two months after completing the MOOC and reported, "I am already doing some flipping with one class this semester and I am currently working on my videos and writing for one of my classes next term. I am attending a technology meeting at one of the colleges where I work in December. I am looking forward to completely flipping in January!!! I learned so much from this course." Another participant who followed up after our latest version of the MOOC also stated, "I really liked the course, and I have learned so much that I feel more secure on using flipping in my classes. I have used the content learned in your class and I have used all the suggestions and strategies. I plan to give a mini-workshop to my adjuncts about flipped classroom and foreign language learning."

For two of the MOOC iterations in which we collected pre- and post-CBAM surveys, we also interviewed some participants who appeared to be "lurkers" in the course asking about their actual engagement with course content. We are still analyzing the patterns that emerged from this detailed analysis of the data, but it appears that they are interacting with course content even though they do not appear to be doing so by participating in the discussion forums and assignments. This data about how individual participants personalized their own path through the MOOC course based on their own goals and interests is just as interesting as the data we collected about the perceptions of the flipped classroom content. As we begin planning to run this MOOC again in spring 2016 we will readjust our assessment strategies as we re-design and prepare the course for the next iteration.

The largest challenge and also greatest opportunity of working through the process of designing and developing the Teaching Flipped MOOC was rethinking assessment because of the structure and context of the MOOC environment. Since there were no grades, how would the data collected evaluate whether the goals and outcomes of the course were achieved? How will we know if the course was successful or if the participants learned anything worthwhile? There is still much debate in the MOOC literature on assessing MOOCs (Daradoumis, Bassi, Xhafa, & Caballé, 2013). MOOCs are often criticized for the low MOOC completion rates, but is this really a good measure of MOOC learning? In our case, where we focused more on faculty perceptions and building confidence about flipping their courses, our assessment process had to be more personal. Instead of measuring how many participants finished all the assignments in the MOOC or the clicks in the various modules, we reflected on alternative methods for measuring how faculty were changing how they thought about flipping. We researched personal learning environments, or PLEs (Wilson, Liber, Johnson, Beauvoir, Sharples, & Milligan, 2007). We integrated principles from the adult learning literatures (Candy, 1991; Merriam, Caffarella & Baumgartner, 2012). We also structured each MOOC module into three levels with three different commitment levels so that the adult learners in this MOOC could pick and choose

the materials and time commitment that was most relevant to them. What we have discovered from the analysis of the CBAM pre- and post–profiles and other assessment measures is that the profiles are all different; there is no alignment of the CBAM with the completion of the MOOC assignments or amount of viewing of all of the MOOC module content. We need to keep searching for the best mix of assessment/evaluation strategies for assessing the true value of our Teaching Flipped MOOC.

Broadening our Perspectives and Narrowing our Scope

Since this course design project centered on professional development and was part of a National Science Foundation grant, we had to create an evaluation plan and an assessment timeline as part of our grant application. We planned for formative and summative measures that were part of a continuous cycle across the grant project. Assessment was truly embedded in the planning process and made so much more sense than what is normally done as part of a traditional course or MOOC development process.

In addition to using the QCF process as described earlier to design the MOOC, a logic model was used to create the overall plan for the Flipped Teaching MOOC project. Logic models are planning tools commonly used for grant proposal planning. The logic model created a visual map for the MOOC project. This logic model matrix then provided an opportunity to articulate resources, inputs, and output tasks, outcomes, and impacts (W.K. Kellogg Foundation, 2001). Table 1 presents an excerpt of an updated logic model created for this professional development MOOC project.

Creating the logic model provided a broader view of the project process and forced reflection about the course design in short- and long-term goals and impacts. The logic model excerpt shows how reflection on mid- and long-term goals helped us see beyond the six-week MOOC and our expectations for the result. The logic model process also created an opportunity to focus on priorities and really detail a narrow and measurable scope for some of the course outcomes. Thinking about impacts—and how to assess project sustainability—is especially important with grant proposals. Reflecting on impacts also encourages thinking beyond the boundaries of traditional outcomes. For example, measuring conceptual change and perceptions about the flipped classroom resulted from thinking and dreaming about our distant outcomes. This experience has helped us see the value of using a logic model in course design planning, a task we will continue to use for designing future courses. Another Fink tool, the "dream exercise," can help in this broader visioning process. The dream exercise enables us to envision what students or participants will have learned, what we want them to be able to do, and what dispositions we hope they have at the end of instruction. The exercise can be found at this link. This backward process of

dreaming about outcomes helps to identify goals that can then be used to define measurable objectives and/or outcomes as the starting point for the alignment grid.

Needs and plans for preparing for the program			**Outcomes - during and after the program begins**		
Inputs / Resources *What resources will be needed*	**Activities /Tasks** *What activities or (deliverables) will be needed for completion of the project*	**Outputs / Deliverables** *Evidence of progress*	**Short Term Outcomes** *What is expected or hoped will happen in the short term during the project*	**Medium Term Outcomes** *Measurable change that will happen in the mid term*	**Impacts Or Long Term Outcomes** *Big picture outcomes/impacts*
NSF funding Use of the Quality Course Framework as the model for developing the MOOC Support and resources from TLT, Library and CTLE for video support Support from the Library for gathering OER materials for the MOOC Support from TLT for the Canvas MOOC and integrating additional online tools	Design & develop the MOOC in Canvas Design & develop tutorials and videos to help faculty flip their courses Collect data during the MOOC pilot and other implementations for continuous improvement	The MOOC will be developed and piloted with a local cohort of faculty participants Tutorials and videos will be completed and added to the MOOC Data collected from the pilot and subsequent iterations of the MOOC will be used to improve the MOOC	Through the CBAM survey, faculty will show a change in their concerns about flipping their courses Faculty will demonstrate they can create videos and active learning activities for their flipped courses Faculty will report they can now attempt to flip their courses MOOC participants report they like the new approach to teaching Faculty report they learned more than just how to flip a classroom	MOOC participants demonstrate they can design and implement a flipped classroom Faculty participants share their new knowledge with peers A successful, collaborative and sustainable MOOC model will be transferred to CTLE ownership MOOC faculty continue to use flipped classroom strategies and apply them to other courses MOOC faculty use what they have learned to successfully apply for their own grants	The MOOC becomes a respected open course that is used worldwide for helping faculty learn to flip their courses The MOOC project becomes a faculty development model that can be used by other CTLs Local MOOC faculty will win teaching awards Better course alignment between engineering courses developed at the U of U and SLCC that will improve the student transfer process

Table 1: Example of a Logic Model Excerpt for the Teaching Flipped Project

After articulating the broader vision using the logic model, we created a grid to align course outcomes to assessment, teaching demonstrations, and learning activities. As we designed and reworked the online course modules over four different iterations, we consolidated, streamlined, and adapted the course based on participant feedback. Table 2 presents an excerpt from an alignment grid for the six-module, six-week MOOC. I am in the process of redesigning the grid for our newest three-module, six-week MOOC adapting the MOOC based on participant feedback. Here is the link to the full six-week alignment grid.

Objectives/ Outcomes	Assessments	Our Presentation/ Demonstration	Online Practice with Feedback	Resources Required
WHAT IS FLIPPING ABOUT? As participants think about and **REFLECT** on their own teaching practice and gather ideas for flipping, they will learn about what a flipped course is all about and see how it work in their discipline	• Completion of CBAM, learning and teaching styles inventories • Reflection on ways they can flip their course and share with peers in discussion	**Module 1a:** Introduction to the Flipped Classroom • Overview of the course • Providing links to take surveys • Provide introductory readings and Cindy's videos about flipping • Facilitate discussion around introductory discussion	**Module 1a:** Introduction to the Flipped Classroom • Watch the online lectures about flipping • Complete surveys • Online Discussion: initial questions and comments about flipping • Online discussions for introductions and own context	• Online Lectures - Cindy's recorded flipping lecture from ID summit as an intro • Links to introductory flipped classroom articles and readings • Links to teaching, learning and CBAM surveys
WHAT ARE OTHER PEOPLE DOING WITH FLIPPING? Research good teaching pedagogy and **REFLECT** how to apply what is learned to practice with a focus on student centered learning, active learning strategies, and the flipped classroom	• Learn about search tools and strategies for the educational literature • Install a social bookmarking • Perform searches for disciplinary pedagogy-focused teaching and learning resources and examples • Share resources they find in their searching with peers	**Module 1b:** Introduction to the Education Literature • Present links to the education literature to investigate disciplinary pedagogy • Present materials on threshold concepts and student learning bottlenecks • Provide directions for downloading and installing Diigo • Facilitate discussion of questions and findings from the research	**Module 1b:** Introduction to the Education Literature • Conduct a search through a variety of different teaching and learning journals • If interested, download Diigo for more organized searching • Share some of research finds with peers	• Online lectures and OERS on: o Threshold concepts /Bottlenecks o Teaching Pedagogy o Active Learning • Tutorials on Google Scholar, and Diigo • Links to pedagogy journals

Table 2: Excerpt from the MOOC alignment grid for course planning

In addition to broadening the perspective of what is possible within a course, especially with a MOOC, begin by thinking beyond the assignments. Is the MOOC or course process based where it is possible to identify assignments or benchmarks across the process? How are assignments related or sequenced? In this MOOC, we reflected about going beyond just designing a series of assignments, or a series of "active learning" strategies cobbled together, since just layering random active learning activities onto an already full curriculum will not result in a transformational learning environment. We thought more about affective outcomes and developing a comfort level with flipping, including how to help faculty explain flipping to their students, and designed our assessments and learning activities around those priorities. This process of broadening the scope and then narrowing down to priorities was a very interesting "aha" moment for us, and one that can be adapted to designing traditional face-to-face and online courses.

Importance of Closing the Loop

Over the course of two years we have adjusted and redesigned the course structure significantly in each MOOC iteration based on participant feedback. We started with a full semester online MOOC course of 15 different one-week modules and in our last iteration we now have three modules of two weeks each for a total of six weeks. The focus on continuous improvement and tweaking content, learning activities, and assessments to meet the needs of our participants has changed what we think about "closing the loop." We have moved beyond the idea of using one measure, such as MOOC completion rate statistics, to measure the success or value of our MOOC. We have provided a personal CBAM snapshot for participants who complete both CBAM surveys to help them see and reflect on how they have changed their thinking across the MOOC experience. We now focus on closing the loop by assessing and evaluating the process of the MOOC learning, as well as how students are interacting with the MOOC content. This is not a typical "massive" undergraduate xMOOC, as is commonly discussed in the literature. With only a few thousand participants, we gleaned valuable lessons about identifying personal approaches to assignment choice and assessment. We have reimagined the course processes by utilizing the opportunities and capabilities inherent in the MOOC, not just focusing on presenting active learning strategy or classroom management techniques. Teaching in an open and international MOOC creates an engaging community of practice context including discussions, peer interaction, and sharing of expertise (Wenger, McDermott, & Snyder, 2002). We will continue to adapt and change our approach and enhance the learning community as we learn more about the needs of our MOOC participants who are interested in learning to flip instruction.

This MOOC design, development and implementation project has changed all of the MOOC creators and collaborators. We focus more now on formative assessment and try to uncover what is really going on in our course. We ask our students questions, collect feedback, analyze, and adjust our teaching based on that feedback. We think more about the affective aspects of learning, whether for faculty participants or students. We seek out instruments for measuring how our students' thinking is changing. We follow up and ask difficult questions. We have developed our qualitative analysis skills and see course analysis as something that goes beyond the numbers and analytics of MOOCs. Although first defining one's purpose and aligning that vision to outcomes seems like a logical way to design instruction, we often do not focus on this task enough. It is critical to articulate in detail the purpose of a course or MOOC and write a rationale for the course. Designing this MOOC collaboratively helped us to rethink how multiple visions can be integrated into a design and develop as an effective instructional experience.

RECOMMENDATIONS AND CONCLUSIONS

Our vision for this Teaching Flipped grant project started small with a hybrid workshop supplemented with online materials. By collecting formative data and reflecting on the participant experience, the vision quickly evolved based on our "dream" and purpose. In the beginning, we focused more on the opportunities and problems inherent in flipping the classroom or the content, and less on the design of the learning environment. Drawing on our previous MOOC and online teaching experiences, we realized we needed a more creative and flexible learning space for faculty learners. Since Dr. Furse already had many connections internationally through her YouTube videos, we knew that international perspectives would enrich and deepen faculty discussions and interactions. As our vision matured, and we uncovered new and interesting projects, technologies, and OERs available abroad, we hoped to engage those new perspectives to create the synergy for thinking differently about how faculty might learn in a MOOC learning environment. We also realized the value of learning in an open international context, and with the availability of an LMS vendor in our own backyard, Canvas.net, we received the support we needed to jump into the MOOC fray. We opted to use a MOOC environment for this project as an opportunity to help us rethink how we might provide faculty development in a new way. Instead of one-shot workshops and discussions around teaching by the same voices in our local context, we wanted an interactive experience situated in an international learning community where participants could share expertise and experiences and learn from each other.

The rich interaction, discussion, and sharing among international participants facilitated adaptations and new learning experiences for the K-12 and higher education participants. We learned we should be connecting learning theory to practice, and creating more transparency in our classroom activities and assignments so students will see our strategies and decision-making processes.

The bulk of the literature up to this point around MOOCs has been focused on the "massive" aspect of the MOOC and how institutions are capitalizing on new audiences, new finance streams, and methods for developing a business model for MOOC implementation. Other bodies of the MOOC literature focus on the technology component related to designing and creating tools that will facilitate the scalability of teaching and learning practices in this massive context. But we must also think about how we can capitalize on the opportunities inherent in the MOOC environment to help students be more successful and independent learners.

We have much work to do in creating increased support for self-directed learning opportunities and more engaging opportunities for peer-to-peer learning, as well as better alignment with competency-based outcomes. I plan to continue designing and teaching MOOCs and see what new insights and personal conceptual changes emerge. I will also continue to close the loop and experiment with new ways to adapt, customize, and utilize the opportunities of the MOOC learning environment. This experimentation and search for just the right synergy in online teaching and learning environments are becoming important, as McGrath, Mackey & Davis (2008) articulated so well:

> The professional development landscape is being redrawn as e-learning and educational technologies provide opportunities for participants to connect everyday life and formal online learning in new and dynamic ways. These connections call for authentic learning pedagogies which challenge traditional teacher/learner relationships, formal course design and assessment practices. (p. 613)

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