

# Technology-enhanced Classroom Learning Community for Promoting Tertiary ICT Education Learning in Malaysia

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## Abstract

This paper described the processes of incorporating technology-enhanced learning community (TELC), with its aim to promote students' learning in ICT education in a Malaysian tertiary classroom. This research has drawn on data from a semester-long tertiary ICT education course with Virtual Learning Environment (Moodle) and online forum are designed as TELC by integrating online collaborative learning activities to foster students' interactions and collaboration. Data collected from questionnaires, interviews and online forum transcripts were the basis for an interpretive analysis to develop a more theoretically-based analytical framework for understanding the processes of students' interactions in TELC for learning.

*Keywords: Technology-enhanced learning online learning community and tertiary ICT education*

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## 1. Introduction

Socio-cultural perspectives of learning advocate the formation of learning community through participation in the social groups that are focused on a common outcome (Harasim, 2012) in support of the development of cognitive, social and emotional aspects (Sewell & George, 2008). Although there are various types and characteristics of learning communities, a learning community is usually guided by two important elements: (a) tasks to be fulfilled by member of the community, and (b) goals to be achieved through the interactions within the community (Harasim, 2012). A key benefit of participating in learning community 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 or coordinator to structure and guide the overall direction for students' learning. Students, on the other hand, increasingly learn to participate and manage their own learning and involvement and provide some leadership, at times demonstrating increasing confidence and expertise as they progress from the periphery towards the centre of the knowledge community (Lave & Wenger, 1991). This is crucial, as learning is not viewed as the mere acquisition of concepts or skills but as the appropriation of the culture (or enculturation) specific to the target knowledge community (Yotam & Dani, 2012). A learning community is usually associated with an educational program or course, guided or established by a lecturer and linked to the curriculum of studies that represents formal and non-formal learning (Harasim, 2012). The members (or students) do not participate voluntarily but are recruited by lecturer to meet particular learning objective within the framework of the knowledge community. This is consistent with the view that the development of learning in learning community is a process of transformation through people's participation, rather than an acquisition of knowledge (Lave & Wenger, 1991). Furthermore, the students' participation is constantly changing as the knowledge community is shaped by, and in turn shapes, the development of its participants.

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## 2. The purpose of study

As previous researchers (e.g. Harasim, 2012; Pallof & Prat, 2005) indicate that the challenge for educators in incorporating learning within an online community environment is that the learners' interactions cannot be coerced, instead the interactions are said to be maintained by educators through facilitating learners' interactions and relationships by encouraging them to collaboratively interact with one another. Therefore, in order to inform this process, the objectives of this paper are to:

- illustrate the development of a framework for monitoring and analyzing learners' interactions within an online learning community environment; and
- provide evidence for value of learners' interactions within technology-enhanced learning community (TELC) based on findings from a semester-long tertiary course with online participation.

## 3. Theoretical perspectives

The constructivist learning perspectives advocates an active joint endeavour between teacher, students and their peers in constructing meaning. The philosophical view of constructivism is knowledge constructed through interactions with one another including the community and environment and the result of the interaction is not always absolute, rather it is an umbrella term representing a range of perspectives on learning, for instance, situated and active learning, learning by doing, problem-based learning, inquiry-based learning, cooperative learning, collaborative learning, personalized learning, the learning community, active participatory learning, activity and dialogical processes, anchored instruction, cognitive apprenticeship, discovery learning, and scaffolded learning (Ally, 2008; Harasim, 2012; Schunk, 2012). However, the constructivist learning theory also ignores some other important aspects potentially contributing to the success or failure of learning including the role of cultural artefacts, the nature of the learner, the nature of the environment, and their relations within a cultural context (Gunawardena, Wilson & Nolla, 2003; Tu, 2007). As the nature of learners' interactions within an online environment are complex to understanding but critical in supporting learners' development of cognitive, social and emotional aspects, it is suggested the interaction and participation of learner in TELC can be framed as mediated, distributed, situated and goal-directed within an online learning environment (Forret, Cowie & Khoo, 2009).

