**NORTHCENTRAL UNIVERSITY**
**ASSIGNMENT COVER SHEET**

Learner: **Steven Diaz**

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| **LTM5003** | **Dr. Amy Peterson** |
| **Educational Applications of Educational Media** | **Assignment 2: Technology Integration Planning Model** |

**Dr. Peterson,**

**This assignment came in at the appropriate time in my teaching career. I have been considering integrating a new web-based math program in the basic skills math courses that I currently teach at St. Thomas University. The TIP model helped me focus on areas that I would have usually not considered until after experiencing with the technology in the classroom. Before this assignment, integrating technology in my classroom was based on informal planning, my ability to visualize how I could use the technology, and my own observations of it worked. From this assignment, I learned the importance of planning carefully the integration of technology and making instructional decisions based on the data collected form the action research plan.**

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# Technology Integration Planning Model

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## Phase I: Determine Relative Advantage

As many other higher education institutions in United States, St. Thomas University (STU) offers basic skills or remedial courses to those students who are not prepare academically for the rigor of college courses. According to a report of the National Center for Education Statistics (2003), 28% of nationwide entering freshman students in the Fall of 2000 enrolled in a remedial reading, writing, or mathematics courses, and 22% of freshman students enrolled in a remedial mathematics course. In the Fall 2006, there were 563 new undergraduate students enrolled at STU (Fact Book, 2007) and there were five sections of remedial math courses with an average of 20-25 new undergraduate students per section. These five sections represented approximately 18%-22% of new students taking remedial math courses, which is similar to the nationwide proportion of the Fall 2000. In other words, there is a considerable number of students taking remedial courses, and it is one of the main concerns for improving students' retention at STU.

I have taught all the basic skills mathematics courses (i.e. MAT 098 Arithmetic Review, MAT 099 Introductory Algebra, and MAT 100A Intermediate Algebra) at STU for the last 2 years. My instructional method has consisted of a combination of passionate lectures and using computer software as tutorials and drill-and-practice. In addition, I provide incentives to students for using the tutoring services available in the Academic Enhancement Center (AEC). I have been praised for increasing the number of students passing the remedial courses; however, I am still not satisfied with the overall performance of my students. The average test scores for each basic skills math course is approximately 65-67% and the average proportion of students passing a remedial math course is still below the 75%, which I set up as a goal when I started teaching at STU.

After thorough reflection of possible reasons for the overall performance of my basic skills math students still below my expectations, I have identified that my instructional method is mostly based on traditional class lectures, which according to the head of the National Center for Academic Transformation (NCAT), Carol A. Twigg (2005), class lectures are not appropriate for basic skills math courses. In my lectures, I am constantly using visuals, detailed demonstrations and jargon-free explanations and asking frequent questions to generate discussions, but I have noticed too many students tuning out during my lectures. I do not see them actively engage in the learning process. Students are physically in class, but they are not carefully listening what I am saying and observing what I am showing on the screen or board. Few students are taking notes or asking questions for clarification. In many instances, there are students who do not come prepare for class, lacking the essential supplies to do math such as pencil and paper. Students' participation in class is minimal and to encourage their participation is almost an arduous task. Many of them spend class time engage with their cell phones or falling asleep, even when I have warned those students about the consequences of these actions.

Many students start working on the computer homework assignments but do not complete it. They are not spending time after class to practice and study math, which is essential to grasp fully the math concepts and skills. In my opinion and from my experience, many students are lacking the motivation, commitment, initiative, and determination to pass the basic skills math courses. For many of them, basic skills math courses are irrelevant and redundant since the content of these courses is equivalent to middle and high school mathematics. However, they are not fully prepared to handle the rigor of the higher level math courses.

In an informal survey done on 2006 with all UNI-101 University Preparation courses at STU, math anxiety was identified as one of the major concerns or obstacles for freshmen students to

succeed academically. I have realized that my reliance on class lectures is probably augmenting my students' math anxiety and negative attitudes toward this subject, even though I am always available and accessible for help, give additional opportunities to improve students' tests scores, and constantly motivate students to do their best. Twigg (2005) pointed out that students' success rates in basic skills math courses will not improve if instructors of basic skills math courses continue teaching with the same instructional method (i.e. class lectures) that did not help students succeed the first time they were exposed to the same course content during high school.

