Malaysian undergraduate science physics students’ and pre-service science teachers’ perceptions of online learning

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This paper reports the results of a study concerning of Malaysian undergraduate science physics students’ and pre-service science teachers’ perceptions of learning through online learning. Specifically, it required to ascertain whether students had positive perceptions of the new teaching and learning medium. 102 students were involved in this study which consists of 61 students from the School of Science and Technology (SST, science student) and 41 students from the School of Education and Social Development (SESD, pre-service science teachers). Both programmes were from University Malaysia Sabah. The students then followed all learning activities for sixteen weeks through online. The online learning environment (i.e., learning management system, LMS) was used as the main medium to carry the full learning process throughout the second semester of 2008/2009 academic year. Data were gathered from an established open-ended questionnaire that administered after they completed with the learning activities at the end of the semester. Students’ perceptions after experiencing the online learning were analysed into three main themes: students’ readiness for online learning; motivation affects of online learning; and understanding of learning contents. Generally, though the results yields that students perception were vary but it has shown clearly that students welcome the online learning very well.

Keywords: Online learning; physics students; pre-service science teachers.

INTRODUCTION

Online learning is comparatively new in Universiti Malaysia Sabah (UMS). Though in early 2000, UMS has been introduced with an electronic teaching aid such as Blackboard and several computer aided instruction as one of the teaching and learning tool, both from School of Engineering and Information Technology (SEIT) and School of Education and Social Study (SESD), until now the usage of these teaching aid seems not been utilised at all or at least part of it. In School of Science and Technology (SST), a very small number of lecturers prefer to use online learning as the teaching and learning medium or at least part of it. They were really comfortable with the existing medium (i.e., face-to-face lecture based) as to deliver course syllabus and content objective throughout semester. Ironically Malaysian government through the 9 challenges in Vision 2020 that must be achieved in order to be a well developed, advanced and higher income country in 2020 had stated through the 6th challenge that Malaysian citizens must try to adapt with these cutting edge technology and must also contribute to the science and technologies civilizations. Additionally our Prime Minister also stated the Information Communication Technology (ICT) and education service are two main key of the National Key Economic Area (NKEA), thus must be utilised very well in our daily life scenario to ensure the higher income economically and productivity country objectives can be achieved (Razak, 2010). Therefore as a rapid develop country, Malaysia
really need to explore the potentials of these NKEA especially in higher learning institution in order to reply the Prime Minister’s call.

Media and Educational Technology Unit (METU) was then established in UMS to ensure the nation’s vision and mission in higher education particularly in UMS can be achieved. The main objective for METU is to cater the service and facilities in Information Communication and Technology (ICT) such as computer and software component to the university including the teaching and learning aspects, besides it is also deliver digital information across all academic disciplines for research, administration and management of the university activities (Media and Educational Technology Unit, 2012).

Therefore this preliminary research was to address an issue concerning about online learning and what was really happen when the online learning being implemented in UMS. It’s critical for researchers to considerate many factors before implementing online learning fully. As stated by Kišićek et al, (2012) understanding students’ preferences can guide to a better learning instruction through online. Additionally the use of ICT in modern teaching aid (e.g., internet technologies; web portals; and multimedia software) contribute positive output to parts of teaching and learning process such as, cooperation amongst students and the learning becomes more interactive (Mandic et al., 2012). It also might be one of the powerful tools to lesser lectures’ teaching workload. Thus, though the students in this research had been intervened with a different approach (i.e., Problem-based learning, PBL) from the current conventional practice, it was the online learning aspect was the main issue. The main objective was to bring a different way of learning approach compare to the current practice (i.e., face-to-face pedagogy). Thus the researcher took steps to integrate online learning in a particular physics course. And at the end of the intervention, students’ perceptions and consideration in term of three themes (i.e.; students’ readiness for online learning; motivation affects of online learning; and understanding of learning contents) will be evaluated.

**METHODOLOGY**

The study was conducted throughout Semester II during the 2008/2009 academic year at the University Malaysia Sabah (UMS), Malaysia. One hundred and two students were involves, which consist of sixty-one science physics students from Physics With Electronic Programme at the School of Science and Technology (SST), and another forty-one pre-service science teacher from Science Education Programme at the School of Education and Social Development (SESD). The samples pursued all the learning activities in an online learning environment (i.e., learning management system, LMS) which acted as the main medium to support the full learning process throughout the semester. The flow of group sample shows in Figure 1.

The teaching and learning via online was conducted within 16 weeks. During this intervention, all assessment being delivered using the LMS organised by Educational Technology and Multimedia Unit (ETMU) at the Universiti Malaysia Sabah. The researcher prepared the LMS followed the PBL and traditional criteria to fulfilled the learning and teaching activities via online.

