

## **E-Learning Initiatives In E-Ducating Student Teachers**

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### **Abstract**

This paper reports a study of online learning at the School of Education and Social Development, Universiti Malaysia Sabah. It focused on the context of implementation and student perception on online learning in the school. The study involved 324 undergraduate students across all levels of study in the school. A questionnaire was used to collect data about their perception on the readiness of the school, the extent to which online learning was carried out, the opportunities and limitations of the learning mode, and student perception on online learning as a whole. Quest (Adams & Khoo, 1996), an interactive computer item analysis software, was used for data analysis. It was found that online learning helped to supplement the quality of teaching and learning. The students found that online learning was not only helpful, but also enjoyable and exciting. Online learning was perceived to be a better learning experience compared to face-to-face learning. It also helped students to take more initiative in their learning and development compared to the conventional classes. However, the school needs to improve the infrastructure and facilities of ICT for more effective use of online learning for the future.

### **Introduction**

Online learning is certainly gaining popularity in a lot of universities. This can be seen in the number of “traditional” universities now embracing online components to courses, online courses, and even complete online programs. Online learning is being utilized in a lot of educational programs worldwide (Harasim, Hiltz, Teles & Turoff, 1995; Hiltz, 1986, 1990) either exclusively or as a supplementary educational aid. With the advantage of distance and time insensitivity for the learning process, there appears to be a growing sense that this form of teaching and learning has strong pedagogical merit.

At the School of Education and Social Development (SESD), Universiti Malaysia Sabah, one of the principal strategies in teaching and learning is to incorporate new technologies in its program delivery to encourage the rethinking of pedagogical aspects of teaching, learning and assessment. This move of integrating advanced technologies into the regular on-campus teaching methods is intended to supplement traditional (synchronous) on-campus teaching. Beller (1998) echoes the importance of integrating new technologies and suggests that learning technologies provide universities with the opportunity for improved and more effective teaching of on-campus students through the integration of electronic multimedia

learning materials, special simulations and demonstrations; accessibility to a variety of knowledge data bases and experts; continuous contact with instructors and peers; better utilization of lessons for discussion and amplification (instead of the instructor's dictating the material to the students).

How do SEDS's student teachers feel about such a move towards incorporating online learning component into their regular on-campus activities? How do they perceive their own readiness and SEDS's readiness in embarking on this move to stretch the boundaries of the traditional university campus? More importantly, what is their impression of online learning as a whole? This study looks at the aforementioned issues and attempts to provide empirical findings to validate and fine-tune SEDS's effort in embracing online learning.

This paper reports a study on the innovative use of a Learning Management System (LMS) called 'Blackboard'. A survey was carried out to assess the degree of student satisfaction with various aspects of the online learning experience and their learning environments, which include perception on the readiness of the school, the extent to which online learning was carried out, the opportunities and limitations of the learning mode, and student perception on online learning as a whole.

## **Literature Review**

Adding e-learning to the event-driven world of the classroom opens up a multitude of learning possibilities. E-learning is a powerful tool to support the out-of-classroom experience. It can be integrated into current classroom curriculum, and related learning strategies, to help carry the learner beyond the confines of the classroom. From a pedagogical perspective web-based learning has many advantages over traditional techniques (Barnett et al., 1996). It has the potential to provide one-to-one teaching on a grand scale and allows students to work at their own pace in a fairly realistic and interactive way. The possibilities of fostering a deep-approach to learning in a safe environment are an attractive proposition and web-based learning is therefore undergoing considerable expansion in most Higher Education institutions.

The School of Education and Social Development (SESD) is no exception. Amongst other priorities, the School plans to provide at least 30% of its courses via the web by 2004. All the staff had already undergone basic training in using a Learning Management system (LMS) and the School is confident to surpass the target set. As such, a study on the context of its implementation and its impact on the students learning experience is timely.

A quick search through the literature produced some relevant findings on e-learning initiatives. Some common themes that have emerged across the literature on learning experience and the effectiveness of online environments include attitude toward technology, technological support, computer experience, prior participant knowledge, online learner skills. As, the present study explores each of these issues with regard to their applicability in a situation where on-campus undergraduate students take part in online learning hosted by the LMS, further elaboration on them would be desirable.

In the following section, we review the existing research in the areas of online learning environments with specific emphasis on online learner skills and prior experience, which are

among some of the areas of possible explanation for observed variance in student teachers' satisfaction and learning outcomes in their online experience.

