Proposal of STEM Mini Grant

Improvement of Student Learning and Participations using Online Learning Modules

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Introduction

In Engineering Graphics courses, the understanding graphic software is one of the key aspects for students to acquire in order to succeed in the course. However, in general, instructions and guidance that a faculty can provide during the class meeting period are extremely limited. This is because the meeting time of two and half hours a week is simply not enough to teach the key concepts and to provide step-by-step instructions of how-to-use the software as well. At the current time, students can just do their best during the class to follow my examples and practice their drawing or modeling skills using the appropriate software outside the classroom. Sometimes students rely on a number of YouTube videos for additional references but the necessary resources are not available sometimes. The main objective of this project is to create online learning modules for the engineering graphics courses, ENGR 1211 and ENGR 1212 using a software called “SoftChalk” so that students will have the right resources that they can use to improve their understanding of the course materials.

Literature Review

I was introduced to a software “SoftChalk” at a teacher-to-teacher workshop in the spring 2013. The presenter illustrates a many number of features of SoftChalk that would be very useful for this project. SoftChalk enables a user to create online materials quite easily. It provides a very simple platform so that a user does not need to have any knowledge of techniques to create web-pages. A user can publish the created modules to his/her learning platform, such as D2L so that students can use the modules simply by visiting their course website. SoftChalk also provides various types of assessments that can be embedded within the modules such as Crossword Puzzle, DragNDrop, Labeling, and etc. Students can complete the assessments by visiting the course website or by using their mobile devices.

Research Plan

As mentioned above, the main objective of this project is to improve students’ understanding of the course materials by incorporating online learning modules. More specific objectives are i) to improve students’ participation and grades for their assignments including homework and a group project and ii) to improve overall grade distributions for the courses. To achieve these goals, five learning modules will be created for each course, ENGR 1211 and 1212, i.e. a total of ten learning modules will be created in this research. These modules will be posted on iCollege and students will be able to use their choice of web-browser to access the learning modules. Students will be asked to complete each module in every two to three weeks during the semester. The learning modules will provide the basics of the two
programs Autodesk AutoCAD 2013 and Inventor 2013. Step-by-step instructions will be presented for different examples related course assignments and projects. The modules will also provide interactive assessments related to key concepts of the engineering design procedures and drawing/modeling approaches. The learning modules for ENGR 1211 and ENGR 1212 will be completed in Fall 2013 and Spring 2014 respectively.

The online learning modules will be created myself and there will be no additional participant at this stage. Once the learning modules are completed, all students in my ENGR 1211 and ENGR 1212 classes will be using these modules.

**Evaluation Plan**

The usefulness of the SoftChalk will be evaluated throughout the beginning stage of the project when the online modules will be created. Students’ performances in the courses of ENGR1211 and ENGR1212 will be analyzed at the end of fall 2013 and spring 2014 to assess the effectiveness of the online modules created by SoftChalk. The followings will be measured at the end of these courses.

- **Grades for assignments:** Based on the classes I taught in the spring 2013, 59 % and 78 % of students received grades equal to or higher than 70 in the ENGR 1211 and ENGR 1212 classes respectively. I would like to increase the percentage of students who receive a “C” or higher for the assignments by 5 - 10 %.

- **Overall grades for the courses:** Based on the classes I taught in the spring 2013, 68 % and 84 % of students received a “C” or better in the ENGR 1211 and ENGR 1212 classes respectively (The percentage for ENGR1212 is calculated considering two sections I taught together). The college average of students received a “C” or better are 74 % and 89 % in ENGR 1211 and ENGR 1212 respectively. I would like to increase grade distributions in my classes up to the college average.

For each learning module, I will provide a short survey to evaluate how effective the modules are in terms of helping students understand what are discussed in class and how to complete related assignments. At the end of the courses, I will ask my students to complete a survey to gather their evaluations for the effectiveness of the modules as well.

**Dissemination**

The results of this project will be shared with my colleagues in department and presented at the ASEE Southeastern Section Conference in March 2014, which will be held at the Mercer University in Macon, GA.