Using a Projective Technique to Investigate Students’ Mental Models toward E-Learning

CHUN-HUI WU\textsuperscript{1,2} SHIOW-LUAN WANG\textsuperscript{2} YIH-HER YAN\textsuperscript{3}
\textsuperscript{1}Department of Information Management
National Yunlin University of Science & Technology
\textsuperscript{2}Department of Information Management
National Formosa University
\textsuperscript{3}Department of Electrical Engineering
National Formosa University
64, Wen-Hwa Rd, Huwei, Yunlin, 63201 TAIWAN
melody@nfu.edu.tw

Abstract: - Though a growing body of literatures has been discussed with e-learning applications, there were few studies that focused on the individuals’ behavior on the adoption of e-learning systems. The purpose of this study is to investigate students’ perception of e-learning systems. A blend of qualitative methodologies was adopted including the ZMET method, means-end approach, and laddering process for data collection and analysis. The results showed that the majority of respondents in this study indicated the most important value of e-learning includes its convenience, lower costs, removal of time and location limitations, accesses on real time, interaction between peers and teachers, as well as it can help the promotion of environment protection. These findings should give valuable information to help institutions better allocate appropriate funding to effective factors of successful implementing e-learning initiatives.

Key-Words: - e-learning, projective technique, ZMET, means-end chain theory, laddering

1 Introduction
Concomitant with the marked development of information and communication technologies (ICT), it is not surprising that Internet applications such as the Web, e-mail, video conferencing, and virtual reality are commonly applied in the field of higher education. Electronic learning (e-learning) has a dramatic change on the modes of teaching and learning and provides a great way to remove drawbacks that are inherent in traditional classroom learning, especially its lack of flexibility in time and space [16]. Recent studies and statistics indicated that there is a significant growth of utilizing e-learning for delivering of their courses, both on campus and at a distance [3]. In line with this sense, Ozdemir & Abrevaya [14] found that technology-mediated education had spread rapidly among U.S. higher-education institutions between 1997 and 2000, those offering at least one technology-mediated course increased from 59% to 74%. E-learning has been used very widely to offer solutions for covering the massive demand for higher education towards student-centered in accordance with the demands of the knowledge-based society.

However, despite the emerging trend of using e-learning systems to facilitate teaching and learning activities, the user acceptance rate of e-learning systems is not increasing as high as expected [11]. E-learning courses have been argued that have a high rate of dropouts in comparison with traditional on-campus courses [12]. These phenomena have attracted much attention of practitioners and researchers to question what factors may influence the user adoption of e-learning. Essentially, a clear understanding of students’ thoughts and feelings could help institutions better allocate appropriate funding to effective factors and redesign or eliminate non-effective factors. This study, therefore, sets out to explore the following research questions: What are the mental models of students toward the value of e-learning?

Based on participants’ mental models, it is hoped to make more clear exposition about their perceptions and experiences as well as to explore what factors may has an impact on E-learning outcomes. An interpretative approach by means of the Zaltman Metaphor Elicitation Technique (ZMET), a qualitative methodology, was conducted to a University context.
Mental model is a map of the participants’ meanings about the personal relevance of a topic. Mental models allow various meaning representations to be included such as cognitions, attitudes, emotions and feelings, personal values, images, and memories of past consumption events [6].

2 Conceptual background

Literature review

2.1 E-learning related studies
Various issues and problems regarding implementation of E-learning are concerned in the technological perspective. From the viewpoint of technology, some researchers argued that the most primary factor impacting learning outcomes is more access to the technology [9]. Several technology features such as perceived flexibility, convenience, and availability have been examined to have effects on E-learning outcomes [4]. In general, access to learning system must be as easy as possible, and available on a just-in-time basis. If the assumption of technological optimism is correct, once organizations employ E-learning strategy, learning outcomes will get better. However, the technology innovation did not ensure helping users to learn more and better than in traditional training contexts [7][13]. In fact, many organizations have encountered various obstacles in delivering E-learning. For example, a study of 40 Global companies by the Forrester Group found that, unless forced, as many as 68 percent of employees would not enroll for voluntary online courses. Ettinger et al. [8] found the similar results that some higher educational institutes have not yet really recruited enough students to justify the viability of E-learning courses. It means that if there’s no driving force behind using the E-learning system, students or employees may just ignore it.

