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CEP 882

Final Paper, Technology and Literacy Project

I. My Students:

* I would like to note that I will be starting my first year in my own classroom this fall. I have previously been a substitute for various school districts in my areas of certification. Since I do not know the student make-up for my classes as of yet, I have decided to select a hypothetical subgroup of students that may be in my classroom. I am referencing any information based on students that I have taught that fall into a similar category as the hypothetical subgroup.

I will be teaching junior high and high school mathematics starting this fall at Hillman Community Schools. Hillman is a small district with a typical graduating class around 50-60 students. I will be one of two mathematics instructors for the Junior/Senior High School. I will teach eighth grade Algebra, Algebra II, Algebra II A & B, and Pre-Calculus. The eighth grade Algebra course consists of all of the eighth grade students. How well they do in that course determines their course schedule for high school. If they are able to receive a C+ or better, they may skip Algebra I and continue on to take Algebra II, Geometry and Pre-Calculus. If they were not able to get a C+, they would take Algebra I again, followed by Geometry, Algebra II A and Algebra IIB.

The group of students that I am developing my plan for would be in the Algebra II A course. These students struggle with math, especially the abstract nature of Algebra. One of the most difficult parts that these students face is being able to understand the text. If a student is looking for extra examples or explanations, the text is a highly regarded source, but if a student has difficulty understanding the mathematical explanations, it is just another source of frustration. These students also struggle with word problems and communicating mathematically.

The group of students struggle with the understanding of their mathematics on various levels. They are unable to conceptualize mathematics topics, connect their prior learning to new concepts without directly being told, and communicate (orally or written) about their mathematics concepts. These students do not receive any special services and are not diagnosed with a disability. Since the students struggle with conceptualizing mathematics topics, they do not participate often in class and often do not finish assignments; they quickly give up when they do not understand a concept. The students do have a few strengths in their mathematical learning. Once these students gain an understanding of a concept they are able to remember that concept and even teach someone else about the concept, though they may not use the correct terminology in their communications. These students are also very visual and hands-on learners, if they are able to see a concept or use a hands-on tool to develop a new concept, it occurs more easily for them. Since these students struggle with their mathematics, they have been turned off to mathematics. It is often heard from them "I just can't do math" or "I hate math" or "I have never been able to understand math." This can be very difficult to overcome, even when a student does gain an understanding of a concept, it is seen as a "fluke" to the

student and they still believe they “cannot do math.” This group of students needs extra motivation to try or continue trying if they are unable to understand a concept; usually they will give up if they do not understand the concept right away.

II. Curriculum:

I expect that the students are able to communicate mathematical concepts effectively. They should be able to explain to someone else about a math concept in the correct terminology that another student would be able to understand. They should also be able to connect new mathematical concepts to previously learned concepts. Reading about new mathematics concepts should be easily understood and able to be applied to other lessons.

There are many ways that I can use to see if the students are achieving the goals listed above. In order for students to convey that they are able to communicate mathematical concepts effectively, I would have to observe the student communicating with someone. I would be able to find out if they can communicate concepts effectively by having the student answer questions directed from myself, either in front of the whole class (they could answer a question that I directed to the class) or in a one-to-one discussion (initiated by either myself or the student). In either case, I would be looking for correct “steps” or “directions” on how to do something, being able to reason why we would perform those steps to solve the problem, and using the correct terminology (for example, if we were discussing triangles, knowing the difference between obtuse, right, acute). I could also observe the student communicating with another student, for example if they were helping a student with a problem, I would want to see the same things previously stated. It is important for students to be able to read about new math concepts and be able to understand the “mathematical language” used by textbooks. On occasions in class, I have students read from the text about a new concept on their own and try a few problems based on their reading. I am able to see which students are able to read and understand mathematical concepts, and which students struggle with this.

In order to effectively communicate mathematical concepts, the subgroup of students that I am focusing on will have their own goals. I would like the students to be able to read and comprehend about math concepts. Since these students struggle with their reading comprehension, especially their mathematical comprehension, this will be a specific goal for them to achieve their mathematical communication skills. When the students are able to read and comprehend their reading, they can begin to communicate to others their comprehension.

III. Technology:

I believe that technology should be used in the classroom as an aid to students understanding. Technology can be a great tool in the mathematics classroom to help students visualize a concept. There are many great programs that allow students to investigate, explore and visualize concepts. These can be used so that students are not being told how to do something, but learning how or why on their own. Technology can also be used as a way of communication for students, whether that communication is with other students across the world, or with students in their own classroom. Students can communicate with technology by using a variety of programs or applications. For example,

students would be able to communicate with the teacher and other students about homework problems, fascinating math topics or games, etc, in many technology applications such as EduBlog. EduBlog is an educational friendly blog site which allows teachers to have more control than a typical blog site. Students could also communicate to each other during projects using such mathematical software as Cabri Geometry. Students can use this program to explore a wide variety of concepts and can work together with each other in projects and assignments.