### 3.1. Mediated action

Mediated action refers to an interaction between the individual and mediating artefacts or tools or signs, a semiotically produced cognitive tool that resulted from the interaction (Yamagata-Lynch, 2010). Wertsch (1998) argues that human action employs the cultural artefacts as mediational means to accomplish a task or objectives. The importance of the humans and the cultural tools to achieve goals are irreducible in the context of the individual's mental functioning (Wertsch, 1998). These cultural tools act as an intermediate agency between the mental processing of the individual and the object of the mental processing. A mediated action view on learning also signified Vygotsky's ideas such as mediation by tools (e.g. symbols, texts, signs, language) and its role in bridging the learner's cultural development. Vygotsky (1978) argues that every function in the learner's cultural development occurs twice: initially on the social level (between people, inter-psychological), and later, on the individual level (inside the individual, intra-psychological). According to Yamagata-Lynch (2010) individuals as learners are not passive participants waiting for "the environment to instigate a meaning-making process for them but, through their interactions, individuals make meaning of the world while they modify and create activities that trigger transformations of artefacts, tools, and people in the environment" (p.16).

### 3.2. Distributed cognition

The notion of distributed cognition suggests that learning is distributed across the members of a social group (Salomon, 1993) and the person-plus, the individual student, and the environment (Perkins, 1993). The cognition is located outside the individual learner's brain and occurs in the interactions among many individual learners' brains, and cultural tools (or environment). Salomon (1993) states that distribution or distributed is a term intended to mean sharing including sharing authority, language, experiences, tasks and a cultural heritage (p.111). Distributed cognition occurs within social interactions and communications of cultural activities. Salomon (1993) argues that knowledge has the potential to be off-loaded on to a device like a calculator or computer with cognitive functions placed on the machine. Cognition or knowledge is communicated into external representations in physical or virtual which embodied experience through the sensory systems and mental filters of individual learners interacting with learning artefacts, environmental elements, and other people. In the literature of computer supported collaborative learning (CSCL) and computer supported collaborative work (CSCW), distributed cognition has been considered in terms of how collaborative spaces are designed and used.

### 3.3. Situated activity

Viewing learning as situated within cultural activities is the central focus of the situated activity approach. Fundamentally, situated activity represents a range of perspectives on learning including situated learning (Lave & Wenger, 1991) and situated

cognition (Brown, Collins & Duguid, 1989). The situated approaches view learning as situated and embedded in a system of activity, communications, culture and context. The unit of analysis involves not only the individual learner or the tools, setting and environment but also the relationship between the two (Barab & Plucker, 2002). From this perspective, separating the learner, the material to be learned, and the context in which learning occurs is impossible and irrelevant because learning and activity are irreducible into separate processes (Barab, Schatz & Scheckler, 2004). In situated learning, learners go through a kind of cognitive apprenticeship in a knowledge community within an applied learning environment of various levels of expertise where the learners move from the periphery to the centre of the practice (Lave & Wenger, 1991). In other words, the newcomer learner moves from novice to an expert through developmental phases of learning and through interacting and engaging in authentic learning works (e.g. real-world problem solving, problem-based learning, project-based learning, and creative work) within the knowledge community.

### *3.4. Goal-directed*

A goal-directed perspective on learning emphasises the embeddedness of goals within cultural activities in accomplishing desirable learning. The notion of learning as goal-directed is seen to be highlighted in Activity Theory which refers to goal-directed actions anchored with other related activities, the goal and the motives for participating in an activity and material product that participants try to gain in an activity (Yamagata-Lynch, 2010, p.17). Kaptelinin (2005) argues that an object or goal is the reason why individuals and groups of individuals choose to participate in activity, and it is also what holds together the elements in activity (cited in Yamagata-Lynch, 2010). In an object-orientedness and goal-directed action, the individuals and groups of individuals' participation are motivated by their goals and motives which may potentially lead to the creation of new artefacts that can make the activity robust (Yamagata-Lynch, 2010). Consequently, people as human beings are normally considered to respond when "an environment consists of entities that combine all kinds of objective features, including the culturally determined ones, which, in turn, determine the way people act on these entities" (Kaptelinin, 1996, p.103). Viewing learning as goal-directed in the educational practice requires the structuring of goal-directed learning activities when teaching in the classroom. Through these goals, the students are supported in their way to attain the goals through meaningful social activities (Häkkinen et al., 2004).

