

## DESIGNING MATHEMATICS COURSES ONLINE

Siamack Bondari and Jacci White  
Saint Leo University  
Department of Mathematics  
University Campus-MC2188  
Post Office Box 6665  
Saint Leo, FL 33574-6665  
Jacci.white@saintleo.edu

A basic model for designing online courses should start with the development of a course curriculum guide. Student outcome is the most important aspect of designing a course regardless of the presentation medium. Selecting appropriate support materials would be the next major step. Lastly, the course location should contain a means for student communication, a location for accessing course materials, a method for tracking participation, an area for personalizing the students and faculty, security to ensure privacy, and a method for evaluation.

First, make sure you have your curriculum guide and everything you want the students to know when they finish the course. You will need this, otherwise it is too easy to skip something simply because it does not fit well on your web site, or you just do not want the hassle of finding a new way to present some of the material. An appointment with some of book representatives would be another good step because you will be amazed at the types of materials they have that can save you from creating your own. Some of them will post all of your material online for you if you adopt their book, or they have online supporting sites for their books, or tutorial videos on CDs that they will wrap with the book. They have 800 numbers for free tutors, tutorial interactive software, and other materials that can help your students and reduce the work on you.

After you select your materials, you need to decide how to present them. You might consider a multi-part message board, one for off-topic discussions or questions, one for posting helpful web sites, and one for the main class discussions. It can help organize the course if you use a separate message board for each module in the course. Separate message boards for each team can also be useful. Along with message boards you may also opt to use a chat room. According to statistics, very few students ever log on to the chat room, but those who do really count on it. And better yet, it is a place where students can meet to work together on team assignments or homework.

Student Assessment is another item that needs to be created. Live exams are popular in online courses that are limited to students who reside in specific geographic regions. Institutions that utilize live exams in online curriculum typically limit their service area to the physical college vicinity or have partnerships with institutions in other areas that allow them to expand their student pool to include the regions within an easy access distance of the other campus sites. By limiting the geographic region of service,

instructors can require students to take live exams at a campus location during regularly scheduled testing center hours. Two advantages to this system are the ability to control the amount of time allotted for testing as well as checking the identity of the person taking the exam. Two disadvantages include the limited service area of the online medium and the inability to prevent students from discussing test questions with others who may be taking the test at a different time. Using multiple versions of the same exam may reduce the latter disadvantage.

Multiple choice or true and false online exams are very popular at institutions with enrollment that does not follow any geographic boundaries. There are several advantages when using this model. First, the exams are available online so the students can access them anywhere at any time. Second, the pool of questions on the exams can be randomized to reduce the possibility of sharing answers. Third, the exams can be automatically scored online with the scores then available to the student and the instructor, saving the instructor many hours of grading. Fourth, students can get immediate feedback on their work when the exams are graded online. The disadvantages are numerous, but can be categorized as “technical difficulties”. The primary disadvantage from an instructional standpoint is the poor ability to accurately reflect student learning using these sorts of test questions. Once you move on from the instructional problem, you run into a seemingly infinite list of possible technical problems. Students can become very creative when their grade is at stake. For example: “I dropped my calculator on the keyboard and the test was submitted.” (Shall we ask the student how the calculator happened to bounce on the enter key since one must select enter to begin the submit process and again to choose the yes command for submitting), “Something must be wrong with my server because it says that my quiz was submitted but I did not take it” (Interesting how the server not only submitted the quiz, but filled in answers as well), “I cannot access my quiz to submit the answers but here they are” (Amazing how one is unable to figure out how to submit the answers and yet they are all correct! Could it be that the student was able to write all of the correct answers down after he or she submitted the quiz blank and the answers were sent back to him or her with the score of 0%?)... Needless to say the list goes on.

If we move on to essay exams, the advantages are numerous. However, the main disadvantage is enough to steer most instructors to another assessment strategy. The disadvantage is the time it takes to thoroughly grade each question for each student. This is a disadvantage that should not be an issue in education, but the nature of online courses has been to increase class enrollment to double, triple, or even ten times that of traditional class sizes. While we count the high enrollments, keep in mind the extensive time commitment for answering all student questions while prompting students to interact with each other on the message board. Of course, we do not want to forget the hours spent in the chat room with small groups of students since the atmosphere is not conducive for the entire class to attend at the same time. Furthermore, one should also be reminded of the extra time it takes to type answers instead of verbalizing different concepts. Now we can begin to see why the time that is required to grade essay exams can be overwhelming for online faculty.

Lastly, we have student projects. This assessment strategy would tend to belong to the same class as essay exams. However, essay exams can be taken and submitted automatically online. Hence, a disadvantage of projects is finding a common way to submit the projects to the instructor. Typically a combination of technologies must be available in order for all students to have the opportunity to complete their work and for the instructors to have the ability to open it completely. Some students can find common software while others must fax their final project. Of course a project is a good opportunity for group work, so the time required to grade a project could be reduced when several students work together for the same grade. Then again, what will stop a student from passing the project on to new students the next term? Surely there are some problems that are common between traditional and online teaching environments.

Regardless of the type of assessment that you choose, some students will encounter schedule conflicts as well as technical problems during quizzes. However, make-up quizzes are much more difficult to create online. As a result, a policy such as dropping one quiz score can eliminate all excuses, and any other missed quizzes result in a grade of zero. Quizzes can often be set to send answers to the student as soon as they finish, so the student may have the answers if you choose to reset the quiz.

A place to post all the grades and the final grade is helpful, otherwise you will get dozens and dozens of emails from students who want to know their grade at any given point during or after the semester. Also, if you post the grades immediately, students will check them and you can catch any errors before the official grades are sent to the school. A list of frequently asked questions that is posted on the message board at the start of the term can save a great deal of time, because students regularly ask the same types of questions.

Online course models and enrollment are growing exponentially. As a natural result, student assessment problems are growing at an equal rate. One skill that a majority of students learn in the online classroom is creativity. Students have become increasingly creative and bold in their attempts to improve grades. Email does not register as a permanent and legally binding document to most students. Hence a bold new student may try to put together his or her own incriminating documentation in an effort to save a failing grade. Administration is on a mission to increase student enrollment for obvious reasons, in response; faculty must be on a mission to improve quality. Quality control appears to stop at student assessment, the area where control is most important in order to uphold academic standards for documenting student ability. Effort rather than ability often determine online course grades, especially when that effort is directed towards manipulating the testing systems.