When using class lectures, I am not considering the previous experiences that my students have of the course content. I am assuming that all my students have the same difficulties with mathematics instead of considering their individual needs. In many instances, I have used the cliché *math is not a spectator sport* with my students to emphasize the importance of doing math problems to fully grasp the concepts and skills. However, I am still using an instructional approach that barely provides the opportunities for them to learn by doing during class time.

I once taught introductory math courses in another university where the instructional model was not based on the traditional class lectures, and which the role of the math instructor was more a facilitator of knowledge than a lecturer. Students were using a web-based math program (i.e. MyMathLab) to learn, practice, and master the course content, and the instructor was in the classroom to monitor students' progress and to provide individual or small group instruction when necessary. Students completed the course objectives at their own pace but with a suggested schedule that helped them identify how far ahead or behind they were in the course. Several students took advantage of the self-pace learning to complete the introductory math courses sequence within a term, which allowed them to quickly focus their time and effort into

the courses of their chosen major. The most notable characteristic of this instructional model was that students were engage doing math during the whole class period. They were actively learning by doing.

My plan is to use a similar instructional model (as described above) in the remedial math courses at STU. I believe my students will become more actively engage learning the course objectives of the basic skills math courses with the technology integration of Assessment and Learning in Knowledge Spaces (ALEKS), which is a web based artificial intelligent assessment and learning system created by ALEKS Corporation, in partnership with McGraw Hill Publishers. According to ALEKS Corporation (2007), ALEKS will diagnose students' strength and weaknesses of the course content, it will instruct the student on those areas the student is ready to learn and it will continuously assess students' knowledge to ensure retention of concepts and skills. In other words, ALEKS provide an individualized learning experience based on students' previous knowledge and the course objectives. Students will stop being passive learners and will start taking ownership of their learning experiences.

In my opinion, instructional time will be used effectively and efficiently to provide intervention to those students who struggle and enrichment to those who excel. My teaching time will not be spent on those topics students already know. I also believe students' attitudes and confidence doing mathematics will improve; therefore, students will be motivated studying and practicing math to pass the course. Highly motivated students imply higher success rates and higher freshman student retention.

A main concern for using ALEKS in my classroom is the possibility that students use computers for non-academic purposes (e.g. visiting sites such as MySpace or Facebook, instant messaging, etc.) during class time. This implies that I need to spend more time and effort

monitoring or policing students' appropriate use of computers, so they stay on-task learning the course content. Another concern of integrating ALEKS is how long it will take my students to adjust to a different way of learning math. Most students' learning math experiences have been through class lectures, where the flow of math instruction was mostly one-dimensional: instructor to students. They are used to have the instructor being the only source and owner of knowledge. I foresee students having difficulties becoming actively engage with ALEKS since they will need to take the initiative and determination of pacing themselves to cover the course objectives and using all the available resources to construct and retain knowledge. I will need to spend considerable time and effort coaching students to overcome their over dependence on the instructor to learn math and help them become active learners. My last concern is the fact that I need to change my teaching methods from lectures to active learning strategies. I must go out of my comfort zone of being in total control of the instructional flow to let students take control of it. This change will take considerable amount of time on planning the activities and effort on avoiding spending too much time on lectures.

Overall, integrating ALEKS to enhance the instruction of basic math skills will have more benefits than continue using the current and traditional instructional model of class lectures. With the new instructional model, it will take me tremendous effort and time to change my role in the classroom learning experiences but it will help more students succeed in these courses.

## Phase II: Decide on Objectives and Assessments

There are several objectives for integrating ALEKS into the instructional method of basic skills math courses. The following objectives with its measurable outcomes and assessment methods will be used to verify if the objectives have been accomplished:

1. To improve the proportion of students who successfully pass a basic skills math course to 75%. This proportion will be calculated by counting the numbers of students who pass the course from the total number of students that enrolled in the course.
2. To improve students' average test scores to at least 70% for Arithmetic Review and Introductory Algebra courses, and to at least 80% for Intermediate Algebra course. Written cognitive tests will be given for each chapter covered in the basic skills math courses and the class' average test scores for each of those tests will be calculated.
3. To increase students' Accuplacer mathematics placement test score at least up to the minimum required to be placed in the next math course. The placement test score indicates readiness for the rigor of math courses. Students initially take the placement test as part of the school's admission requirement, and it is the reason for many of them to be placed in remedial courses. After completing a remedial course, students are required to take this test again to find out if there was improvement in academic readiness. The goal is that at least 75% of students who take the placement test at the end of the course will meet the minimum required placement score of the next math course.
4. To improve students' confidence and motivation of doing mathematics. Students' confidence and motivation doing mathematics will be assessed at the beginning and at the end of the course using a survey in Likert scale format, where a scale of 1 represents Strongly Disagree and a scale of 5 represents Strongly Agree, to find out if there was improvement before and after using ALEKS. The survey will consist of the following statements:
    a. "I believe that I can do math."
    b. "I can solve most math problems without a calculator."

