Application of Web-Based Knowledge Community on an Engineering Education Course

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Abstract. To study on implementation of e-learning is a hot issue recently. There are so many researches on knowledge community, more and more of them focus on platform construct, e-learning construct, information technical and developing instruments. Even emphasize applications are at elementary education or secondary education. This paper has two main objectives. The first one is to empirically analyze the application of web-based knowledge community among undergraduate students who study on engineering education. The second is to specify the CSFs of e-learning acceptance by them. The course selected for undergraduate students who study on “Introductory of Engineering Education”. Both traditional learning and e-learning are application. Research results can find two interesting items. First, even in the Internet, students still think that teacher is very important who plays the role of guidance and teaching. The other one is part-time students need teacher’s assistance more than full-time students.

Introduction

E-learning, one of the tools emerged from information technology, has been integrated in many university programs. Besides there are several factors that need to be considered while developing or implementing university curriculums that offer e-learning based courses. E-learning is one of the new learning trends that challenge the traditional education that assumes the instructor owns the knowledge and deposits it into the passive students who attend the class [1].

Unlike traditional face-to-face learning environments, technology inserts a layer of mediation between course interactions. This mediation creates a potential barrier to the social context of learning. Thus, e-learning environments “can be both highly interactive and simultaneously isolating because of the inherent difficulties of developing cohesiveness and true connectedness among students” [3, p.210]. This lack of a shared environment occurs because e-learning appears to lack a shared learning space similar to that created in a traditional classroom [4].

Based on a comprehensive study by Selim (2007), the author integrated papers by Papp (2000), Benigno and Trentin (2000), Volery and Lord (2000), Soong, Chan, Chua, and Loh (2001), Dillon and Guawardena (1995), Leidner and Jarvenpaa (1993), Govindasamy (2002), and grouped “Critical Success Factor (CSF)” into four categories: (1) instructor; (2) student; (3) information technology; and (4) university support [5, 6, 7, 8, 9, 10, 11].

To study on implementation of e-learning is a hot issue recently. There are so many researches on knowledge community, more and more of them focus on platform construct, e-learning construct, information technical and developing instruments. Even emphasize applications are at elementary education or secondary education. This paper has two main objectives. The first one is to empirically analyze the application of web-based knowledge community among undergraduate students who study on engineering education. The second one is to specify the CSFs of e-learning acceptance by them. All results are contributions of this study.

Theoretical Background

On the industrial point, the knowledge community (KC) provides free and easy to use online communication tools to help people share, learn and work together. It is aimed at anyone with an
interest in bringing about positive change for people with health and social care needs (Care Services Improvement Partnership). Knowledge Community is an application framework that interconnects product modules for a flexible and extensible web environment (Knowledge Community).

E-learning refers to training initiatives which provide learning material, course communications, and delivery of course content electronically through technology mediation [12]. The current approaches for e-learning systems development remain ill-structured in their definitions and descriptions which limit tutors in their choice and use of them [13].

To use of web as an educational delivery medium (e-learning) provides students with the opportunity to develop an additional set of communication, technical, teamwork and interpersonal skills that mirror the business environment in which they will work [14]. Students may react differently to the online learning environment, depending on their own level and attitude [15]. With a variety of information and communication technologies, it is very important yet challenging to select and utilize appropriate media for different tasks [16].

Chen & Hsiang (2007) conclude benefits of developing a knowledge community: “When a company embarks on knowledge community-based e-learning, it needs to consider several issues: how to develop knowledge strategy, how to use information technology, how to carry out a knowledge procedure, and how to operate a knowledge community” [17]. These issues must be addressed in order to achieve organizational effectiveness and aggressive focus when working towards desired goals. Benefits of an efficient knowledge community can bring to a better organization environment include: learning curve improvement, quick response and efficient customer satisfaction (QR/ECS), increased experience sharing within an organization, a decrease in repetitive work, enhanced communication and innovation, efficient resolution of practical problems, and increased learning overall in relevant areas of growth [18, 19, 20, 21, 22].”

Research Methodology

The course selected for study on “Introductory of Engineering Education” and all of undergraduate students active and centered learning. Both traditional learning and e-learning are application. The former means that students had to be required attendance, regular textbook, and presence of instructor during the scheduled class time. The latter used are electronic student-student and student-instructor communication, asynchronous course material delivered through a course web, in-class active and collaborating learning activities, and student self-pacing pattern.

Data were collected through an anonymous survey instrument administered to 29 undergraduate students during the fall semester of 2017. Respondents for this study consisted of 15 females and 14 males. Among the students involved 21 senior students and 8 junior students. They took the same course offered by the College of Technology at the university in central Taiwan. Every student has a computer belong himself at least.

Base on the paper by Selim (2007) intended to specify e-learning critical success factors (CSFs) as perceived by university students. The published e-learning critical success factors were surveyed and grouped into 4 categories namely, instructor, student, information technology, and university support. Each category included several measures. All items used a five-point Likert-type scale of potential responses: strongly agree, agree, neutral, disagree, and strongly disagree.

Findings and Discussion

To Analyze the Application of Web-based Knowledge Community among Undergraduate Students who Study on Engineering Education

During community observation, students interact in a good condition and have reactions as the following: 1. Web-based knowledge community provides a wonderful learning environment to promote learning motivation. 2. The majority of students expected to learn from web-based knowledge community unceasingly. 3. Web-based knowledge community provides a chance for
multi-dimensional study. 4. Community can enhance integrated use of information technology ability. 5. Students are more self-discipline and toward self-directed learning. 6. More discussion, more sharing, more interaction, and more learning happened.

**To Specify the CSFs of E-learning Acceptance by Undergraduate Students who Study on Engineering Education**

For analysis of “gender” and “grade” by \( t \) test as well as four variables which CSFs in knowledge community. The “gender” is no significance, no different between males and females. Students of different grade have different opinions. They consider with “information technology” is important, also is “instructor”. On the “university support” is significance, that is, different grade students have different perspectives. The variable “instructor” and “information technology” have significance by one-way ANOVA. In variable “instructor”, part-time student is more significant than full-time student. The result in variable “information technology” is the same as “instructor”.

**Conclusions**

The study on critical success factors was a scale developed by Selim in 2007. Students think “Instructor” variable is the most important. As research of Volery and Lord (2000), instructor is one of critical success factors of e-learning. The same as research of Soong, Chan, Chua, and Loh (2001), Dillon and Guawardena (1995) and Leidner and Jarvenpaa (1993), Govindasamy (2002), they propose the importance of instructor’s mindset, characteristics, attitude, and teaching style further. Specially, part-time students think instructor is more important than full-time students. Research results can find two interesting items. First, even in the Internet, students still think that teacher is very important who plays the role of guidance and teaching. The other one is part-time students may be more limited of study time. They need teacher’s assistance more than full-time students, in order to reduce the pressure of study time. As results of Selim (2007), instructor’s attitude towards and control of technology, interactive learning and teaching via e-learning technologies are important factors.

It is e-learning time. Many researches study on knowledge community of web-based knowledge community. A lot of advantages of e-learning have been discussed as our research results. It is noteworthy that self-directed learning of students. Whether students prepare well or not and what readiness is need to study in the future.

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