Malaysian Undergraduate Pre-Service Teachers’ Perceptions of Learning Online Through the Implementation of Online Collaborative Learning Environment

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The use of e-learning in pre-service teacher education programme has increased tremendously in Malaysian public universities due to the desire of the Malaysian government to optimise e-learning as one of the instructional methods in tertiary education. Many Malaysian public universities have responded by offering online (or e-learning) courses or by using online learning as an adjunct to classroom modes of course delivery. However, simply providing students with online access to learning materials and replicating a classroom model of teacher-centered learning is inadequate. Research advocates online learning move towards a model of student-centered learning in which social collaboration among students is encouraged. The study reported in this paper presents the preliminary findings of research investigating the implementation of an online collaborative learning environment in a Malaysian university, which aims to promote student-centered learning through active online participation among Malaysian undergraduate pre-service teachers. For the purpose of this paper, only the initial findings of the research were reported which focused on students’ perceptions of learning online through the implementation of online collaborative learning environment in a Malaysian undergraduate classroom. The research used Activity Theory as lenses to understand the context of the research and in the construction of online questionnaire. Each variable in each theme was presented and grouped under five components of Activity Theory (Tool, Subject, Rule, Community and Division of labor). The initial findings from the questionnaires point to a positive view of learning online for each of the themes. However, serious issues were raised about technology constraints that could potentially affect students’ participation in the online learning environment.

Introduction

Online learning is rapidly gaining popularity as a method of knowledge delivery through the use of Internet and network technologies. In the field of tertiary education, online learning has been seen as an alternative strategy to help educators to accommodate the numbers and the diversity of students who are coming into tertiary classrooms (Curtis & Lawson, 2001; Hiltz & Turoff, 2002; Hughes, 2005; Mason & Rennie, 2008). One of the advantages of online learning that has been the focus of much research is the “flexibility to meet the needs of the learner, through adaptability to different learner needs, learning patterns and settings, and media combinations” that could benefit full-time campus based students as well as distance learners (Collis & Moonen, 2001). The “flexibility” of online learning has encouraged many educators to make their learning materials and resources available online so that students can reach them through Internet at anytime and anywhere. However, simply providing students with online access to learning materials is inadequate. Research advocates online learning move towards a model of student-centered learning in which social collaboration among students is encouraged.

Background of the Research

The use of online learning (or e-learning) in pre-service teacher education programme has increased tremendously in Malaysian public universities due to the desire of the Malaysian
government to optimise e-learning as one of the instructional methods in tertiary education. Many Malaysian public universities have responded by offering online (or e-learning) courses or by using online learning as an adjunct to classroom modes of course delivery. With the introduction of Learning Management Systems (LMS) also known as Virtual Learning Environments (VLE) in tertiary education, crucial knowledge building collaboration and communication can be facilitated (Coomey & Stephenson, 2001; Ingram & Hathorn, 2003). An example of LMS that is widely used to facilitate online teaching and learning in tertiary education is Moodle (Modular Object-Oriented Dynamic Learning Environment). Unlike other LMS, namely Blackboard and WebCT, Moodle is an open source software, which allow educators the freedom to copy, use and modify Moodle template without licensing costs (refer http://moodle.org/). Also, Moodle is designed pedagogically to assist educators to produce online content tailored to their respective classes in a collaborative and interactive environment (Maikish, 2006). A useful characteristic of Moodle, as noted by Cornell, is that Moodle promotes social constructionist pedagogy and is suitable for supplementing face-to-face in-class teaching and learning.

The integration of online learning environment for learning in which social collaboration among students is emphasized are seen as offering educators an alternative to more teacher-centered approaches and promoting learning as social process. With today’s education climate, many students who are now entering university have experiences engaging with digital learning resources that demand learning through active participation, in teams with peers, and with information available when it is needed (Oblinger & Oblinger, 2005). Thus, the design and implementation of learning through Virtual Learning Environment must not only to take into account the affordances and constraints of technology but also the pedagogical and social perspectives of learning.

**Collaborative Learning**

Research on online learning reveals that strategies are needed to gear online learning towards worthwhile learning, and at the same time, move away from the typical model of teacher-centred towards a student-centred model in which social collaboration among students is encouraged (An, Kim, & Kim, 2008; Häkkinen, Arvaja, & Mäkitalo, 2004; Mason & Rennie, 2008). One such strategy is in collaborative learning which has been considered as an effective instructional method in both traditional and distance learning environments (Johnson & Johnson, 1996; So & Brush, 2008). Current Computer Supported Collaborative Learning (CSCL) research has also regarded collaborative learning as a popular type of learning that promotes learning as a social process (Miyake, 2007). Collaborative learning, which is supported by Internet and network technologies, is able to create online communities that allow learners to participate in social learning activities and in building socially shared expertise (Häkkinen, Arvaja, & Mäkitalo, 2004). Hence, decrease loneliness of working in isolation in an online environment which could affect learning outcomes and students’ satisfaction with online courses (Palloff & Pratt, 2005).