In contrast to technological optimism, some researchers have expressed their different viewpoints on e-learning, such as: “We do not believe that one single and typically simple approach to using technology to support learning will succeed. Instead, our starting point is not the technology per se but the educational process itself. To be more precise, we focus on educational issues or problems that might possibly be solved, at least partially, by the provision of learning arrangements that make deliberate, effective use of technology” [10]. Armed with the above argument, Alavi and Leider [1] pointed out that E-learning should not merely try to replicate traditional classroom learning but attempt to result in better learning outcomes. They further suggested that researchers should focus on relevant instructional, psychological, and environmental factors that will enhance learning effectiveness. Several researchers were also convinced that it is necessary to take into account more critical factors that will in turn facilitate learning in the near future. From the multiple roles perspective, Alexander [2] stated that successful E-learning takes place within a complex system involving the student experience of learning, teachers’ strategies, teachers’ planning and thinking, and the teaching/learning context. Schramm [17] showed that learning is influenced more by the content and instructional strategy in the learning materials than by the type of technology used to deliver instruction. In a similar sense, Wan et al. [19] suggested organizations and institutions need to re-think about the special needs of learners who do not have adequate knowledge, skills, and abilities to perform in virtual environments. Additionally, Weaver [20] argued that unless learners are highly motivated, they might not complete the training or absorb the learning.

2.2 The projective technique
ZMET is a hybrid methodology which integrates the visual projection technique, in-depth personal interview, and a range of qualitative data-coding method, such as categorization, abstraction of categories, and comparison of instances within data to elicit the metaphors, constructs, and mental models that drive consumers’ thinking and behavior. For improving qualitative research, ZMET uses multidisciplinary ideas such as cognitive neuroscience, neurobiology, art critique, literary criticism, visual anthropology, visual sociology, semiotics, the philosophy of mind, art therapy, and psycholinguistics to combine knowledge from the social sciences, biological sciences, and the humanities [21]. Metaphors, photo analysis, and narrating are key concepts used in ZMET, and each adds value to this research process. This technique achieves high validity since issues and structures emerge from the data collected by the respondents themselves.

ZMET has gained considerable interest and has been used in over 20 countries around the world by the world’s leading companies, such as AT&T, coca-cola, Motorola, AmericanExpress, to explore consumer and organizational issues [21]. ZMET has also been employed in numerous academic researches, and many studies have been published in several journals.
2.3 The Means–end chain theory and laddering

For assuming consumer’s knowledge to be hierarchically organized, spanning different levels of abstraction in the consumer's memory [15], the means–end chain approach attempts to uncover the salient meanings that consumers associate with products, services and behaviors. Means-end chain theory has been successfully applied to new product development, advertising strategy development, etc [5].

The focus is on associations in the consumer's mind between the attributes of products, services or behaviors (the means), the consequences of these attributes for the consumer, and the personal values or beliefs (the ends), which are strengthened or satisfied by the consequences. These linkages between attributes, consequences and values (A–C–V) are the means–end chains, the mental connections that connect the different levels of knowledge [15]. Means-end data can be gathered through the laddering process which is an in-depth, one-on-one interviewing technique for eliciting A–C–V linkages from participants.

3 Research Methodology

To address the research question, a qualitative research framework is presented in Fig. 1. In order to capture the mental of students who were facing the adoption of E-learning, a blend of qualitative methodologies including the ZMET method, means-end approach, and laddering process were used for data collection and analysis. Qualitative-based procedures were selected for this study for three reasons. First, this study seeks to deeply better understand what is actually happening in this learning environment. Second, it is hoped to obtain more in-depth information that may be difficult to convey quantitatively. Third, ZMET method provides opportunity for researchers to look at the phenomena in more varied and deeper ways than is possible through other traditional qualitative method.
(1). Storytelling: Provides participants with an opportunity to tell their stories. Because human memory and communication is story-based (Schank, 1990) describes the content of each picture.

(2). Missed issues and images: Participants describe any issues for which they are unable to find a picture to obtain and explain their relevance.

(3). Sorting task: Participants are asked to sort their pictures into meaningful piles.

(4). Construct elicitation: The laddering technique is used to elicit basic constructs and their relationships. Participants’ pictures serve as stimuli.

(5). Opposite images: Respondent describes pictures that represent the opposite of the task.

(6). Most representative picture: Participants indicate the picture that is most representative.

(7). Sensory images: Descriptions are elicited of what does and does not describe the taste, touch, smell, sound, color, and emotion of the concept being explored.

(8). The summary image: Respondent, with scissors used to cut photos, creates a summary image.

(9). The vignette: Participant is asked to create a story or short imaginary video that communicates important issues related to the topic under consideration.

(10). Consensus maps: All the respondents’ mental maps were merged to a consensus map, as shown Fig. 3. This consensus map presented over 80% of all constructs mentioned by any one participant.

4 Findings and Conclusions

The majority of respondents in this study indicated the most important value of e-learning includes its convenience, lower costs, removal of time and location limitations, accesses on real time, interaction between peers and teachers, as well as it can help the promotion of environment protection. This study’s findings of e-learning were consistent with past research. Additionally, respondents also pointed out that teachers play important role in determining the willingness to use the e-learning systems. As teachers bear primary responsibility for the impact of online learning, teachers should know what their students think of e-learning and should consider it in order to improve e-learning performance.

5 Acknowledgement

Thanks to National Formosa University for providing funds to conduct this study.

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**Fig. 3. Themed consensus map**
References: