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Evolving Learning Environments in Information Technology Education

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ABSTRACT

The information technology instructional model involves not only the knowledge convey, but also the skills training. Information technology learning requires that students have opportunities to comprehend what they hear and read as well as express themselves in meaningful assignments or products. From the instructor standpoints, creating a learning environment for students becomes an import part of the course instruction. Evolving a learning environment for information technology classes adopting the cooperative learning approach is demonstrated in this paper.

Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other's learning. Cooperative learning helps build strengthened individual and team performance which in information technology class and helps produce more high quality graduates for tomorrow's information technology workforce.

In cooperative learning, the instructor acts as a facilitator, a tutor, a resource, but is not the source of the course's content—the students are, through their own research and analysis. The aim: fostering independence and critical thinking.

INTRODUCTION

Teaching information technology courses involves three main elements: logic training, theory instruction and hands-on practices. Thus, the information technology instructional model involves not only the knowledge convey, but also the skills training. Information technology learning requires that students have opportunities to comprehend what they hear and read as well as express themselves in meaningful assignments or products. Creating a learning environment for students becomes an import part of the course instruction. Generally speaking, in the traditional approach to information technology teaching, most class time is spent with the professor lecturing and the students watching and listening. The students work individually on assignments in the campus lab or at home, and cooperation is discouraged. However, lecturing is the most common, the easiest, and the least effective. Unless the instructor is a real spellbinder, most students cannot stay focused throughout a lecture: after about 10 minutes their attention begins to drift, and for longer intervals their minds are totally flying in the air and hard to catch up the contents.

Students' backgrounds and learning curves in information technology are very diverse. Some students can catch up the content in a one hour; some students may need one week to figure the contents. Creating a flexible and diverse learning environment in information technology instruction is the best way to assist students' study. Cooperative methods are very flexible and can be adapted for students with special needs. In diverse IT background settings, differences in students' computer skill proficiencies makes it necessary for teachers to modify the methods to ensure that information technology learners can participate fully with fellow team members. For example, teachers may ask one member of each team to be a project leader who helps students work together. In addition, activities that focus on skill development and teambuilding should be used frequently to facilitate problem solving and understanding among team members.

In this paper, creating a student learning environment—cooperative learning in information technology education is presented. Cooperative learning is a successful teaching strategy in which small teams, each with students of different levels of ability, use a variety of learning activities to improve their understanding of a subject. Each member of a team is responsible not only for learning what is taught but also for helping teammates learn, thus creating an atmosphere of achievement. Cooperative groups increase opportunities for students to produce and comprehend language and to obtain modeling and feedback from their peers. Much of the value of cooperative learning lies in the way that teamwork encourages students to engage in such high-level thinking skills as analyzing, explaining, synthesizing, and elaborating.

COOPERATIVE LEARNING

This paper will provide a general case discussion of a different information technology course using cooperative learning to evolving learning environments. The general case will be presented in four phases: pre-planning, planning, implementation and evaluation.

Pre-planning

The most important concept of the cooperative learning is the instructor plays a variety of roles—curriculum designer, tutor, resource, and evaluator. The difference between traditional lecture and cooperative learning is the instructor's task in cooperative learning is guiding without leading and assisting, without directing.

The role of students is also different from traditional lecture classroom setting. They must become team players with peers to grab the concept and learn the skills. They cannot afford to sit passively in the classroom and collect the information provided by the instructor (LaLopa, Jacobs and Countryman, 1999).

Planning

Team Building

When you assemble a team, you will bring together people who represent diverse experiences, skills, personalities and social backgrounds. Had you not brought these people together, they may not have naturally gravitated to one another to from friendships or social interaction. Yet now these people must work together to achieve a specific objective. Your job is to manage the interaction and unite these very different people to get the desired results.

The advantage is that the different experiences and skills provide you with tremendous opportunities to devise innovative solutions to the problem or task you face. The disadvantage is that the differences, if not managed properly can create endless stumbling blocks and make it difficult to achieve any results.

To this extend, the first stage is to form teams. Although there are many good models to form a team, the general rules of thumb are skill and knowledge diversity, and personality. Skill and knowledge diversity can be found from student background checking in the first day of class. Managing a diverse group, particularly one that contains individuals with strong or abrasive personalities, can be broken into three steps:

1. Identify basic psychology/emotional needs that are common to all team members.
2. Establish limits and ground rules that will help you manage future problems.
3. Minimize differences and maximize shared interests and needs to build cohesiveness among

In the first two weeks, students did not get into the main topics of the course. Instead, the first two weeks are spent building team and a team learning environment. Students learn how to build a team, build up team goal and how to work on the team activities as well as use the problem-solving tool and

techniques. Instructor can take advantage of this stage to give students some pre-assessment to review the pre-knowledge they should have prior to take this course.

The Syllabus

The syllabus can follow the traditional syllabus structure. However, the team rule and the cooperative learning instructional model have to be included in the components. The team rule includes the team building approach, team goal, team activities implementation and grading method. Students new to the team style may get frustrated by what they perceive as lack of structure, direction, and information. The cooperative learning instructional model section must clearly communicate goals and expectations to student. It must also provide the guidance and structure in order to have students learn process skills and how to effectively function in teams.

Implementation

Having taught at Purdue University, Davenport University and Lansing Community College, the author develops and implements the information technology cooperative learning methods to the following courses: Introduction to Computer Information Systems, Network Administration, E-commerce, Project Management as well as C++, Visual Basic and Web Programming. After the pre-planning and planning stage, the following procedure shows the implementation within the class.

1. Give students a short, well-formatted handout covering lecturing material, a case study or example, or a summarized text. Ask them to read silently. The study team works best when the material is moderately challenging or open to widespread interpretation.
2. Provide each group a team in-class assignment and ask them to work together. The main purpose of the team assignment is to help students to grab the concepts, systematically organize the key points and application disciplines. To this extent, the team in-class assignment should include the following five directions:
   a. Assess how well you understand the material.
   b. Clarify the contents.
   c. Crate examples, illustrations, or applications of the information or ideas.
   d. Identify points that are confusing or you disagree with.
   e. Argue with the text; develop an opposing point of view.
3. Reconvene the total class and do one or more of the following:
   a. Review the material together
   b. Quiz students
   c. Obtain questions
   d. Ask students to assess how well they understand and material
   e. Provide an application exercise for students to solve.

Evaluation

Grade will base on team performance and also adjusted for individual performance. Two peer performance assessments, three team exams, 10 in-class assignments as well as self-assessment journal have to be developed. The peer performance assessments are administrated at the middle and end of the semester. It can be developed as the Likert scale or open-end questions. The important idea is that it has be able to quantified later on.

An in-class team assignment is a good tool for equipping students to deal with specific puzzling problems that may surface. For example, in the programming language course, syntax debug and logic design are always the bid headache to students. Thus put give the team assignment and give them a few minutes to brainstorm strategies which any idea to implement the language and logic design. List their ideas on the board, throwing in one or two of your own if you have any input, and put the students back in their groups to try and reach consensus on the best strategies for what to do. Also, in-class team assignment serves as the individual attendance and contribution to the team. Students miss class a total of five times, including the ones they had accrued to that point. Each additional absence beyond the fifth would result in the student having his or her grade dropped one full letter grade unless the absence was due to illness and accompanied by a doctor's excuse or a legitimate school function that was accompanied by official explaining the dated and purpose of the event. Attendance improved dramatically from that point forward.

Often group conflicts stem from different expectations team members have for one another. To get teams off to a good start, have them prepare the self-assessment journal. In a few weeks into the semester, have the teams revisit their lists and evaluate how well they are doing in meeting the expectations the set for themselves. A self-assessment journal is a good tool for equipping students to deal with specific interpersonal problems that may surface. For example, after the instructor has gotten a few complaints about the slackers, the instructor might ask each team member to submit the self-assessment journal and review it with the whole team. Then, it can easy toe expose the problem and also build up the communication within the team members.

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