The learning activities started with problems. After they encounter with the problem, they have to find their own information, knowledge and sources in order to find the appropriate solution. They can either find the solution via Internet, interview lectures or tutors, from text books, observation or any other methods in sequence to find
adequate information to solve their problems. The students in PBL group also have to access to the LMS to do their chat room at least once in a week and monitored by a facilitator. In this chat room they will argue, share thoughts and most probably constructed their own thinking regarding to the particular problems. They also be able to enter the forum room to post any inquiries or any ideas asynchronously. Additionally some linkages, sources and lecture note also uploaded by the facilitator for them just to ensure the students did not lose their ways in sequence to find the suitable solution and just to give them the correct path in searching their resource. They had been given two weeks for each problem to solve before passing up, and there were five problems need to be solved throughout the semester. This LMS system was using Moodle2007 course management systems. Jayasundara et al. (2007) suggested that the PBL online service and implementation rate of system perhaps more improve and even better if it is incorporated with existing course management systems such as Moodle2007 and Blackborad2007.

In this study the intention was to investigate Malaysian Undergraduate Science Physics Students’ and Pre-Service Science Teachers’ Perceptions of online Learning. The data were collected through a well developed survey which has $\alpha = 0.81$ Cronbach’s Alpha. The survey was filled one week after their finish with the intervention.

**FINDINGS**

Research question for this paper concerned the Malaysian undergraduate physics students’ and pre-service science teachers’ perceptions of learning through online learning. Specifically, it sought to ascertain whether students held positive views of the intervention. Therefore this paper seeks to see understand students’ awareness regarding online learning in terms of students’ reflection on their learning of the Modern Physics course which involved online work. Student responses are presented overall and any differences for students from the SST program and SESD program are then detailed.

Additionally, this paper also try to identify students’ views regarding online learning in terms of their experiences in learning Modern Physics. There are three key themes which together comprised the survey: students’ readiness for online learning; the motivation effects of online learning; and understanding of learning contents. The questions in the survey are not necessarily presented in the above sequence, because the items in the survey were mixed to make it less repetitive for the students.

**Students’ readiness for online learning**

The questions of this survey relevant to student’s readiness to learn online (six statements). In general there were no great differences noted between the science students and pre-service teachers regarding their perceptions of readiness for online learning as shown in Table 1. Except for statement #; ‘I know how to use a standard word processor programs such as Microsoft Word, Microsoft Works, or Word Perfect’, where almost 90 percent of pre-service teachers agreed that they were pretty comfortable with word processing compared with only about 60 percent of science students. Additionally,

### Table 1. Themes of students’ readiness for online learning for SST and SESD

<table>
<thead>
<tr>
<th>Statement</th>
<th>Majority of Students’ Answer</th>
<th>SST Percent (frequency)</th>
<th>SESD Percent (frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I was able to log on the Internet to work on this course.</td>
<td>At least twice a week.</td>
<td>45.9 (28)</td>
<td>41.5 (17)</td>
</tr>
<tr>
<td>I know how to use a web browser such as Netscape; Internet Explorer; FireFox Explorer to get around the Internet.</td>
<td>Yes, I browse the net frequently.</td>
<td>97.6 (40)</td>
<td>90.2 (55)</td>
</tr>
<tr>
<td>#I know how to use a standard word processor programs such as Microsoft Word, Microsoft Works, or Word Perfect.</td>
<td>Yes, I am pretty comfortable with word processing.</td>
<td>60.7 (37)</td>
<td>87.8 (36)</td>
</tr>
<tr>
<td>I have basic knowledge of email.</td>
<td>Yes, I have an e-mail account.</td>
<td>100.0 (61)</td>
<td>100.0 (41)</td>
</tr>
<tr>
<td>#I am comfortable working with computers.</td>
<td>I find working with computers interesting.</td>
<td>52.5 (32)</td>
<td>78.0 (32)</td>
</tr>
<tr>
<td>I was able to cope when my computer or software broke down during the course.</td>
<td>I will get it fixed immediately and will use another system in the meantime.</td>
<td>75.4 (46)</td>
<td>61.0 (25)</td>
</tr>
</tbody>
</table>
almost 80 percent of the pre-service teachers said they found that interesting working with computers (#), in contrast to the science students of which approximately half reported being 'comfortable working with computers'.

**Motivation affects of online learning**

The statement under this theme queried students about the motivational effect of online learning after experiencing the learning approach (eleven statements). For question *; 'Are you a self-motivated, independent learner?' students responded that studying alone was a positive challenge (about 25% from SST and 17% from SESD). However, there was some different feedback where almost 28 percent from SST and roughly 37 percent from the SESD commented that they needed the stimulation of a group. For statement **; 'I know how to use a web browser such as Netscape; Internet Explorer; FireFox Explorer to get around the Internet,' there were also two major answers recorded: ‘Yes, I look forward to the experience’ (around 50% responded from SST and 68% from SESD); and ‘Yes, I don’t have time to take a traditional class’ where there is about 20 percent different documentation between science students and pre-service science teacher as shown in Table 2.