### **Online learning environments**

In traditional classrooms, learning occurs within physical boundaries - for example, a classroom, a school, and field trips, and various other locations. By contrast, with online learning, learning can happen anywhere and anytime without the limit of physical location (Mayadass, 1977). There has been a lot of research studying pedagogical aspects of "online learning environments" (Hill, 1997), but relatively little research addresses physical characteristics of the overall learning environment, such as learning areas and internet connections. In this study, we specifically address the students' perceptions of the physical settings from which they connected to and used the LMS, and how that might influence their satisfaction and learning outcomes.

### **Prior Experience**

Various studies on online learning have shown that prior experience affects the success of online learning (Eastmond, 1995; Zoltan & Chapanis, 1982; Davies et. al., 1989). Familiarity with the technologies used in the online course is especially important for students who take a course online. Researchers have also argued that the successful implementation of any new technology depends on factors related to users' attitudes and opinions (Davies et al, 1989; Zoltan & Chapanis, 1982). Webster and Hackley (1997) studied the teaching effectiveness in technology-mediated distance learning and found a positive relationship between students' attitudes toward technology and their learning outcomes.

Presently SESD on-campus courses are moving fast to integrate computers and Internet technologies into the classroom to complement traditional face-to-face teaching. However, only a small portion of the content in traditional courses is actually presented online and there still exists substantial opportunity to interact face-to-face. Therefore in this study, we examine these two types of prior experience, that is, prior experience with technologies and prior attitude toward technology.

### **Methodology**

This study was conducted at the School of Education and Social Development, Universiti Malaysia Sabah. A set of questionnaire was used to collect data from 324 student teachers who were selected by cluster sampling. The data were analysed using Quest (Adams & Khoo, 1996), an interactive computer analysis software based on the *item response theory* (IRT) and Rasch *partial credit model* (PCM) (Hambleton & Swaminathan, 1985; Wright & Masters, 1982).

Quest analyses mainly involved the interpretation of variable maps generated by the program based on fixed-response data of the students teachers. The magnitude of effect (Carver, 1993; Cohen, 1988; Hunter, Schmidt & Jackson, 1982) was used to ascertain the relationship between independent variables such as seniority, the language background, and age with the online attitude score. The calculation of effect size was based on the formula:

$$ES = \frac{X_2 - X_1}{s_p}$$

where  $x_1$  and  $x_2$  are the means of the estimates of the respective groups and  $s_p$  is the pooled standard deviation of the groups which is computed from

$$s_p^2 = \frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1 + n_2 - 2}$$

where  $n_1$  and  $n_2$  are the sample sizes and  $s_1$  and  $s_2$  their corresponding standard deviations (Glass, McGaw & Smith, 1981). For the interpretation of effect size, the categories suggested by Cohen (1988) as summarised in Table 1 was adopted.

Table 1: Interpretation of Effect Size

<i>Value of effect size</i>	<i>Effect</i>
ES < 0.2	Nil
0.2 =< ES < 0.5	Small
0.5 =< ES < 0.8	Medium
ES >= 0.8	Large

## Instrumentation

To assess the physical setting of the online learning environment for the students, the post survey questionnaire included 2 sets of questions (Section C and D). In these questions the students were asked to indicate their perceptions of *Equipment Access*, as well as the ease of *Internet access*.

Prior Experience included prior *experience with technologies* and prior *attitude toward technology*. In this study, prior experience with technologies (Section B) was assessed with a three-point scale survey that asked for the students' ratings of their own involvement with technologies. Similarly, attitude toward technology was assessed with 6 dichotomous pairing of key words describing their attitudes toward computer. Based on the pair of words (e.g. exciting and dull; fun and discouraging, etc.), students had to indicate which word better indicates their attitude more accurately.

## Findings and Implications

### *Experience with Computers*

Table 2: The respondents' experience with computers

		missing	seldom/never	occasionally	frequently
personal computer	n	6	30	93	194
	%	1.9	9.3	28.7	59.9
email	n	3	88	113	119
	%	0.9	27.2	34.9	36.7
Word processor	n	9	38	87	189
	%	2.8	11.7	26.9	58.3
Web browsers	n	12	115	94	102
	%	3.7	35.5	29.0	31.5
Programming	n	19	218	69	18
	%	5.9	67.3	21.3	5.6

Table 2 shows that 88.6% (287 out of 324 respondents) of the respondents had experience with a personal computer. It was found that most students used computers for word processing (276 out of 324 respondents, 85.2%) and surfing the internet (196 out of 324 respondents, 60.5%). These findings were not unexpected as student teachers needed computers to work on their assignments or projects. However, programming skills with most respondents were low (237 out of 324 respondents, 73.2%). This was not surprising as student teachers were not required nor expected to perform any programming. In general, the respondents' experience with computers was good except for programming where it is not compulsory for them to learn the skill.

Table 3: Feelings about using computers

Exciting	n	276	Dull	n	7
	%	85.2		%	2.2
Fun	n	276	discouraging	n	11
	%	85.2		%	3.4
Easy	n	187	Difficult	n	70
	%	57.7		%	21.6
Personal	n	209	Impersonal	n	22
	%	64.5		%	6.8
Helpful	n	277	Hindering	n	7
	%	85.5		%	2.2
Unthreatening	n	124	Threatening	n	71
	%	38.3		%	21.9

Table 3 reports the findings on the student teachers' attitudes toward computers. Most of the students had positive feelings about using computers. 85.2% (276 out of 324 respondents) of the respondents found computers *exciting and fun* while 85.5% (276 out of 324 respondents) of them felt that computers are *helpful*. Some 187 out of 324 respondents (57.7%) felt that computers are *easy* while 209 of them (64.5%) felt that computers served *personal* purposes. When probed whether computer is threatening or not, 38.3% (124 out of 324 respondents) responded that computers are *unthreatening*. Generally, the majority of them perceived positively the use of computers as an important tool for learning. This finding was similar to Brush's (1997) and Kok's (1989) findings that students had positive perception towards using computers.

Notwithstanding the favourable affections toward computers, there were also some negative sentiments recorded. The negative sentiments included notions that described computers as *threatening* (71 out of 324 respondents, 21.9%); *difficult* (70 out of 324 respondents, 21.6%); *impersonal* (22 out of 324 respondents, 6.8%); *discouraging* (11 out of 324 respondents, 3.4%); *hindering* (7 out of 324 respondents, 2.2%); and *dull* (7 out of 324 respondents, 2.2%).

**Online environment - Internet Access**

Table 4: Internet Access

		1*	2	3	4	5
Access to terminal	n	10	60	170	77	4
	%	3.1	18.5	52.5	23.8	1.2
Busy lines	n	54	135	113	11	9
	%	16.7	41.7	34.9	3.4	2.8
Slow response	n	62	128	110	16	5
	%	19.1	39.5	34.0	4.9	1.5
Server down	n	90	111	100	14	7
	%	27.8	34.3	30.9	4.3	2.2
Learning mgt system	n	36	91	136	51	7
	%	11.1	28.1	42.0	15.7	2.2

\* 1:A serious problem, 2:A problem, 3:A little problem, 4:Not a problem, 5:Hardly a problem

In terms of internet access, most respondents admitted that there were problems with internet access. 74.1% (240 out of 324 respondents) of the respondents had at least some problems with access to internet terminals (Table 4). Other items that indicated at least a little problem were *busy lines* (93.3%), *slow response* in accessing internet (92.6%), *server down* (93.0%). Findings demonstrated thus far seem to indicate that the ICT infrastructure needs to be upgraded so that better internet access can be achieved.

As for the LMS, 263 out of 324 respondents (81.2%) responded that there was at least a little problem with it. With almost 40% of the users indicating that there were problems with the LMS, the university ought to critically evaluate the effectiveness of the system and the context of implementation to better facilitate the implementation of e-learning.