c. "I do not feel anxious when doing math."

d. "I usually do not give up when I do not understand a math problem."

e. "I look for more information when I find a math topic interesting or challenging."

The goal is that at least 75% of the students in a course will have a higher average scale score of the survey questions at the end of the course than at the beginning of the course.

5. To incorporate activities that uses active learning strategies in my classroom on at least 25% of the total class time. I want students to not only learn from ALEKS but also from their peers and instructor. This objective will be assessed using journal entries to log the occurrences of active learning strategies that I used in the classroom and as a reflection of its effectiveness.

## Phase III: Design Integration Strategies

The purpose for integrating ALEKS in the basic skills math courses is essentially to redesign the current instructional model (i.e. class lectures supplemented with a drill-and-practice web-based math program) since I am not satisfied with the academic performance of my students and their confidence and motivational level doing mathematics. In addition, I am not satisfied on how I have been delivering instruction in these courses and a change is necessary to engage students to do mathematics and improve their performance by learning actively. Therefore, I will be integrating ALEKS based on the *Emporium* model suggested by NCAT. According to Twigg (2005), this model consists on eliminating class lecture meetings and replaces it with a learning resource center, where students learn from instructional software (i.e. ALEKS) and from using web-based or instructor-made learning resources and they have available personalized assistance when necessary. Twigg (2005) also states instructors who use the Emporium model, their students spend most of the class time doing problems, work on the content areas they do not

know instead on the areas they already know, and can find immediate assistance when they have difficulties with the material. In this model, students are actively engage in the learning process, as NCAT (2005) stated in their article *Five Principles of Successful Course Redesign,* "In moving from an entirely lecture-based to a student-engagement approach, learning is less dependent on words uttered by instructors and more dependent on reading, exploring, and problem-solving undertaken actively by students" (para. 8).

With the Emporium model, the learning environment for using ALEKS will be based on directed and constructivist strategies, which according to Roblyer (2006), a combination of both strategies will generate students' motivation to learn actively at their own pace and remedy their lack of basic math skills. Instruction will be focused on a single subject: to reinforce students' basic math skills (i.e. Arithmetic and/or Algebra). The following steps will be required to carry out and meet the stated objectives of phase II when integrating ALEKS in my classroom.

1. Contact McGraw-Hill sales representative to set up courses in ALEKS and get course codes for each basic skills math course that I teach at STU.
2. Install and test ALEKS plug-ins in all computers of the Academic Enhancement Center (AEC) computer lab.
3. Contact STU's office of information technology (OIT) for tech support in case security measures arise in many computers of the AEC lab.
4. Customize the content in ALEKS to match with the course objectives of each basic skills course and its textbook.
5. Create course syllabi, which will include a detailed explanation of how ALEKS will be used in the course and about the new instructional method (i.e. Emporium model), course

objectives, expectations, policies, and suggested schedule to complete the course objectives.

6. Create the survey to assess students' confidence and motivation in doing mathematics.
7. Set up a meeting with the director of the AEC to ensure there is always a tutor available in my courses to help me provide individual or small group instruction when necessary.
8. Set up a meeting with the tutors to explain their role during instructional time.
9. Hand out course syllabus and introduce the new instructional method and ALEKS to students on the first two days of class. ALEKS will not be used on the first two days to allow sufficient time for students to purchase the necessary materials (i.e. textbook and students access code). These two days will be used to introduce and model course policies, class routines and active learning activities, so students become familiar of the course expectations.
10. Administer survey for assessing students' confidence and motivation levels of doing mathematics on one of the first two days of class.
11. Demonstrate how to register and use ALEKS on the third day of class. Students will take ALEKS tutorial and take the initial assessment that identifies or diagnose students' strengths and weaknesses.
12. After the third day of class and until the end of the term, students will be using ALEKS to actively learn and do mathematics during class time.
13. Students will be engage (several times throughout the course) in activities that require them to collaborate with other students on those topics that most students are having difficulties or if I consider (from my experience) the complexity of the topic too high for

students. Active learning strategies will be used in these activities; in other words, the use of lectures is minimal.

