A CONCEPTUAL RESEARCH FRAMEWORK FOR INVESTIGATING THE EFFECTS OF TEACHING PEDAGOGY AND TECHNOLOGY ON LEARNING PERFORMANCE IN ONLINE EDUCATION

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ABSTRACT

Using Internet technology to develop and support university online education programs has become a hot research topic in recent years. Online learning supported by technology is very different from traditional learning in traditional classroom, but many key issues influencing learning performance in online education programs have not been empirically investigated. This research aims to focus on two key factors, teaching pedagogy and supporting technology and examine the effects of the two factors on learning performance in an online education program. Based upon literature review, differences between online virtual learning environment (VLE) and traditional learning environment (TLE) are summarized and a conceptual research framework is proposed to guide the empirical investigation of the effects of teaching pedagogy and technology on learning performance. A survey will be conducted in the near future.

Keywords: Conceptual framework, teaching pedagogy, online education

INTRODUCTION

The use of innovative Internet technology to enhance university education has steadily increased over the years in universities. In 1993, Peterson's College Guide tallied only 93 "cyber schools" and four years later, the 1997 Distance Learning Guide included 762 such schools. It is estimated that 55% of the U.S.' 2,215 four-year colleges and universities had courses available off-site [11]. Internet technology has been used in university education and on-job training in different industries such as in bank and finance [21], military forces [20], and medicine and health industry [17]. According to the National Center for Education Statistics, approximately 58 percent of institutions of higher education are currently engaged in providing distance education [8]. Many of these universities are looking at the Internet as a way to facilitate their entry into this area of education. At the same time, there has been a large increase (300% increase between 1995-1998) in the use of web pages for classes in public research institutions and 500% increase for private institutions.

However, there have been many problems and difficulties with current eEducation programs and many important issues have not been fully understood and tested in empirical studies. Failure to understand these issues has become barriers for future development of eEducation. This current research intends to study effects of teaching pedagogy and technology on learning performance in eEducation program.

More specifically, following research questions will be examined in the current study.

- What are the effects of teaching pedagogy on learning performance of students in VLE?

- What are the effects of Internet technology on learning performance of students in VLE?
- Given a specific teaching pedagogy and Internet technology used in VLE, do students from different backgrounds (age, working experience, the major of first university degree, gender, or computer skills) have statistically significant different learning performance?

LITERATURE REVIEW

Learning Theories and Models Related to Teaching Pedagogy

Some well-known pedagogies include the instructor-center model (a model of one-way information transfer from an instructor to students) [14], learner-centered model (students learn most effectively through self-exploratory, self-discovery learning, and skills and knowledge acquisitions through their own experiences [5], learning-team-centered model (interactions and collaborations among students can improve learning performance) [14], and Problem-Based Learning Model (PBLM, a curriculum approach which helps a learner to frame experience as a series of problems to be solved and where the process of learning unfolds through the application of knowledge and skills to the solution of real world problems, often in the contexts of real practice [6]. PBLM is the teaching pedagogy chosen for the current study.

Teaching pedagogies adopted in university education are largely based on the behavior educational theory [9], objectivism educational theory [12], and cognitive/constructivism theory [5]. The relationship between PBLM and the learning theories/models are summarized in Table 1 ([2], [4], [12]).

Table 1. Summary of Learning Theories/Models here

Objectivism	Learning is the uncritical absorption of objective knowledge.	Transfer of knowledge from instructor to student.	Instructor houses all necessary knowledge.	Instructor is in control of material and pace.
		Recall of knowledge.	Students learn best in isolated and intensive subject matter.	Instructor provides stimulus.
Constructivism	Learning is a process of constructing knowledge by an individual.	Formation of abstract concepts to represent reality.	Individuals learn better when they discover things themselves and when they control the pace of learning.	Learner-centered active learning.
		Assigning meaning to events and information.		Instructor for support rather than direction.
Collaborativism	Learning emerges through shared understandings of more than one learner.	Promote group skills—commun-cation, listening, participation.	Involvement is critical to learning,	Communication-oriented.
		Promote socialization.	Learners have some prior knowledge.	Instructor as questioner and discussion leader.
Cognitive Information	Learning is the processing and	Improve cognitive processing abilities	Limited selective attention,	Aspects of stimulus can affect attention.

| Processing | transfer of new knowledge into long-term memory. | of learners.

Improve recall and retention, | Prior knowledge affects level of instructional support needed. | Instructors need feedback on student learning. |
| Socioculturism | Learning is subjective and individualistic. | Empowerment.

Emancipatory learning,

Action-oriented, socially conscious learners with a view to change rather than accept or understand society. | Anglos have distorted knowledge and framed information in their own terms.

Learning occurs best in environments where personally well known. | Instruction is always culturally value laden.

