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Understanding Cultural Influences: Principles for Personalized E-learning Systems

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Abstract—In the globalized e-learning environment, students coming from different cultures and countries have different characteristics and require different support designed for their approaches to study and learning styles. This paper explores the ways in which cultural background influences students' approaches to study and learning styles. Participants in the study consisted of 131 eastern students and 54 western students from an Australian university. The students were tested using the Study Process Questionnaire (SPQ) for assessing their approaches to study and the Index of Learning Styles Questionnaire (ILS) for assessing their learning styles. The results of the study led to a set of principles being proposed to guide personalization of e-learning system design on the basis of cultural differences.

***Keywords*—** Approaches to study, Cultural influences, Learning styles, Personalization, e-learning system.

I. Introduction

Human learning processes are very complicated and are influenced by various factors. In many institutions efforts are being made to make learning available at any time and place. One of the most popular ways is by providing the courseware through e-learning. Instructors in almost every field of study are trying, with varying degrees of success, to implement the concept of e-learning for their courses. Many groups of researchers have put effort into studying, surveying, designing and implementing programs to develop e-learning. Those efforts have shown that the new methods used in e-learning have the ability to be more interactive, provide a more convenient way to communicate between lecturers and students, and provide more suitable courseware for the students.

Despite such efforts many students, particularly among those learning through technology, drop out from their courses [1], [2], [3]. What is wrong with the design of e-learning? Do the researchers overlook very important factors that have influence on human learning?

There are different characteristics among students who come from different cultures and countries. Students from Eastern countries seem to be more passive compared to the students from Western countries [4], [5], [6]. Chinese and Vietnamese students tend to do well in studying [7], [8], [9]. Do culture and race influence learning success? In the learning environment, students who come from different ethnic groups and cultures require different support. "It is not possible, in the view of some scholars, to create a model of the good teacher without taking issues of culture and context into account" (p. 36) [10]. There is very little research on ethnic and cultural influence on human learning [11], [12].

The main purpose of this research is to provide design principles for a personalized e-learning system that takes into consideration aspects of cultural influences on human learning. Consideration of such influences may be essential if we wish to design a system that is suitable for students from different backgrounds.

II. Methodology

The study used a survey method with a paper questionnaire to gather information about the cultural educational backgrounds, approaches to study and learning styles preferences of a group of an Australian university's students.

A. Sample

For the purpose of this study, the term "eastern" is used to indicate Asian countries, such as China, Vietnam, Malaysia, Indonesia, Korea, and the countries influenced by Asian culture value systems. The term "western" is used to indicate the countries influenced by European culture value systems. The participants were 185 undergraduate students in Information Technology and Systems of an Australian university who volunteered to take part in the research. There were 131 eastern students (Chinese, Vietnamese, Malaysian, Indonesian, Cambodian, Korean, Indian, Thai and other eastern students) and 54 western students (Australian, British, and other western students).

B. Questionnaires

The questionnaire was divided into three sections. Section 1 was designed to obtain biographical and cultural educational tradition information. Section 2 comprised the 42 items of the Study Process Questionnaire (SPQ) developed by Biggs [13]. The SPQ is a questionnaire used to assess the student approaches to learning and studying. Table I gives a description of the three important approaches to learning

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(surface, deep and achieving) and their constituent motives and strategies as described by Biggs.

TABLE I
Motive and Strategy in approaches to learning and studying (p.10) [14]

Approach	Motive	Strategy
Surface	Surface motive (SM) is to meet requirements minimally; a balancing act between failing and working more than is necessary.	Surface strategy (SS) is to limit target of study to bare essentials and reproduce them through rote learning.
Deep	Deep motive (DM) is intrinsic interest in what is being learned; to develop competence in particular academic subjects.	Deep strategy (DS) is to discover meaning by reading widely, inter-relating with previous relevant knowledge, etc.
Achieving	Achieving motive (AM) is to enhance ego and self-esteem through competition; to obtain highest grades, whether or not material is interesting.	Achieving strategy (AS) is to organize one's time and working space; to follow up all suggested readings, schedule time, behave as 'model student'.

Section 3 comprised the modified 33 items of the Index of Learning Styles (ILS) developed by Richard Felder and Barbara Soloman [15]. The ILS is a questionnaire designed to assess learning styles preferences on four scales, *sensing-intuitive, visual-verbal, active-reflective,* and *sequential-global*. In this research, the scales of sensing-intuitive were discarded because of practical constraints. Table II illustrates the dimensions and definitions of ILS.