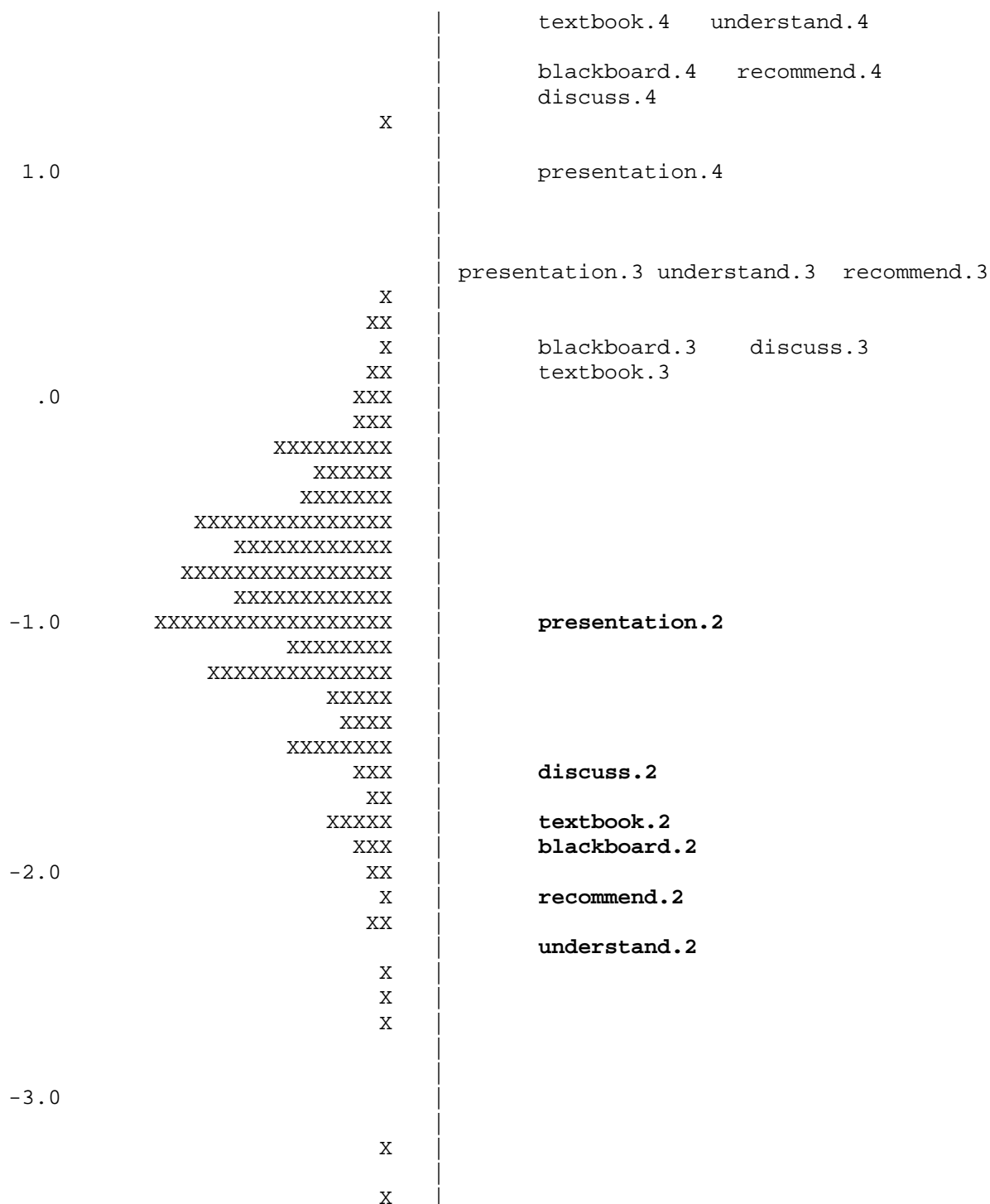
**Learning Support Technology**

In this section of the questionnaire, respondents were asked to respond their perceptions of the effectiveness of the four learning support technologies, namely: (a) *textbooks*, (b) *Blackboard* website, (c) email exchange or online *discussion* board, and (d) LCD projector or PowerPoint *presentation*. The respondents were also asked to state the degree of agreement to two statements: (i) the availability of this online learning programme has helped me to *understand* my course better, and (ii) I would *recommend* online learning delivery to my friends. The variable map for the responses of the items is shown in Figure 1.

**Online Learning - Learning Support Technologies**

Item Estimates (Thresholds)

all on te (N = 324 L = 6 Probability Level= .50)



Each X represents 2 students

Figure 1: The variable map for learning support technologies

The thresholds for response '2' (agree or effective) in the variable map (Figure 1) show that the most agreeable item was 'the availability of this online learning programme has helped

me to *understand* my courses better', followed by 'I would *recommend* online learning delivery to my friends'. The comparison of the teacher distribution and the thresholds for the response '2' implies that all except 10 students (314 out of 324, 96.9%) are likely to that the availability of the online learning programme has helped them to understand the courses better. It also implies that all except 14 teachers (310 out of 324, 95.7 %) are likely to agree that they will recommend online learning to their friends.

Likewise, the effectiveness of the delivery technologies had also received favourable responses from the respondents. The likelihood of agreement of the technologies, in descending order, were Blackboard website (93.8%), textbooks (92.0%), email exchange or online discussion board (87.7%), and LCD projector or PowerPoint presentation (61.7%).

### ***Online Learning***

For the comparison between online learning and face-to-face learning modes, the respondents were asked to respond to 20 items in the questionnaire. The variable map for the responses of the items is shown in Figure 2.