Instruction is embedded in a person's everyday cultural/social context. |

As shown in Table 1, the PBLM is supported by learning theories of constructivism (PBLM requires students to apply what they learn from textbook and other sources to solve real problems. In this process, students must construct new meanings from their learned knowledge so that they could solve real problems because existing knowledge from textbook normally does not provide solutions to real problems), collaborativism (group assignments used in PBLM would promote collaborative learning), cognitive information processing (the idea of learning by doing in PBLM could help transfer learned knowledge to long-term memory), and socioculturism (PBLM supported by VLE provides necessary space and room for each individual to learn based upon their own individual paces and subjective preferences).

Literature Review on eEducation in Virtual Learning Environment (VLE)

Empirical studies of eEducation are still in their initial stages. Many studies on eEducation in VLE are published in conference proceedings or books (e.g., [7], [10], [13], [16], [18]), though some papers are published in major MIS journals (e.g., [1], [2], [3], [4], [11], [12], [15]).

eEducation programs in VLE are different from normal education programs in TLE. Table 2 summarizes the main differences between the two [15].

Table 2. Differences between VLE and TLE here

	TLE (Traditional Learning Environment)	VLE (Virtual Learning Environment)
Time	. Students and instructor convene twice a week for 90 minutes . Students work independently on their assigned homework	. Students connect to the online classroom when they choose . Students work independently on their assigned homework
Place	. Students and instructor convene in a physical classroom . Students complete their homework at home, work, or a school computer laboratory	. Students connect to the online course from home, work, or a school computer laboratory . Students complete their homework at home, work, or a school computer laboratory
Space	. The instructor lectures during class time	. Students use online teaching modules

	. Students use their notes when completing assignments outside of class	. Students use the same online teaching modules to complete assignments
Interaction	. Students are able to interact face-to-face with the instructor during bi-weekly lectures . Students receive immediate responses to questions asked during class meeting . Limited interaction between the instructor and some students (individually) occurs via e-mail	. Communication occurs exclusively through electronic media (e-mail, discussion board) . Students post questions to the online discussion; responses are generally not immediate . Communication among all participants is ongoing
Technology	. An overhead projector allows the instructor to demonstrate the operation of the applications . Students sit at workstations during instruction and repeat the tasks shown by the instructor	. Students access the online material through a Web browser . Students access the communication technology through a Web browser
Learner Control	. Students cannot control the pace or order in which the material is presented . Students cannot skip over topics during the lecture . Students can ask for repetition of concepts or topics but do so rarely and almost never is there more than one repetition	. Students control the pace and order in which the material is accessed . Students are free to review or skip any lecture or components of it . Students can repeat entire lectures, or any component of them, at will and repeatedly

Many factors influence learning effectiveness and performance, including teaching pedagogy, support technology, profile of student, profile of instructor, etc. Figure 1 depicts a general learning framework in VLE [15].
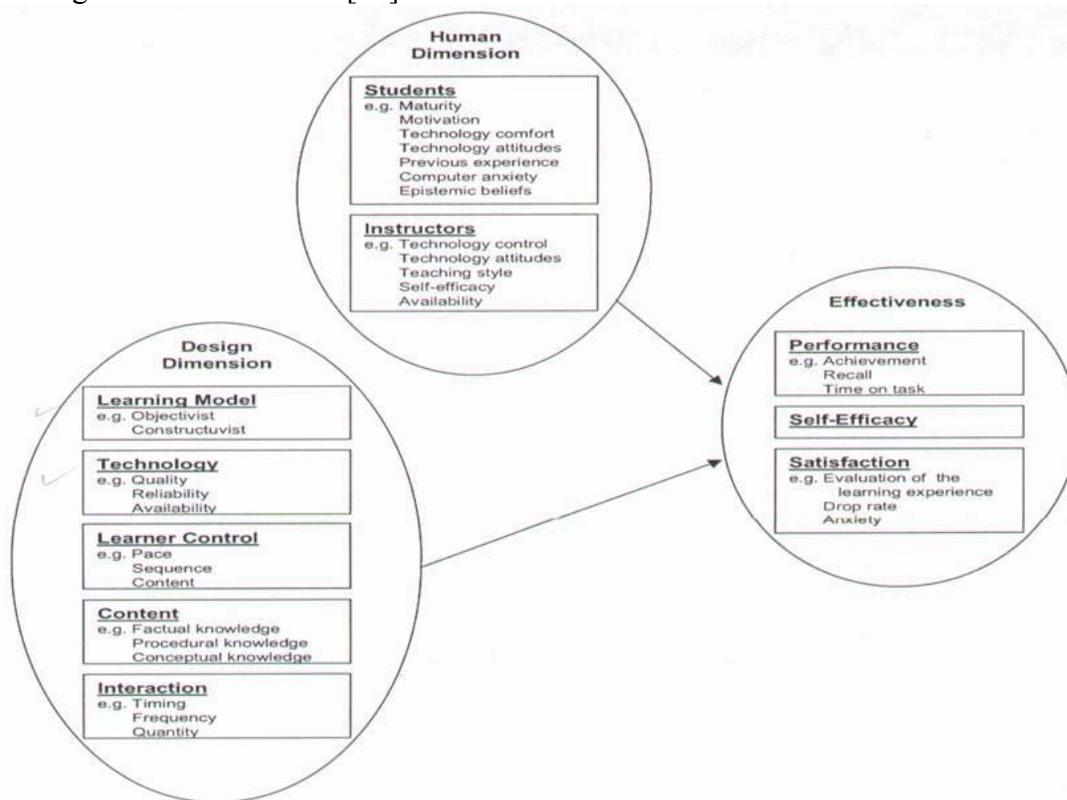