**Community of Learners**

Socio-cultural perspectives of learning advocate the formation of learning communities through participation in the social groups that are focussed on a common outcome (Lave & Wenger, 1991). For educators, the values of community are seen as offering an alternative to more individualistic approaches, and these values are reflected in group work. Key benefits of participating in collaborative group work is that a student has the opportunity to; learn from more knowledgeable peers, learn to take responsibility for their learning, and to develop more autonomy in their learning. The instructor’s role is shifted from instructive to supportive and they act more as a facilitator and coordinator to structure and guide the overall direction for students’ learning. Students, on the other
hand, increasingly learn to participate and involve towards the center of the community (Lave & Wenger, 1991). By participating in online collaborative learning environments, students are working together in groups that could be viewed as community of learners. This is crucial as learning is not viewed as the mere acquisition of concepts or skills but as the appropriation of the culture specific to the target community (Häkkinen, Arvaja, & Mäkitalo, 2004).

**Theoretical Background**

An understanding of complex interrelations among group(s) that are made up of individuals in online collaborative learning is sought through Activity Theory. Activity Theory is increasingly being applied to aspects of technology-based learning because of its emphasis on the mediation of tools and social development on human activity. It has been used in the study of Human-Computer Interaction (Nardi, 1996), in research into collaborative and distributed system (Russell, 2002), for conceptualizing online community in educational setting (Barab, Schatz & Scheckler, 2004) and for designing constructivist e-learning environment (Jonassen & Murphy, 1999).

Activity Theory provides a useful framework that enables researchers to analyze human activity within contextual settings as a developmental process, interlinking both the levels of the individual and society (Engeström, 2001; Jonassen & Rohrer-Murphy, 1999; Kuutti, 1996). Engeström argues that the understanding of human activities as developmental processes is important in order to reveal “changes and contradictions” within the activity system and to discuss potential outcomes, in which Engeström called “expansive learning”. Drawing on the early works of Vygotsky (1978) and Leont’ev (1981), Engeström presents a much more integrated model of a collective human activity system that outlines crucial differences between an individual action and a collective activity and is depicted graphically in Figure 1.

![Figure 1: The structure of an activity system, adapted from Engeström](image)

In activity system (Figure 1), students are portrayed as subject interacting with object to attain desired outcome. The object is the goal (or motive) of the activity and the interaction is mediated through the use of tools (or technology affordances for students in the activity). Similarly, the relationship between subject and community is mediated through rules. Rules are described as any formal or informal regulations (or pedagogical rules) which affect how the activity takes place. The affiliation between community and object is mediated through division of labour, which refers to how the tasks are shared (or socially distributed) among the students. It has been argued that learning task(s) that involve the aspects of technology, pedagogy and social in online collaborative
The learning environment can be represented as an Activity System (Engeström, 2001).

The Study

The research reported in this paper is part of doctoral study to understand the impacts of online learning environment through the affordances of Virtual Learning Environment with the implementation of collaborative group task(s) to create a social environment for meaningful learning experiences to students in a Malaysian tertiary classroom. For the purpose of this paper, only the initial findings of the research were reported which focused on how did students perceived the use of tools, rules and division of labour within shared space of online collaborative learning environment in a Malaysian undergraduate classroom.

Method

An interpretive methodology was used to frame the collection and analysis of the data that include the collection of quantitative and qualitative data. For the purpose of this paper, only quantitative results are presented and discussed.

Participants

The participants were the Malaysian undergraduate pre-service teachers in three different programmes, namely Chemistry with Computer Education (n = 9), Physics with Computer Education (n = 10) and Mathematics with Computer Education (n = 27). The students in each programme were in the second year of their study and were enrolled in Computer Education course with online participation through Virtual Learning Environment. The course was conducted in second semester of academic calendar and was running for about 14 weeks. The researcher was involved in the research as the instructor of the course for about 13 weeks. During the course, students in each programme were formed into groups of 4-6 with a total of nine groups involved. The collaborative group task(s) were designed to enable group in each programme to participate online and involved towards the creation of solution of problem case study. During the activity, the students were all engaged in online group and inter-group discussions in Virtual Learning Environment before producing a group report.