14. Students who satisfactorily complete early in the term a basic skill course, they will be moved immediately to the next course in the sequence of basic skills math courses (e.g. moving a student from MAT 099 to MAT 100). This action will give students the opportunity to complete another basic skills math course within the same term. If they cannot complete the second course (e.g. MAT 100) within the term then they must register for the second course (e.g. MAT 100) in the next term and they will continue working on the last concept or skill worked in ALEKS for such course. If students satisfactorily complete early in the term the last course of the sequence of basic skills math courses then they will be excused for attending class the rest of the term.

## Phase IV: Prepare the Instructional Environment

All basic skills math courses have been scheduled to take place in the computer lab of the AEC, which contains 22 computers with fast Internet connection, and one of these computers is readily available to accommodate a student with physical disability. All computers have installed 2003 Microsoft Office Suite, a variety of media players (e.g. QuickTime, Real Player, etc.), and the application software that comes with Windows XP. Computers are not equipped with speakers; therefore, students must bring their head phones to listen audio. The lab also has a projector with white screen to display the instructor's computer screen and movies in DVD or VHS format. The lab also provides wireless Internet connections for students who prefer to use their wireless laptops, which will allow increasing the maximum capacity of students per basic skills math course sections up to 25, instead of 22 students. All computers are connected to three printers that are located in the AEC, one in the lab and two in the lobby of the center.

Using the Emporium model to integrate ALEKS in my classroom requires having additional resources readily available for students to refer and use during class time or at any time. Fortunately, I have been teaching introductory math courses for several years, in which I have created or found a wealth of resources (e.g. Power Points presentations, handouts, lecture notes, etc.) for my onsite and online courses. In additional, I have found several math web resources which I have saved in my Favorites folder in my Internet Explorer browser. However, I need to organize these resources in a manner that students can easily find what they need; therefore, I need to spend time reorganizing my Blackboard course shells and add new resources if necessary. In addition, I will be revising and editing the current resources that I have and improve these if necessary (e.g. adding speaker notes, graphics, and audio to the Power Point presentations). I want to create my own video lectures, which I will gradually do throughout the school year and include in the existing resources in my Blackboard shell.

Another set of materials that I need to plan and create are for the activities using active learning strategies. I recently learned about active learning strategies and want to explore, apply and experience these strategies with my students with using traditional (e.g. poster boards, index cards, markers, etc.) and Internet tools (e.g. YouTube, discussion boards, wikis, blogs, etc.). These activities provide the opportunity for students to learn from other students and the instructor and to reflect what they have learned from ALEKS.

Since STU computers do not use a firewall to restrict access to inappropriate sites; therefore, I need to create an Acceptable Use Policy (AUP) for my courses, which students must sign before using the computers or wireless connections in the AEC computer lab. The AUP will be discussed thoroughly during the first two days of class and the consequences for following the

policy. Copies of the policies for appropriate computer that are specified in STU Student Handbook will be handout and discussed during class.

From my experiences using computers, I believe that I am capable to troubleshoot common computer breakdowns. If the computer breakdown is beyond my ability to fix it, then I will rely on the prompt assistance from OIT personnel. If the computer technical problems cannot be solved immediately by tech support, or me then I will proceed with the following two options: (1) Convert the class time to a study group session using the course textbook or (2) dismiss the class with the condition students continue working with ALEKS at their own time, which I will corroborate if they did by using ALEKS' instructor monitoring tools. One of the advantages of using ALEKS is that the program is web-based, which implies that students can use ALEKS in any computer at any time.

## Phase V: Evaluate and Revise Integration Strategies

At this moment, there are no evidence to review and find out how successful the plan and strategies solved the problems that I identified in my classroom instruction as Roblyer (2006) suggested. Therefore, I have no information to decide making changes on the plan and improve its effectiveness and success. This plan will be implemented in the Summer 2008 term at STU when there are only few sections of basic skills courses and the class sizes are relatively smaller than the Fall and Spring terms. Using the data that I will collect from the summer course sections, STU's end-of-course student surveys, and the acquired learning experiences of using ALEKS during such term, I will identify areas of improvement before fully implementing the plan during the Fall 2008 term, when more students register to the basic skills math courses.

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