

SUPPORT TECHNIQUES TO ENHANCE STUDENTS' PROJECT-BASED LEARNING

Leong Siok Jen¹ and Tee Meng Yew²

¹INTI International College Subang, Malaysia (siokjen.leong@newinti.edu.my)

²Universiti Malaya, Malaysia (mytee22@yahoo.com)

ABSTRACT

The purpose of this study is to investigate the impact of using various support techniques to enhance students' learning in a project-based diploma level database management course. Project-based learning is a systematic teaching method that engages students in learning essential knowledge and life-enhancing skills through a use of authentic question and carefully structured tasks. The project was divided into three main phases, involving requirements analysis conceptual design and database system implementation using Microsoft Access. Students were assigned into teams of three to four members based on weak-strong selection techniques. This study was conducted for a period of 12 weeks, guided based on an action research design. The initial findings suggest that techniques such as setting ground rules, regular constructive feedback by the lecturer, using templates to assist thinking, peer-evaluation, questioning and self-reflection can enhance learning.

KEYWORDS

Project-based learning, Support techniques, Scaffolding, Group project, Database management, Action research

INTRODUCTION

In this era of rapid technological innovation, institutions of higher learning are faced with the challenge to develop highly qualified and trained graduates. Information systems (IS) education in general has been criticized for not producing graduates with the right set of skills, knowledge and attitude to meet the needs of the global and technological evolving workforce (Archer, 1983; Cardinali, 1988). In a recent survey of recruiters of graduates, 87% of those survey said that teamwork was very important for hiring graduate, 89% of recruiters indicated that communication and interpersonal skills are very important. (Ken *et al.*, 2005) In fact, the IS profession has stress that it needs graduates that are well educated in technical skills and also interpersonal, communication and team-oriented skills. (Ehie, 2002; Cardinali, 1988).

In a traditional approach to teaching there is an emphasis on students acquiring knowledge and less of the development of the above mentioned soft skills. In this regard, project-based learning can be a more holistic instructional approach to help students cultivate knowledge as well as soft skills. (Carlo *et al.*, 2005).

While, there is a longstanding practice in schools for "doing projects," but a lack of a universally accepted model or theory of Project-Based Learning (PBL) (Barrows, 1986) has diluted some of its potential benefits. Diehl *et al.* (1999) argued that authenticity, constructivism, and the importance of learning "new basic skills" were key components in attempting to describe the difference between project-based learning and general models that involved projects. PBL uses challenging questions or

problems, that involve students in design, problem-solving, decision making, or investigative activities; give students the opportunity to work relatively autonomously over extended periods of time; and culminate in realistic products or presentations. In PBL, the central activities of the project must involve the transformation and construction of knowledge on the part of students (Bereiter & Scardamalia, 1999). If the activities of the project represent no difficulty to the student or can be carried out with the application of already-learned information or skills, the project is an exercise, not a PBL project. In addition, PBL incorporates an authentic (not simulated) problems and where solutions has a clearly defined end product.

The potential benefits of PBL are well documented. For example, PBL when compared with a traditional curriculum found students in PBL was associated with better assessment of content knowledge (Penuel & Means, 2000; Stepien *et al.*, 1993), higher levels of student engagement (Belland, *et al.*, 2006) and increase in student motivation to learn (Bartscher *et al.*, 1995). Students who have engaged in PBL reported improvement in critical thinking (Mergendoller *et al.*, 2006), problem-solving capabilities, attitude towards learning and self esteem (Tretten & Zachariou, 1995).

Although PBL has numerous benefits, many instructors have found its implementation to be challenging. For examples, instructors may feel that projects take longer time than anticipated, classrooms may be disorderly, difficult to identify the level of support needed by students, to identify the appropriate technology to incorporate as a cognitive tool, and hard to design authentic assessments (Marx *et al.*, 1997). In addition, instructors often find it difficult to develop authentic problem scenarios that can develop students' inquiry skills and find it hard to facilitate multiple student groups that have varying abilities (Sage, 1996).

From the perspective of the students, they may face difficulties associated with initiating inquiry, directing investigations, consolidating their learning and managing time (John, 2000). Hence the effectiveness of project based learning as an instructional method may depend to a great extent on the incorporation of a range of supports implemented by instructors to help students in their learning (John, 2000). This is what this study sets out to do which is to understand whether the support techniques employed helped students in their PBL experience.

RESEARCH AND COURSE DESIGN

This action research was conducted for a period of 12 weeks. Data was captured in the form of teacher observations and reflections, student reflection, and student-created artefacts in order to assess the effectiveness of the technique implemented. The multiplicity of various data sources allowed for triangulation to promote validity.

The focus of this study is on a required Database Management course for a Diploma in Information and Communication Technology. Thirteen students took this course and they were required to undertake a project that spans over 12 weeks. Students were divided into three different teams of three to four students in a group whereby they were selected based on the weak-strong selection technique so that academically weaker students would gain the advantage of working with their academically stronger peers (Jones & Birtle, 1999).