Ethical Considerations

Students’ participations in the research were voluntarily and they all were informed with the study. Consent was attained both from individuals and institution involved. All information was strictly confidential and no name of the student was used in order to ensure ideas were remain anonymous. Efforts were also made to respect student’s privacy and to seek permission prior to collecting samples of works. Students were also informed of their right to withdraw at any stages of the research and no further information would be gathered about their activities and would not affect their progress in the course nor any assessment of their works. The research had obtained ethical approval by Human Research Ethics Committee, The University of Waikato prior to conducting the study.

Data Analysis

A total of 43 out of 46 online questionnaires were answered and returned both at the start (n =43) and at the end (n = 43) of the course. Data from online questionnaire was coded and analysed using SPSS, statistical analysis software. A descriptive analysis was conducted to obtain mean (M) and standard deviation (SD) for each theme. Non-parametric analysis (Kruskal-Wallis) was used to compare across the groups. This non-parametric analysis was used because of the number of
students ($n$) within group was small.

**Result**

The students’ perceptions of the use of online collaborative learning environment for the aspects of technology (tools), pedagogy (rules) and social (division of labour) based on the data from online questionnaires are provided separately in the following sections.

**Perceptions on Technology (Tools)**

Table 1 provides the means and standard deviations with respect to the students’ experiences with the learning environment at the end of the course. The means range from the lowest score of 3.67 to the highest score of 4.40. This indicates that students have had a positive view based on their experiences engaged with the learning environment.

Table 1: *Means and standard deviations on the variables of technology*

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>eLearning helped me to learn on my own</td>
<td>43</td>
<td>3.84</td>
<td>0.652</td>
</tr>
<tr>
<td>eLearning helped me to learn online</td>
<td>43</td>
<td>4.00</td>
<td>0.658</td>
</tr>
<tr>
<td>eLearning helped me to learn in my group work</td>
<td>43</td>
<td>3.67</td>
<td>0.778</td>
</tr>
<tr>
<td>eLearning helped me to share ideas or communicate within an online group</td>
<td>43</td>
<td>4.40</td>
<td>0.623</td>
</tr>
<tr>
<td>eLearning provided me an easy way to get course learning materials</td>
<td>43</td>
<td>4.00</td>
<td>0.845</td>
</tr>
<tr>
<td>eLearning provided me an easy way to get additional information and material for my assignment</td>
<td>43</td>
<td>3.98</td>
<td>0.913</td>
</tr>
</tbody>
</table>

Scale: 1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly agree

However, Table 2 shows that some of the students (indicated by the high standard deviation) were reported difficulties and problems to get connected with the online learning environment due to inconsistency of Internet connection around the campus.

Table 2: *Means and standard deviations on the variables of the constraints of technology*

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have difficulty with the eLearning program</td>
<td>43</td>
<td>2.91</td>
<td>1.130</td>
</tr>
<tr>
<td>I often had problems accessing eLearning because of Internet breakdown at the University</td>
<td>43</td>
<td>4.02</td>
<td>1.035</td>
</tr>
<tr>
<td>There were not always enough computers for students to access to do eLearning at the University</td>
<td>43</td>
<td>2.95</td>
<td>1.174</td>
</tr>
</tbody>
</table>

Scale: 1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly agree

**Perceptions on Pedagogy (Rules)**

Table 3 provides the means and standard deviations on students’ perceptions of the designated collaborative group task(s). The means range from 2.81 to 4.00. These results indicate that the average scores for students’ perceptions on pedagogy were above the midpoint except on the variable “I like to work alone even when placed in an online group”. This means that students generally had responded their engagement in online collaborative group were useful but some of the students (indicated by the high standard deviation) were not used to this approach and inclined to work alone even they were placed in an online group.
Table 3: Means and standard deviations on the variables of pedagogy

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturers guided me in working within an online group</td>
<td>43</td>
<td>4.00</td>
<td>0.733</td>
</tr>
<tr>
<td>In my online group work, the instructions given by the lecturer about how to work as a group facilitated the group task</td>
<td>43</td>
<td>3.77</td>
<td>0.718</td>
</tr>
<tr>
<td>Working together within an online group helped me accomplish higher quality work than if I were working alone</td>
<td>43</td>
<td>3.74</td>
<td>0.734</td>
</tr>
<tr>
<td>I prefer to work online within a group rather than work alone</td>
<td>43</td>
<td>3.70</td>
<td>0.860</td>
</tr>
<tr>
<td>I like participating and sharing my ideas in online discussions</td>
<td>43</td>
<td>3.72</td>
<td>0.826</td>
</tr>
<tr>
<td>I like to work alone even when placed in an online group</td>
<td>43</td>
<td>2.81</td>
<td>1.006</td>
</tr>
</tbody>
</table>

Scale: 1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly agree

Perceptions on Social (Division of Labour)

Table 4 contains the means and standard deviations on the aspects of social of learning through online collaborative learning environment. The means range from 3.93 to 4.09 which were close to 4.00 and above. These results indicate that the students in general had played their roles and responsibilities quite well in groups.