**Understanding of learning contents**

In this theme, students were asked regarding their understanding of learning contents. Statement: *How good are you at following directions on assignments?* About 20 percent difference (favoring SESD) was recorded as saying that they can read and follow directions on their own: whilst 15 percent difference (favoring SST) responded that they have difficulty understanding directions and frequently need clarification. Details are shown in Table 3.

**DISCUSSIONS AND CONCLUSION**

The findings reported reveal several themes regarding the students’ perceptions of learning through online learning. Overall, it seems that the majority of the science students and pre-service teachers were satisfied with their online learning experience. They presented several main themes: the students’ readiness for online learning (e.g., always eager to log on to the online course material, having an e-mail account, and comfortable with word processing, etc); motivation effect of online learning (e.g., stimulation from group study, preferring online learning to face-to-face learning); and also understanding of learning content in online learning (e.g., good at following directions on assignments); and handling technology while learning computer use in online learning (e.g., knowing how to handle computers when something goes wrong). In general, the students from both cohorts were positive about online learning and it seems there was good engagement while learning this way. Razak (2005), in her work based in the Malaysian context, also reported that students who were involved in

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**Table 2. Themes of Motivation Affect for SST and SESD**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Majority of Students’ Answer</th>
<th>SST Percent (frequency)</th>
<th>SESD Percent (frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Are you a self-motivated, independent learner?</em></td>
<td>I find studying alone a positive challenge.</td>
<td>24.6 (15)</td>
<td>17.1 (7)</td>
</tr>
<tr>
<td></td>
<td>I need the stimulation of a group.</td>
<td>27.9 (17)</td>
<td>36.6 (15)</td>
</tr>
<tr>
<td><strong>I know how to use a web browser such as Netscape; Internet Explorer; FireFox Explorer to get around the Internet.</strong></td>
<td>Yes, I look forward to the experience.</td>
<td>49.2 (30)</td>
<td>68.3 (28)</td>
</tr>
<tr>
<td></td>
<td>Yes, I don’t have time to take a traditional class.</td>
<td>34.4 (21)</td>
<td>14.6 (6)</td>
</tr>
</tbody>
</table>

**Table 3. Themes of student understanding of learning content in online learning for SST and SESD**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Majority of Students’ Answer</th>
<th>SST Percent (frequency)</th>
<th>SESD Percent (frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How good are you at following directions on assignments?</td>
<td>I can read and follow directions on my own.</td>
<td>32.8 (20)</td>
<td>51.2 (21)</td>
</tr>
<tr>
<td></td>
<td>I have difficulty understanding directions and frequently need clarification.</td>
<td>44.0 (27)</td>
<td>31.7 (13)</td>
</tr>
</tbody>
</table>
Using Multimedia Resources in an online learning were receptive of the intervention. This is also supported in work by Coleridge (2005) who stressed that using ICT had an positive overall impact on students' learning or access to learning, for example, ease and quick access to data and information from the Internet, that is, students were able to construct cognitive activities and develop a mental picture of the problem and the conceptual network upon which it was based. Additionally, the literature suggests that online learning can facilitate the clear, fast and accurate representation of scientific data, allowing the focus of a lesson to move to a meaningful discussion (Miller, 2001). It also seems that online learning is highly motivating because of access to information and ways to communicate that information effectively. Besides, cooperative work of students do exists when ICT being intervened into teaching and learning process (Mandic et al., 2012).

However, there were some issues of concern which arose in this work. The main issue appears to be the nature of the online assignments, arrangements, and the content available on the web. This is not an especially surprising outcome, since the PBL model itself was presented in an ‘ill-structured’ syllabus with the learning, far from typical learning, which, as noted above, is more usually well-structured and involves rote-learning. Moreover, the learning content delivered using online learning is new for the students. Ambotang and Shukery (2005) suggest that students are sometimes annoyed with e-learning because of initial experiences of difficulty with the technology. In the present work, the students were ‘perplexed’ at the beginning of the intervention, and needed close of guidance from the instructor on how to do their task individually and in their group.

With the advent of electronic learning technology, students are facing new challenges with respect to perceiving knowledge and setting new goals to manage today’s global knowledge. In the Modern Physics course, an innovative approach using LMS and facilitated by the lecturer was implemented in order to enrich the PBL online experience. The course was problem-based so that students could engage in substantial and meaningful interaction with team members and facilitator. This paper has discussed the Malaysian undergraduate science physics students’ and pre-service science teachers’ perceptions of online learning in terms of three main themes. It has shown clearly that students welcome the online learning very well, particularly in those three themes, though it still has obstacles and deficiencies in the process of learning. Through the help from the online discussion forums and the help from group members and the facilitator, students shifted towards independent learning establishing more regular self-directed learning practices in their learning process. They were also exposed to the virtual library and information science fields, mostly in the modern physics domain by exploiting the advantages of information communication and technology (ICT).

REFERENCE


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