**Online Learning - Comparison of OL and F2F**

Item Estimates (Thresholds)

all on co (N = 324 L = 20 Probability Level= .50)

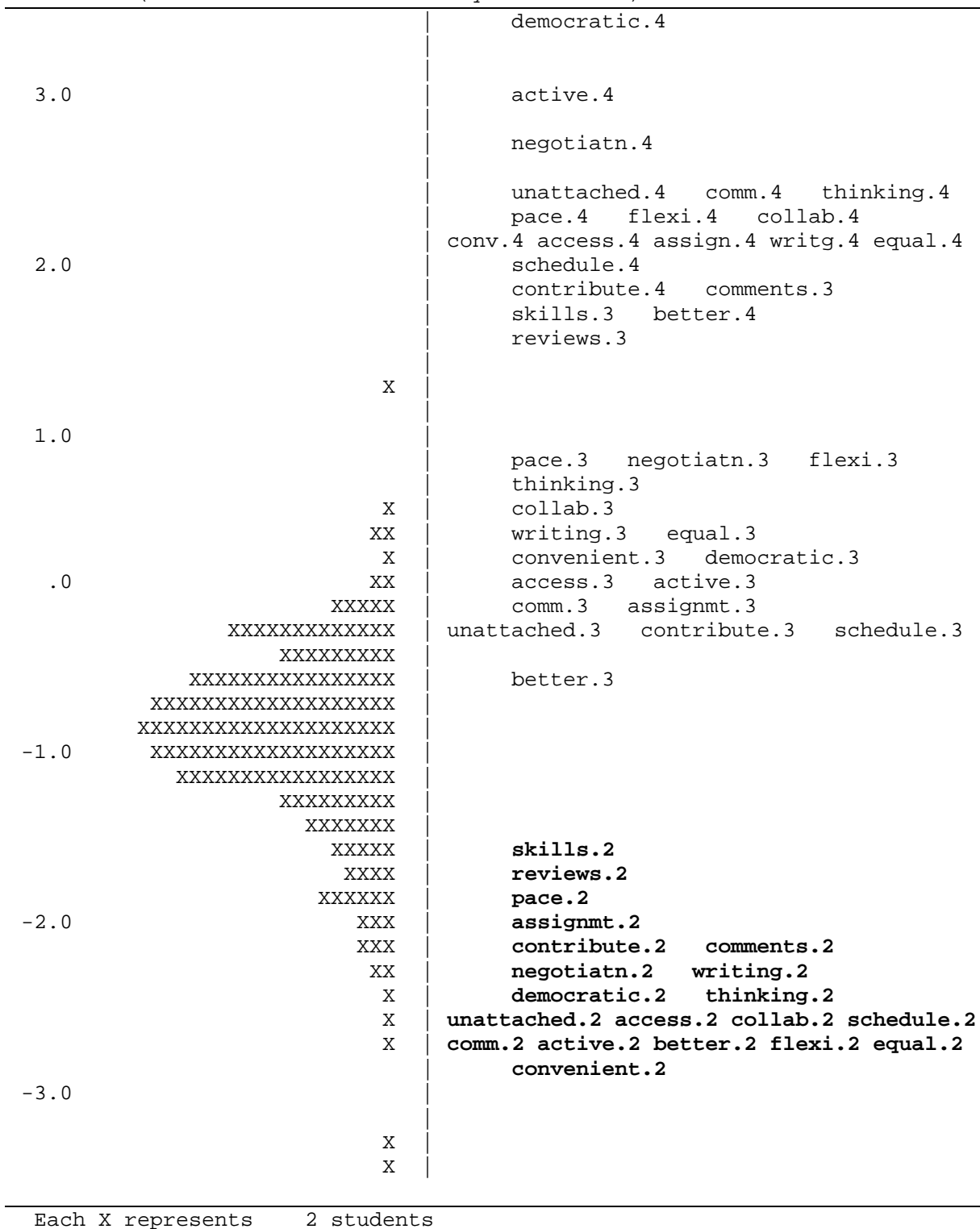


Figure 2: Comparison of Online Learning and Face-to-Face Learning

The thresholds for response '2' (agree) in the variable map show that it is likely that at least 278 out of 324 (85.8%) of the students agree to all the items. The items according to the degree of agreement, in descending order, are:

