

How Online Instruction changed my Lecture Classes

Writing two online courses five six years ago and teaching them each semester necessitated **some changes in assessment methodology**. Tests for these courses are given in the math labs at the various campus sites, but the communication piece – essential to the Mathematics for Elementary Teachers courses was getting lost in the shuffle. The premise for our teacher preparation courses in math theory is that the students have the prerequisite skills in mathematics (which isn't always true) and that they are ready to delve more deeply into the how and why of mathematics.

Homework problems are chosen for their assessment possibilities and for their ability to stimulate conversation. What were your assumptions? Was that the only answer? How do you know when you have all the answers? An attempt is made to change our student's attitudes towards mathematics. Assessments using hands-on activities are done weekly in the classroom through individual and group projects. These needed to be adapted to the online environment.

One example: (slide 1)

Communication activities using geoboards which are done in class and are a big hit translated easily into the same activity online. (Slide 2) Online students match up in pairs as they approach this assignment and email each other directions, which they translate into shapes on the NCTM Illuminations geoboard website and they send each other these pictures for verification. Discussions about these activities and homework problems take place on the student discussion board.

<http://standards.nctm.org/document/eexamples/chap4/4.2/>

Spatial activities which we practice in the hallway in on site classes, with students giving other students directions - translated into online students practicing on the lady bug websites, also at NCTM.

Lady bug worksheet

http://illuminations.nctm.org/index_d.aspx?id=160

Lady bug rectangles

<http://standards.nctm.org/document/eexamples/chap4/4.3/standalone2.htm>

Hiding the ladybug

<http://standards.nctm.org/document/eexamples/chap4/4.3/index.htm>

Students do the same hands-on activities at home as at school. In order to send in their work, students take digital pictures of their homework and attach them to me at home or at the Blackboard site for grading. (Slide 3) Slide of attribute pieces showing differences in matrix format.

As I worked to reestablish the "lines of communication" by adapting most of the classroom activities and discussion to the distance format, I realized that **this type of ongoing assessment was something that would benefit all of my classes**, not just those containing prospective teachers.

UNEXPECTED SIDE BENEFIT: In classes containing preservice teachers, we expect to hear the answer, their approach to the problem, whether or not they considered other approaches, and descriptions of obstacles and dead-ends that they encountered along the road to the solution. We want them to have this type of atmosphere in their classes when they become teachers so it is important that they practice this behavior. They have NOT been expected to explain much in their past math classes, so their mathematical vocabulary is limited and their explanations are stumbling in the beginning.

In my other classes, **there didn't seem to be time** for these types of explanations.

However, I found myself finding time for this, gradually at first. In the Intermediate Algebra class the effects of these immediate and ongoing assessments are the most obvious. The class, initially (just like the preservice teachers) is hesitant to speak up.

They don't want to volunteer, they don't want to talk, they don't even want to make eye contact. But after the first few exchanges and after a brief discussion about why they are uncomfortable, the flood gates open. **These students want to talk, they want to know if their approach, (not the one or two we discussed in class) is OK, and they want to know if their form of the answer is acceptable.**

Once the talking starts, there is no lack of volunteering. **The comfort level is there** and the **retention of material is in my opinion much improved.** Once the conversations begin, I pretty much know how each student is going to do on the next exam. The exams have the same problems to solve as before, but now they contain short answers. When the students do their corrections after the exams are returned, all their corrections include a statement of what they did wrong. Some of the students include how they plan to stop making that mistake in the future.

When the student doesn't feel comfortable in class talking about a topic, or explaining their steps to an answer, they KNOW where they are and they know they need to put in more time on that topic. As they explain their steps to me, they are talking to the class and to themselves.

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