Table 4: Means and standard deviations on the variables of social

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>The group members agreed with the individual roles and responsibilities to be held for the group task</td>
<td>43</td>
<td>3.93</td>
<td>0.669</td>
</tr>
<tr>
<td>Knowing my role and responsibilities in the group task helped me feel a part of the group</td>
<td>43</td>
<td>4.02</td>
<td>0.740</td>
</tr>
<tr>
<td>Knowing my role and responsibilities in the group task helped me to think that I was contributing to the group</td>
<td>43</td>
<td>3.93</td>
<td>0.799</td>
</tr>
<tr>
<td>The group task was well divided and distributed between group members</td>
<td>43</td>
<td>4.09</td>
<td>0.648</td>
</tr>
<tr>
<td>The group members agreed about how the group task was divided and distributed</td>
<td>43</td>
<td>4.00</td>
<td>0.724</td>
</tr>
<tr>
<td>Group members were involved in group task accomplishment</td>
<td>43</td>
<td>3.98</td>
<td>0.831</td>
</tr>
</tbody>
</table>

Scale: 1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree, 5-Strongly agree

Non-parametric Analysis

Non-parametric analysis was conducted to compare students’ perceptions on technology, pedagogy and social across groups because students worked within and between groups. The Kruskal-Wallis test was used because the number of students was small. The results reveal that students across groups differed significantly on the perceptions of technology - “eLearning provided me an easy way to get additional information and material for my assignment” \( (\chi^2 = 7.663, df= 2, \rho<0.01) \); on the perceptions of pedagogy - “Lecturers guided me in working within an online group” \( (\chi^2 = 10.374, df= 2, \rho<0.03) \) and “Working together within an online group helped me accomplish higher quality work than if I were working alone” \( (\chi^2 = 7.346, df= 2, \rho<0.02) \); and on the perceptions of social - “The group members agreed with the individual roles and responsibilities to be held for the group task” \( (\chi^2 = 10.678, df= 2, \rho<0.03) \), “Knowing my role and
responsibilities in the group task helped me feel a part of the group” \((\chi^2 = 10.323, df= 2, \rho<0.03)\), “Knowing my role and responsibilities in the group task helped me to think that I was contributing to the group” \((\chi^2 = 16.597, df= 2, \rho<0.001)\) and “Group members were involved in group task accomplishment” \((\chi^2 = 6.253, df= 2, \rho<0.04)\). These results indicate that students perceptions on technology affords them access to learning material, perceptions on pedagogy of working together and teacher guidance; and perceptions on social in shared roles and responsibilities might be important for students in learning through online collaborative learning environment.

**Discussion**

The initial findings from the questionnaires indicate that although students’ had a positive view of learning online through the online collaborative learning environment for each theme as described in previous sections, the constraints of technology can potentially affect their motivation to participate in the online learning environment. Thus, an alternative approach that is suitable and effective needs to be considered to compensate for those constraints (e.g. Internet failure, technical problems). Emphasis is also given to active participation through quality online interaction in online group and inter-group discussion in which students are equipped with necessary preparation in order to obtain the intended outcome by participating and sharing ideas. The social development of online collaborative learning environment occurs when students are willing to support and help other in a cooperative manner. The development is reflected through their shared roles and responsibilities to increase participation in the online learning environment.

**Conclusion**

Overall, this study contributes to the design and implementation of online collaborative learning environment in tertiary education through the lenses of Activity Theory in re-conceptualizing learning through online environment. It highlights how learning is mediated through the use of technology (tools), facilitated by learning activity (pedagogical rules) and distributed and shared among students (division of labour).

**Notes**

The research reported in this paper is an initial work of the first author’s doctoral study at the University of Waikato, Hamilton, New Zealand. A full version of this paper has been submitted for publication in an international proceeding in Europe. Interested readers please contact the authors for more information regarding this paper.

**References**