- Taking online courses is more *convenient* (98.8%)
- I *communicate* more with other students in the class as a result of the computerised conference (98.8%)
- I feel more involved in taking an *active* part in the programme (98.8%)
- I find online learning to be better learning experience than face-to-face learning (98.8%)
- Online learning provides *flexibility* in setting pace for studying (98.8%)
- Online learning provides a greater sense of *equal* opportunity (98.8%)
- I felt *unattached* in taking part in the online discussion compared to classroom discussion (98.1%)
- Having the computerised conferencing system available provides better *access* to lecturers (98.1%)
- I have more opportunity to participate in *collaborative* learning (98.1%)
- I have more control over my *schedule* and my learning (98.1%)
- Online learning creates a more *democratic* environment for group interaction (97.5%)
- The processes of writing and reflecting in online learning in online learning promotes clearer *thinking* (97.5%)
- Discussion via online discussion board supports social *negotiation* of ideas (96.9%)
- I have improved my *writing* skills through participating in online learning (96.9%)
- I contribute more of my opinion in an online environment than in a regular class (92.6%)
- I find the *comments* made by other students to be useful to me (92.6%)
- The fact that my *assignments* would be read by other learners increases my motivation to do a thorough job (90.7%)
- The online classroom allows me to work at my own *pace* (88.9%)
- I find reading the reviews or assignments of other students to be useful to me (88.3%)
- I gain new skills through online learning (85.8%)

The most agreeable item was 'the availability of this online learning programme has helped me to *understand* my courses better', followed by 'I would *recommend* online learning delivery to my friends'. The comparison of the teacher distribution and the thresholds for the response '2' implies that all except 10 students (314 out of 324, 96.9%) are likely to that the availability of the online learning programme has helped them to understand the courses better. It also implies that all except 14 teachers (310 out of 324, 95.7 %) are likely to agree that they will recommend online learning to their friends.

Likewise, the effectiveness of the delivery technologies had also received favourable responses from the respondents. The likelihood of agreement of the technologies, in descending order, were Blackboard website (93.8%), textbooks (92.0%), email exchange or online discussion board (87.7%), and LCD projector or PowerPoint presentation (61.7%).

### Factors Affecting Online Learning Scores

All the items for the perception of the students on online learning were scaled according to gender, age, seniority, and course groups. The online learning attitude scores of the respondents in the groups are summarised in Table 5.

Table 5: Online Learning Attitude Scores in Groups

Group		<i>n</i>	<i>Mean</i>	<i>SD</i>	<i>ES</i>
Gender	Male	89	-0.93	0.64	0.07
	Female	235	-0.87	0.58	
Age	Above 25	157	-0.99	0.65	0.34
	25 and below	167	-0.79	0.52	
Seniority	Senior	242	-0.89	0.62	0.02
	Junior	82	-0.88	0.51	
Course	TESL	106	-1.02	0.62	0.34
	Non-TESL	218	-0.82	0.57	
All	-	324	-0.89	0.59	-

The value of effect size of the gender grouping showed that there was no difference between the perceptions of the male and female students. Similarly there was no difference whether between the senior students and their juniors. However, it was shown that students with the age of 25 or less had slightly higher perceptions on the benefits of online learning. It was also shown that non-TESL students had slightly higher perception of the benefits of online learning.

### Conclusion

In general, this study has provided us with useful information about applying online learning in regular on campus courses. It is becoming more important to understand how traditional students adapt to online learning, as more and more online initiatives will be introduced in UMS in general and SESD in particular in the near future. The use of the innovative LMS provides us with a unique opportunity to explore those students' reaction to learning online and find the ways to help them prepare for the changes. Some of the findings from this study are meaningful for designing and improving such online classes in the future.

First, we should notice the aspects related to equipment access and access to the internet. Both these facilities are important factors to consider when offering online courses. Findings indicate that the school needs to further improve the infrastructure and facilities of ICT for more effective use of online learning in the future. However, students feedback on learning support technologies (via the LMS) and their overall perception of online learning seem positive and are in tandem with the SESD initiative to embrace online learning. While findings thus far are encouraging, a lot more still has to be done. The experience gained in this study amplifies the need to better prepare students taking online classes mentally and technologically. The combination of enough prior experience with technologies and positive attitudes toward technology will better prepare students for future e-learning initiatives.

As a final word of caution, the findings of this study should be viewed as preliminary because the sample was only drawn from the SESD and not the university as a whole. A study with

larger and more representative samples is needed to validate the conclusions. Additionally, this is only a survey study. Applying different research designs in future studies--such as through case study or mixed method (including combining quantitative and qualitative measures) approaches - can provide us with a greater understanding about e-learning initiatives to 'e-ducate' student teachers.

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