Students with disabilities (and even those without) can benefit from visualizations and hands-on inquiry through technology. Students are able to go past the difficult rules, procedures and steps that can be a struggle for many math students and use technology to gain a better understanding of mathematics.

Although it can be helpful at times, and can be fun for students, I do not think technology should be only used to drill or test students. I think students can gain from both of these applications of technology (and the teacher can easily see students understanding), but I think there are many more ways to use technology in the classroom- these should not be the only ways. As I stated above, I think that technology can be a great way for students to investigate and use inquiry.

In my classroom and school, there are great resources for my technology use. In my classroom I have a total of eight computers. There is also a projector that can be linked to my computer, clickers for each student, graphing calculators for each student (with Cabri Geometry on them), overhead screens for the graphing calculators, computer-based laboratory systems, and a few programs that go along with the textbooks that can be used to assess the student learning and give extra problems/explanations for help. Since I have not been able to have access onto the computers yet (the techie does not come in until closer to the start of the year), I do not know the additional programs that would be on the computers. I also know that the school has at least one computer lab for my use, but I would have to sign up for the use as all of the Junior/Senior High teachers use it. I look forward to learning more about what programs are already available for my use.

I would assume that the students in my classroom have quite a bit of experience with technology and should have good technology skills. Computer courses are required for the students to take, so they will have experience working on the internet and using programs such as powerpoint, word, excel, etc. I know that the previous math teacher integrated clicker use and tried to keep the students using technology in the classroom, so they will have had experience from his teaching.

IV. Literacy Toolbox and Toolbox Implementation

Five technologies that would be in my literacy toolbox to use to help achieve the goals given above would be Kurzweil 3000, Clickers (classroom response systems), Cabri Geometry, EduBlogs, and Delicious. I feel that these five programs can help this group of students (and the other students in my classes) overcome their mathematical difficulties and achieve the goals that I have set for them. I will go into more detail for each program and how I feel it will help the group of students.

Kurzweil 3000 (<http://www.kurzweiledu.com/kurz3000.aspx>) is an excellent reader program that goes beyond just reading the text. Students are able to gain more information about their reading through the use of Kurzweil. Kurzweil allows the students to look up definitions of words, gain further information about a topic on the web, and allows teachers to supplement the text in many ways. Through my review of this program and reading the reviews of others that looked at similar reading programs, I feel that Kurzweil 3000 would be the most beneficial for the students in my class because of all of its extra capabilities. Kurzweil would be used by the group of students that I have selected. These students struggle with their reading comprehension. Kurzweil would allow them to read the text out of the book (there is a CD with all of the text online that could be easily used with this program), and further gain understandings of unknown words or topics by being able to look it up on the internet. I could also add in additional information (whether it is additional examples or further explanation or questions for them to answer while reading the text) to their reading through Kurzweil. Through the use of Kurzweil, I think that the students would be able to better read and comprehend math topics. This program could be used whenever students are asked to read from the text, or when they need extra help in understanding a topic. This can be a program that they go to whenever they need extra help from the text.

Clickers, or Student/classroom Response Systems (one CRS: <http://www.irespond.com/>, information about CRS's: http://www.vanderbilt.edu/cft/resources/teaching_resources/technology/crs.htm) are already in my classroom and I look forward to using them with my students. Clickers allow a teacher to immediately receive feedback on how a student or class is understanding a concept; thus allowing the teacher to know if more time needs to be spent on a topic or if the students are ready to move on. It is also fun for the students, and from our readings I have found that they also help improve the overall motivational level of the classroom. All of the students in my classes will use this program, as it is a great way for me to assess their level of understanding. Also, this gives the students an opportunity to have practice with multiple choice questions to help them prepare for standardized tests, since I do not typically make tests in my classes multiple choice responses. Clickers would be used anytime that I wanted to assess the students understanding of a topic, whether that be for review before a test or quiz, or after we have covered a concept to check their level of understanding. The most beneficial aspect of this program for the students that I have focused on would be my ability to look at each individual student's understanding of a topic. If I assign specific clicker numbers for each student, I can (at any time) go into the software and find out the level of individual student understanding. If I feel that one of these students need extra help, I could put them on the computer with Kurzweil, or I could spend extra time working individually with those students. This ability would allow me to help them improve their mathematical understanding of any topic we cover.

Cabri Geometry (<http://www.cabri.com/>) is a great interactive learning program that helps students gain a better understanding of a wide variety of math concepts. Instead of students being told about similar triangles, they can instead manipulate and investigate similar triangles themselves, for example. This allows students who are struggling with their reading and comprehension skills to gain an understanding of a new concept without facing the difficulties of reading text. Even though the program is called Cabri Geometry, concepts from algebra are can be used with this program as well. This

program will be used whenever we cover a topic that can be used on Cabri. This program can be used in a way so that students can work individually or with others, or it can be used as a demonstration tool. Either way Cabri is used, it can help any student with their concept understanding. When working with others on this program, a student can improve their mathematical communication skills. By being able to describe what they did on Cabri, they improve their ability to communicate math effectively.

