

Paper Title: Evolution of a Truly Open Arithmetic MOOC

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Abstract

MOOC's are all the rage with courses offered via groups such as Coursera, Udacity, and EdX. Higher education institutions have been working to wrap its arms around MOOCs and determine their application and usefulness. In this paper, Donna Gaudet, a community college instructor from Arizona, USA will discuss her experience teaching a truly open MOOC: Basic Arithmetic. She taught the course 3 times during 2013 and shares her implementation model, results, and lessons learned.

BACKGROUND

MOOC! The very name seems to demand attention and the words behind each letter even more so; MASSIVELY OPEN ONLINE COURSE. MOOCs burst onto the academic landscape in 2008 when George Siemens of Athabasca University and Stephen Downes of the Canadian National Research Council taught a course titled, "Connectivism and Connected Knowledge". Offered through the University of Manitoba as a regular tuition class, it was attended by 25 local students. In addition, 2300 other students participated in the class, free of charge, via the web. The course was taught using a constructivist approach of knowledge building and student interaction. A standard LMS (learning management system) was eschewed in favor of a variety of open web technologies such as wikis, discussion boards, web pages, etc.... The term MOOC, coined by Dave Cormier and Bryan Alexander (*Wikipedia, 2013*), was a direct result of this class. Several years later, the "Connectivism" class would be used as a classic example of what is called a "cMOOC" or "Constructivist MOOC" as a way to differentiate smaller, open content MOOC's from the large scale MOOCs that were yet to come.

Not much happened in the MOOC world for a few years. Then, in 2011, Sebastian Thrun and Peter Norvig from Stanford offered an Artificial Intelligence course that enrolled over 160,000 online students. Offered in conjunction with a tuition course, the open course utilized short weekly video lectures with web based form responses. The instructors created the course just ahead of the students so the content was fresh. Discussion boards had a lot of activity. Assignments were structured with due dates, and a midterm and final were required for course completion (*Martin, August, 2012*). Thrun's AI class is often used as the classic example of what is called an "xMOOC", a term that is used to indicate the more "assembly line" approach that can handle extremely large numbers of students.

BASIC ARITHMETIC MOOC

Colleges and universities around the U.S. have been working to understand how to leverage MOOCs and what to do with them. My college is no different and in the fall of 2012, I agreed to teach a Basic Arithmetic course as part of the inaugural Canvas Learning Network. The arithmetic course I would teach was the same one I teach online for my college, Scottsdale Community College, with the exception that students would not be taking our department final exam. Rather, I created a separate final test for them.

The enrollment was capped at 500 and Canvas sent me enrollment reports each month. As the enrollment quickly climbed from 40 to 80 to 150 to 225, I began to panic a bit at the thought of interacting with 500 students. Well before the course began, the max enrollment was reached. With a start date of February 4, 2013, I was able to spend much of winter break prepping the course and getting ready for the onslaught of students.

MATERIALS

I am a huge proponent of open resources, especially in disciplines such as math and science, and I teach all my classes using only OER materials. I wanted my MOOC to be truly open in every sense of the word. The following materials were utilized as part of the class:

- Basic Arithmetic – Student Workbook
 - This workbook was written by myself and two other faculty members at my college and is published under a Creative Commons, open source license. Along with the workbook, over 150 videos were created to accompany the examples in the text. The materials can be found here: <http://sccmath.wordpress.com/mat082/>
- MathAS software
 - This is an open source math homework and assessment system created by David Lippman (<http://www.imathas.com/>)

COURSE DESIGN

Because of the number of students enrolled in the class, I wanted to streamline all the assignments and make the grading automatic. The following structure was used for the course and the assignments within it:

- 12 lessons covering the following topics: Whole Numbers, Fractions, Decimals, Percent, Ratio & Proportion, Geometry, Statistics, and Integers
- Each lesson was supported by the workbook and included video examples, problems for the students to try on their own within the lesson, additional practice problems at the end of the lesson, and an overall lesson assessment. Solutions to all the problems were made available to the students. Students

could decide how much of each lesson they wanted to complete before they took the required online assessment in MathAS.

- The content students were learning in the workbook was supported by assignments in MathAS (HW, Quiz, Test). As with the paper/pencil work, students could decide how much of the online HW and Quiz they wanted to complete.
- In order to earn successful course completion, students had to complete each lesson test with a 75% or greater score and an end of course assessment also with a 75% or greater. All of the required assessments were delivered via MathAS.

COMMUNICATION

Initially, I was very worried at the thought of managing communication and interaction with 500 students. I used the Groups feature of Canvas to break the class discussion area into smaller subgroups that could interact with each other and I attempted to minimize contact from students via direct messaging. My hope was that students would form communities within the class and ask questions of each other then I could step in as needed during the course.

RESULTS

As is the norm with success rates in MOOCs, the success rates were not good for my first offering. Around 2% of the 512 enrolled students completed the coursework and received a certificate. However, only 103 students actually completed the course orientation and, of these, 12.6% completed the course and received a certificate. If numbers are computed from those that completed the first lesson (53), then the success rate jumps to 24.5%. The lesson here may be that success data for MOOCs should be computed from those that actually begin not just from those that enroll.

LESSONS LEARNED

As with any first-time experience, I learned many lessons delivering my first MOOC. I will share two of the major ones here. The first major lesson involved class discussions. In planning for 500 students, I spent quite a bit of time on some design areas that I not only ending up not needing but that actually detracted from the student experience. Because I was concerned about being able to manage discussions with 500 students at once, I created ten separate discussion groups with 50 students each. The time I invested setting up these groups and group discussions was not necessarily wasted, as I will use that learning if I ever teach a class of something like 10,000. However, for 500 enrolled students, placing them into separate discussion compartments was not necessary. From an instructional perspective working within Canvas, navigating all these groups to see if and when students had posted was time consuming and the participation numbers were too

small for students to benefit from working together. For my second MOOC, which I am currently teaching, all the students discuss in the same area and I have found that the students are interacting with and supporting each other to a much greater extent.

The second lesson involved the length of the class. My first MOOC was 13 weeks long and I found that students did not apply themselves well during this time and many seemed to get distracted and “wander away”. The second offering of Basic Arithmetic is only 6 weeks long. What I am finding now is that students are applying themselves and moving quickly through the material. I feel the shorter timeline puts some pressure on them to keep up with the class and not get behind. Perhaps more will be successful this way.

RESOURCES QUOTED

Wikipedia (2013). “Massive Open Online Course”
http://en.wikipedia.org/wiki/Massive_open_online_course accessed March 24, 2014

Martin, F. (2012). Will massive open online courses change how we teach? Communications of the ACM, Vol 55, No. 8, August 2012. Retrieved from <http://cacm.acm.org/magazines/2012/8/153817-will-massive-open-online-courses-change-how-we-teach/fulltext> accessed March 24, 2014

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