TABLE II
Dimensions and definitions of ILS

Dimensions	Definitions
Active	Learn by doing it, enjoy working in groups
Reflective	Learn by thinking about it, prefer working alone
Visual	Prefer pictures, diagrams and flow charts
Verbal	Prefer written and lecture
Sequential	Step by Step
Global	Big Picture

C. Procedure

The questionnaire was administered to students from all years of the Bachelor Information Technology and Systems degree. Students were assured of their anonymity and a written consent to answer the questionnaire was obtained.

III. Results And Discussion

A. Demographic data

The results showed that the majority of participants (71%) were eastern students with 40 percent being Chinese. The 29 percent who were western students included 21 percent who were Australian. About eighty percent were aged between 18 and 24 years and 17 percent were aged between 25 and 34 years. Only 1.6 percent were aged between 35 and 44 years. With regard to gender, 82 percent were male and 17 percent female. Information about the sample, in terms of ethnic background group, is summarized in Table III.

TABLE III
Ethnic background group data

Ethnic background group	Frequency (respondents)	Percent (%)
Eastern	**131**	**71.0**
Chinese	74	40.0
Vietnamese	10	5.4
Malaysian	8	4.3
Indonesian	6	3.2
Indian	9	4.9
Korean	2	1.1
Cambodian	5	2.7
Other Asian	17	9.1
Western	**54**	**29.0**
Australian	38	20.5
British	2	1.1
Other Western	13	7.0

B. Educational cultural background of the participants

The results showed some of the differences in the characteristics of eastern students and western students. From the survey results, 46 percent of eastern students indicated that their parents or family feel that high achievement in their education brings honor and prestige to the family while only 19 percent western students indicated the same. A number of the western students stated that their family wants them to do their best but do not feel that it brings honor and prestige to the family. About 83 percent of eastern students felt that their cultural educational tradition was teacher-centered which was higher than the percentage for western students (about 62 percent). Seventy six percent of eastern students claimed that they treated their teachers with respect while the majority of western students stated that they treated their teachers basically as equals (47%). About 60 percent of eastern students identified that rote learning was the activity that characterized the educational tradition in their culture while criticism and/or discussion was the activity in the western students' educational tradition (72%). In addition, in situations where the students disagree with somebody in their class, many of eastern students prefer to talk to the person privately (35%) while western students prefer to tell the class openly (55%).

C. Study approach scores of eastern and western students using the SPQ

Eastern and western students' approaches to learning scores and subscales scores were compared. The mean scores of the two student groups on the SM, DM, and AM subscales and on the SS, DS, and AS subscales are listed in Table IV. The deep motive and deep strategy were the most popular learning motive (mean = 24.2) and learning strategy (mean = 23.0) for western students. In contrast, eastern students have a different popular learning motive and strategy. Eastern students' scores were high on surface motive (mean = 24.5), surface strategy (mean = 22.3), achieving motive (mean = 23.5) and achieving strategy (mean = 21.4). With regard to study approaches scores, eastern students' scores were significantly higher than western students for surface approach (46.8 vs. 45.3) and achieving approach (44.9 vs. 38.2). For the Deep Approach the order was reversed (43.7 vs. 47.2).

The higher achieving approach of eastern students may result from the high expectation of parents or family that feel high achievement in education brings honor and prestige to the family. Moreover, the majority of eastern students are full-fee paying international students. Therefore, the eastern students have a high motivation to achieve good results in studying to show their family or a sponsor in their countries. The results support Biggs' argument that Asian students place high value on education achievement [16]. Shen and Mo [17] also stated that "Academic achievement and upward mobility are not viewed by Asian parents as personal matters but part of their children's obligation for the maintenance of the family." On the other hand, most of the western students have less pressure from parents or family to achieve a high grade. According to the survey results, most of the western students stated that their parents expect them to do their best but do not pressure them or feel that high academic achievement brings prestige to the family. In addition, most western students are Commonwealth Supported Place* students. Therefore, western students have less pressure to obtain the highest grades.

The higher surface approach scores of eastern students showed that they seem less interested in the contents of subjects. This may result from their educational background experience of learning by rote in a teacher-centered environment. When eastern students have to study in a new learning environment, they need to adjust themselves for survival. In addition, they may have language problems if English is not their first language. When eastern students have to read and write in English, they require more time and effort to study when compared to western students.

On the other hand, western students' scores on deep approach scores were higher than eastern students' scores. This indicated that western students are more interested in what they are studying rather than competition to get a high grade. Accordingly, Liu [18] claimed that "western people sometimes ridiculed the high prestige and importance in which examinations were held by Asian students" (p. 38).

