

Teach-Flipped: A Faculty Development MOOC on How to Teach Flipped

Abstract: The objective of this NSF project was to help faculty learn to flip their classes. What started out as a faculty development program designed for local STEM faculty quickly expanded to include faculty around the country and the world, across a wide variety of disciplines and K-12 teachers as well. The program included three modules – backwards design applied to the flipped class [1], creating online materials (video lectures), and active learning strategies for the face-to-face classroom. These modules were taught in a variety of different ways for *different* audiences including in-person workshops, flipped semi-in person workshops, and completely online massive open online course (MOOC)s. The online MOOCs are now taught each semester by our Center for Teaching and Learning Excellence through Canvas.Net.

We observed several interesting things as we helped such a broad variety of faculty work through the basic ideas of flipping a class. The richness this broad community provided was observed in the discussion forums, and we identified a variety of specific concerns that were in some cases general to all disciplines (for instance, "How can I find the time to make these course changes?") and in others limited to specific disciplines or circumstances (for instance, how can I explain to a nurse how to insert an IV online or how can I use this type of pedagogy in a K12 class where the students have limited internet at home). We found that people who signed up for the course did so for a variety of reasons, not all of which were directly related to wanting to immediately prepare to flip their courses. Far more participants were simply beginning their exploration of this and other new teaching strategies. For many, the online discussion forum proved a valuable conduit to explore these concerns with peers (many of whom had substantial experience to share on the matter), and with the professionals who were running the course.

I. introduction

One of the most promising and transformative trends in STEM education is the development of new hybrid courses that combine individualized online learning activities with group learning activities in the classroom. In the 'Flipped Classroom' the lectures and homework are 'flipped'. Instead of lectures in class and homework out of class, students watch video lectures prior to class. The in-class face-to-face (F2F) time is then used for active and engaged problem solving, usually working with peers, guided by the professor. 'Flipping' the lectures and homework has been shown to be much more effective than the traditional 'sage on the stage' lecture format for students and faculty alike [2, 3]. Blended/hybrid learning examples can be found in engineering [4], the sciences [5], business [6], teacher education, languages [7], political science [8] and a multitude of other disciplines. While most of the research on the flipped classroom has focused on enhanced student satisfaction and learning, this paper will focus on faculty development for faculty who are transforming their teaching with this method.

This paper describes a faculty development program to help faculty flip their classes. The Teach-Flip MOOC (teach-flip.utah.edu) was developed by Dr. Cynthia Furse (professor of Electrical & Computer Engineering) and Dr. Donna Ziegenfuss (associate librarian) at the

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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: Introduction to Flipping, Engaging Students Online: Creating Video Lectures, and Engaging Students in Class: Active Learning) were developed. Each module includes basic (introductory knowledge), intermediate (first attempts at integrating the concepts in their classroom), and advanced (more complete, advanced integration into their classroom) sections. The course utilizes online content, individual exploration (‘Find out what others in your discipline are doing.’), and peer discussion/feedback (online or in person).

II. faculty development

Traditionally, higher education faculty receive little training in course design [9-11] and often only receive their teacher training through trial and error experiences in the classroom or through occasional faculty development workshops [11-13]. In this time of historic change in higher education, changing factors such as accountability, financial and time constraints, and assessment are revitalizing an interest in defining how faculty design instruction and teach in a higher education environment. Barr and Tagg [14] use the phrase “shift from an instruction to a learning paradigm” to refer to changes in higher education. They state, “The very purpose of the Instruction Paradigm is to offer courses. In the Learning Paradigm, on the other hand, a college’s purpose is not to transfer knowledge but to create environments and experiences that bring students to discover and construct knowledge for themselves” (p. 15). In addition, Arreola, Aleamoni, & Theall [15] argue that faculty must also develop course design and technology skill sets if they are to adapt to the changing academic environment. However, just telling faculty about teaching and course design strategies they can use in their classroom to promote learner-centered instruction is not enough to spark conceptual change in teaching practice. The faculty development literature contends that faculty must have a more sustained experience where they are able to integrate theory and practice and where they can interact with peers as they reflect on their own practice [16-18]. Active learning instruction and technology-enhanced instruction (ex. designing hybrid and flipped courses) require rigorous pre-course planning [19, 20]. Shifting the learning paradigm from teaching-centered to learning-centered is also an important shift in teaching strategy.[4, 11, 13, 21] This faculty development program supports the social aspect of learning with other faculty – learning community/ community of practice model – found to better achieve conceptual change and transform practice – [22-24].

Although there are many references in the literature on HOW to flip the classroom and on student perceptions about flipping a classroom [3, 25], there is a paucity of research on faculty development initiatives for this type of instructional process. Workshop opportunities are available (e.g. Flipped Learning Network, 2012, flippedlearning.org), although single workshops have already been found to be insufficient for faculty we have been mentoring and following in this process. There is little written about faculty perceptions, motivations and expectations as they go through this flipping process.