EduBlogs (<http://edublogs.org/>) is an educational blog site that allows teachers more control over their classroom blogs. I would like to use this blog as a way to get extra information to the students and a place for them to ask/answer questions. This blog would be used by all of the students. I would set up a blog for each class and students would be allowed to post questions and responses to the blog. Students can use this blog not only to remember what the homework assignment was, but also receive help from each other or myself on homework problems. Students would use this blog when they are not in the classroom, so that they are still connected to others and able to work through any difficult concept. This would allow those students that are struggling in their concept areas to gain a better understanding through communicating to others.

Delicious (<http://delicious.com/>) is a bookmarking site that allows you, or others, to access your bookmarks even when you are not on your personal computer. This is a great way to create a list of resources for students to use in and out of the classroom. Sites that I would save onto delicious would be accessible to all of my students through the classroom blog. These sites would be added resources to help them with their homework, basic concepts or just to have fun! There are many tutorials on the web that help students gain an understanding of math topics. Some sites include: <http://mathforum.org/students/> and <http://www.webmath.com/>. These would give extra help and guidance to the students that I have focused on when they are not in the classroom. Having a great list of resources available for the students to use would allow them to easily work through difficulties at home without the stress of having to find a good teaching site.

In order to implement my technology plan, I will have to purchase some programs and complete some preparation before it is ready for student use. I do not know if Hillman has Kurzweil, so if they do not, I would have to get the program for the class to use (if they have a different reader program that is available, I may review that program and see which is best for my students). Although this would be a large investment, I feel that not only will it benefit my classroom; it can benefit any subject area as well. There are also many grants that I can apply for to help offset the schools cost. Cabri Geometry is available for the student use on the graphing calculators, and can be project to the whole class from the graphing calculators and a program called TI Connect. I am unsure if the computer version is available for my use; if it is not, I may consider purchasing that- it has many more applications than the graphing calculator version. The clickers are already available for my use in the classroom. I would not have to purchase anything to use EduBlogs or Delicious. I would however have to spend time preparing for the use of clickers, EduBlogs, or Delicious in my classroom. I would have to set up any questions that I would want the students to use for the clickers; though this would not be very difficult, the software that comes with the books have questions set up for each topic covered. To prepare for the students use of the blog or Delicious, I would need to set up the blog and its settings to allow the students to comment and respond on the blog and I would need to gather websites that I feel would be beneficial

for the students onto Delicious. Since I already have the knowledge of how to use this technology, I do not think I would need any additional training.

V. Evaluation

Kurzweil 3000: I will collect the group of student's notebooks once a week to check how their homework is improving based on the use of Kurzweil. By looking at their homework/classwork problems, I will be able to see how Kurzweil is improving their skills. The more problems they have correct the more Kurzweil is helping in their understanding of the text. If their ability continues to improve, it will show that Kurzweil has helped the student(s) comprehend the text and improve their math skills.

Clickers: Since there is immediate feedback given with the classroom response systems, it will be easy to evaluate how the class as a whole, or individual students, are improving because of the use of the clickers. I can track student and classroom progress any time that I use the clickers in class. I can also easily look back on previous progress made and see who needs individual help or what topics the entire class needs more time on. It is a great program because of its easy ability to evaluate how it is helping the students.

Cabri Geometry: I will collect assignments after we have used Cabri Geometry to check if their understanding is improving because of the use of Cabri. If student understanding is higher after the use of Cabri compared to after a traditional note/lecture lesson, I will be able to see that Cabri is improving student understanding. If their ability continues to improve when students use Cabri, it will show that Cabri has helped students understand mathematical concepts and improve their skills.

EduBlog: I would observe student improvement of those that actively post and respond in the blog. If a student posts a question on the blog, I can observe their understanding of that concept the next day in class and also on quizzes and tests covering that topic. I can also check for understanding when I collect assignments on a weekly basis.

Delicious: This will be the most difficult technology to evaluate. The biggest problem is that since I would have the students use this as a resource at home, I do not know how often they are using (if at all!). I would have no way to evaluate whether or not this is helping them gain a better understanding of their mathematical concepts. But, I do not feel that that is enough of a reason not to use it. I can teach the students how to effectively use these resources when they are outside the classroom and hope that they are using it. It is a free resource and requires very little time and effort to compile a list of websites that would help students at home, thus I feel that it would be beneficial to make. Students will use it, how much it helps, may be more difficult to track. I could periodically survey the students' use of Delicious and if they feel the sites have helped them; but again, this might not be a great evaluation to see if it is helping them achieve the goals that I have established.

I think the biggest problem that I will face will be knowing how effective a technology is for a student. As I went through how to evaluate how effective the technologies will be in helping the students achieve the goals I have mentioned, I have found that it will not be an easy task. As I had

mentioned above, Delicious will be very difficult to evaluate. If I expect the students to use Delicious outside of class, it will be incredibly difficult to track how effect it is. Another limitation will be the additional time that will be needed to prepare for the use of the technologies. As a first year teacher, I already have a lot on my plate! But if these technologies can help student understanding and comprehension, it is worth the extra time and effort on my part.