TABLE IV
Approach scores and subscales scores of Eastern and Western students using the SPQ

Scales/ subscales	Eastern student (n = 131)	Western student (n = 54)	t-Test	Sig. (2-tailed)
Motives				
Surface	24.5(4.54)	23.9 (5.46)	0.6	.265
Deep	22.6 (3.98)	24.2(3.84)	-2.4***	.000
Achieving	23.5 (4.66)	21.6 (5.29)	-1.9*	.024
Strategies				
Surface	22.3(3.72)	21.4 (4.49)	0.9	.227
Deep	21.1 (4.28)	23.0(3.42)	-1.9*	.024
Achieving	21.4 (4.91)	16.5 (5.47)	4.9***	.000
Approach				
Surface	46.8 (7.38)	45.3 (8.85)	1.5*	.017
Deep	43.7 (7.36)	47.2(5.77)	-3.5**	.010
Achieving	44.9 (7.94)	38.2 (8.57)	6.7***	.000

*$p<.05$ **$p<.01$ ***$p<.001$

D. Eastern and western students' learning style preferences

Learning style preferences of undergraduate students in Information Technology and Systems have been determined using the ILS. According to Table V, active, visual and sequential learning styles were more popular among eastern students (51.9%, 82.4% and 55.0%) and western students (58.5%, 77.4% and 50.9%). The results also show that the percentages of eastern students were slightly more reflective, visual and sequential when compared to western students. Chi-square tests were performed to test for differences in learning style preferences between eastern students and western students for each scale. According to the chi-square test results, the proportion of eastern students and western students were not significantly different in learning style preferences for this sample study.

Table V
Learning Style Preferences

Learning Style Preferences	Eastern		Western	
	Freq.	Percent (%)	Freq.	Percent (%)
Active	68	51.9	31	58.5
Reflective	63	48.1	22	41.5
Visual	108	82.4	41	77.4
Verbal	23	17.6	12	22.6
Sequential	72	55.0	27	50.9
Global	59	45.0	26	49.1

* A Commonwealth supported place refers to a student's enrolment in a program towards which the Australian Government contributes to the cost of education.

IV. Principles For Designing Personalized E-Learning Systems

The study has shown that eastern and western learners have different study approaches and characteristics which are require different support in learning. Below are principles that need to be considered when designing a personalized e-learning system for students who have different cultural backgrounds.

- **Educational value differences**. From the survey results, eastern students and their families place high values on their educational results. Therefore, eastern students are more serious with their educational results than western students. In order to answer correctly in an examination, eastern students expect a very precise answer from their instructors. Instructors and course designers should be sensitive to this issue in providing online course materials for international students.
- **Educational cultural background differences.** The survey results showed that a common feature of eastern tradition educational backgrounds was rote learning. Therefore, eastern students are less likely to criticize or discuss their opinions in class. When designing a system, instructors and course designers need to provide activities for interaction in the early stages of the online course to encourage participation from the eastern students.
- **Cultural communication differences.** Eastern cultures tend to be high-context [19]. This means that people from eastern cultures are indirect, implicit and reserved in communication. According to the survey results, when eastern students have a difference of opinion with somebody in their class, most prefer to talk to the person privately or they may simply remain silent, as confrontation is seen negatively in their culture. While western cultures tend to be low-context, which means that they are direct, explicit and unambiguous in communication. Western students prefer to openly discuss disagreements in class. In addition, eastern students were more respectful to their teachers. They prefer to listen and get feedback from their instructors rather than peers [20]. Instructors and course designers should understand this difference as it might cause potential problems with discussion forms in the online learning environment.
- **Different language usages.** Language is closely related to culture. In a globalized e-learning system, students come from a variety of cultural backgrounds therefore, instructors and course designers should be aware of this issue. Using slang or local idioms may cause confusion to the students who do not have the same culture backgrounds. It is recommended to use relatively simple sentences for non-native speaking students.
- **Learning style preferences**. According to the survey results regarding learning style preferences, eastern students and western students were not statistically-significant difference in learning style preferences. However, students have different learning style preferences in each culture group. Instructors and course designers need to provide course material that takes into consideration students' individual learning style preferences.

V. Conclusion

This research has discussed the issues related to the principles for designing a personalized e-learning system that that takes into consideration aspects of cultural influences on student learning approaches and learning styles. The results revealed that students from different culture backgrounds have different learning approaches. In order to design a personalized e-learning system that can help to improve the learning ability of the students from different cultural backgrounds, the issues of educational value differences, educational cultural background differences, cultural communication differences, language usage differences and students' individual learning style preferences need to be considered.

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