Many ‘early-adopter’ faculty are now using a variety of multimedia lecture methods to ‘flip’ their classrooms. These early adopters generally see high levels of student satisfaction

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(teaching evaluations), and learning improvements typical of this method. Mentoring and peer review have already been found to be important and effective for helping faculty succeed with these new methods, particularly when they can pick up problems early and help resolve them. Our initial observations and feedback from early adopters give us several important observations that guide the development of this project:

- Faculty are initially most concerned about developing the video/multimedia materials for their class. Information, advice and training make faculty much more efficient in developing these materials.
- Choice and implementation of the in-class active learning activities are key to the success of the method (perhaps even more critical than the nature of the video materials). Faculty are seeking 'best practices', but guidance on this is still very limited.
- Continual near-real-time feedback from the students, and applying it to adapt the classroom, is key to a successful implementation.

III. the flipped teaching MOOC:

The Teach-Flip MOOC was developed during 2013-2014. Based on Dr. Furse's successful experiences flipping her own class and helping other faculty flip theirs [4, 26], and Dr. Ziegenfuss's expertise in curriculum development, the course was originally designed strictly for higher education STEM teachers. The course is based on three modules. Each module is two weeks long and is structured into three levels for three different commitment levels so that the adult learners in this MOOC can pick and choose the materials and time commitment that is most relevant to them.

- *Module 1: Gathering Information – Introduction to Flipping the Classroom*

Introduction of the concept of a flipped a classroom, and how this pedagogical approach might fit into their own teaching and classroom context. By the end of this module, faculty will have reviewed the literature and resources available on the flipped classroom, brainstormed and shared ideas for a flipped learning design, developed a structure for their own flipped instruction.

- *Module 2: Online Engagement – Creating Videos*

Introduction to different types of videos. By the end of this module, faculty will have decided what type of video they want to create; selected and mastered technology to write or create videos for examples, record videos, post videos online; posted and received student feedback on one example video.

- *Module 3: Engaging Students Actively in the Classroom*

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Introduction to active learning including peer discussion, sharing and problem solving, case studies, etc. By the end of this module, faculty will have articulated active learning strategies that work in their discipline; tested out new active learning strategies in their classroom.

Three models of the training program were tested. First, the training program itself was modeled on the flipped classroom, with weekly online modules over the course of a 15-week semester. This was too long and involved for most faculty. We next tried 6-week/6 module and 6-week/3 module versions of essentially the same course, with and without in-person on-campus discussion groups. The 6-week/3 module version appears to work best. Where a local group wishes to host a discussion group, this is an excellent peer discussion format. Alternatively, the online discussion forum has provided a unique opportunity to connect teachers (both higher education and K12) from a wide variety of disciplines around the globe. This program is now taught every semester as an online MOOC (Massive Open Online Class) with several hundred participants each time. Materials are also freely available online for general use by faculty or faculty development professionals. (teach-flip.utah.edu)

IV. results:

The course was taught in Spring and Summer of 2014 as a true flipped course (online preview of materials with in-person face-to-face interaction) at both the University of Utah and Salt Lake Community College with an enrollment of 95 STEM faculty. In 2014 it was taught twice as a cMOOC through canvas.net. This was offered free, open enrollment, with enrollments of 912 and 481 faculty and K12 teachers in a wide variety of disciplines including STEM, humanities, arts, languages, medical training, and more. Half were from North America, with additional participation from Africa(6%), Australia & the South Pacific (2%), the Carribean (1%), Central America (1%), Asia (3%), the Middle East (1%), South America (3%) and Western Europe (23%). We assume the international distribution was controlled in part by the fact that the class and materials were in English. 70% were female, and 91% were adult learners (ages 25-64). Reasons given for taking the class were interest in the flipped classroom (45%), curiosity about MOOCs in general or liked the online format (21%), interest in the Canvas learning management platform (10%), gaining skills for a promotion or new career (13%, and these participants typically requested certificates of completion later), or being part of a community (5%). Some were staff or administrators responsible for local teacher training programs, who were interested in exploring or utilizing the materials we provided. 44% of the participants planned to be 'active' participants, 30% passive, 11% observers, and 10% 'drop in'.

The short-term goal during these trial runs was to gather and analyze data in order to make the necessary changes to make the course design as robust as possible. The long-term goal was to have a fully developed MOOC that at the end of the grant would be handed over to the Center for Teaching and Learning Excellence (CTLE) to run along with their regular faculty development

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offerings. The MOOC has been offered bi-annually, as given in Table 1. It is free of charge to faculty, K-12 teachers, and anyone else who is interested in teaching flipped.

Table 1: Participation in the MOOC

	Total Participants Enrolled	# Participants Logged In
2017-Q4	93	43
2017-Q1	112	53
2016-Q4	141	65
2016-Q1	314	176
2015-Q3	1317	751
2015-Q1	478	271
2014-Q3	911	495

One significant finding from this study is that traditional measures of online engagement, such as the number of clicks, number of online discussion posts, and other course analytics, do not directly translate well when measuring conceptual change in an adult professional development course.[27, 28] If the objective of the course is to help teachers 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. Our experience points to the clear need for more personalized learner-centered assessments of the learning experience and outcomes in online faculty development focused MOOCs. This also surely translates to the need for more learner-centered assessments in face-to-face development opportunities as well.

The Teach-Flipped materials are available online free-of-charge at teach-flip.utah.edu. We have found that the most popular format appears to be an online MOOC where participants can join in online discussion forums about various aspects of teaching in a flipped classroom. The second most popular format appears to be individual groups of faculty (such as through teaching and learning centers or workshops) that use the materials as support for either hybrid or face-to-face discussion and trainings.

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