Figure 1. Factors Influencing Learning Performance in VLE

PROPOSING A CONCEPTUAL RESEARCH FRAMEWORK

Teaching pedagogy and technology are two of the most important factors influencing learning performance in VLE (e.g., [11], [12], [4], [15]). Based upon the above literature review, a conceptual research framework for the current study is shown in Figure 2.
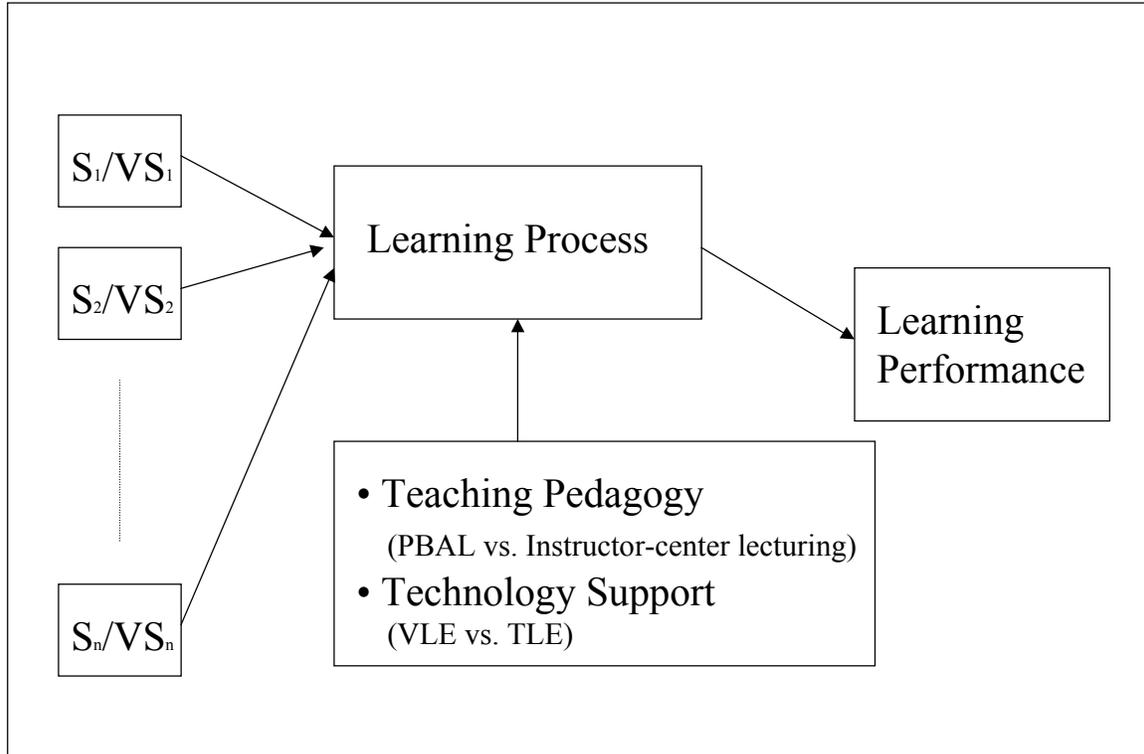

Figure 2. A Conceptual Research Framework

In Figure 2, students (S_1, $S_2, ..., S_n$) or virtual students (VS_1, $VS_2, ..., VS_n$) are involved in learning process, which is supported and facilitated by teaching pedagogy and technology. All other factors influencing learning process and performance, including course content, leaner control, profile of student, and profile of instructor, will be control variables in this study, (e.g., [15]).

A survey research methodology will be used in the current study. Survey subjects are second year MBA students enrolled in the MBAWB (MBA Without Boundaries) program of Ohio University. Launched in 1997, Ohio University's MBAWB has successfully used Problem-Based Learning Model (PBLM) and LotusNotes Domino Technology in its VLE. The MBAWB program has been ranked as one of the best accredited graduate business programs by US News and World Reports [19]. The MBAWB students normally have more than five years working experience and bachelor degrees that were awarded from traditional education programs rather than eEducation programs. The subjects will be asked to assess the effects of teaching pedagogy (PBLM versus traditional instructor-center learning model) and technology (VLE versus TLE) on their learning performance.

The learning performance will be measured from multiple perspectives, including self-efficacy, satisfaction, drop rate, attention of study, final course grade, recall of course content, and

learning participation. This kind of survey can be conducted periodically (e.g., annually) to assess the progressive outcomes of an online education program, so that the online education program could be continuously improved over time.

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