## **4. Context for TELC**

In this research, the context for the TELC intervention is the TELC group work, where students worked together on tasks for a shared outcome within and across online groups through a shared space of Virtual Learning Environment (Moodle) in an ICT education course. The TELC group work is aimed to facilitate the interdisciplinary online collaboration and interactions between students from Chemistry, Physics and Mathematics Education majors and to enhance their learning (Mohamad Said, Forret & Eames, 2010). Previous researchers suggested that the interactions and experiences gained from the online collaborative activities can be considered as 'lived spaces' or equal to a physical classroom, which can facilitate both the opportunities and means for acting (Harasim, 2012, p. 98). Furthermore, through TELC, students can construct knowledge and negotiate meaning through interactions and collaboration; they are not merely transmitting information or receiving communications (Harasim, 2012; Mohamad Said, 2011). The content for discourse and interactions in TELC are also generated by students through the affordances of TELC group discussion applications (e.g. forums) organized by the lecturer. In this way, the students could enter and navigate the TELC discussions at their convenience, to read and contribute to the group work.

## **5. Research design**

The qualitative classroom case study approach (Merriam, 2009; Yin, 2009) in line with the work of Tellis (1997) and Bélanger (2006) was employed and comprised four important phases as elaborated below:

### *5.1. Phase 1: Defining and designing the study*

Establishing the need analysis for TELC including: identifying appropriate subject or course with issue or problem in learning and the potential concerns and challenges of TELC. It also included critical reviews of literature on the nature of TELC interactions. The information obtain in this phase was used as baseline data for constructing the questionnaires, interviews (students and lecturers) and online transcripts (for evaluation e.g. online journal). All instruments were piloted prior to actual study.

### *5.2. Phase 2: Conduct case study*

The second phase of this study was by conducting the case study through preparing and collecting the data: both quantitative and qualitative data. Quantitative data involved the distribution of online questionnaires at the beginning and at the end of the research, while qualitative data was obtained through students' and lecturers' interviews, forum and online transcripts. Prior to the data collection, the researcher sent a formal letter to the Dean of the Faculty of Education, Universiti Teknologi Malaysia (UTM) requesting his permission to conduct the research. The formal letter consists of an information sheet describing the

research in detail and seeking permission to approach targeted participants at the Faculty of Education. The students' and lecturers' informed consents were also collected at the beginning of the course. Data generation involved in-depth interviews and analysed using grounded theory technique – constant comparison approach and content analysis based on participative, interactive, social, and cognitive dimensions.

### *5.3. Phase 3: Performing data analysis*

The third phase of the study was by analysing the case study evidences or data. The data generated during TELC intervention was analysed quantitatively and qualitatively. Quantitative analysis was performed on quantitative data collected from online questionnaires, together with online data based on the online transcripts. The online transcripts was analysed using content analysis techniques based on participative, interactive, social, and cognitive dimensions (Henri, 1992; Hara, Bonk & Angeli, 2000; Lipponen, et al., 2003; Gerbic & Stacey, 2005; Pozzi, et al., 2007). This study used modified Henri's (1992) analytical instrument in order to analyse students' interactions within TELC. Based on the literature, Henri's (1992) analytical instrument is the most cited instrument in online learning research and is often used as a starting point in many Computer Supported Collaborative Learning (CSCL) studies (Wever, et al., 2006, p.11). It also can be considered as pioneering work and has been the base for subsequent research of online learning environment (Wever, et al., 2006).

In order to safeguard credibility and to validate the coding procedures of the modified categories from Henri's (1992) model, intra-rater and inter-rater coding were employed. Intra-rater was conducted by the researcher as 'coder agreeing with his self (coding) over time' (Wever, et al., 2006). This was done by running the coding multiple times before reaching coding stability. The inter-rater reliability (the ability of multiple and distinct groups of researchers to apply the coding scheme reliably) was conducted between two independent coders agreeing with each other (Wever, et al., 2006). Guidelines for coding were formulated stating clearly what comprises a unit, and descriptions of all categories. Two graduate Malaysian researchers were asked to help with the coding with the guidelines and instructions were introduced to them. A one-hour training session was held during which these guidelines explain. After that, one transcript was randomly selected (altogether totalling approximately 10% of online transcripts) and coded separately by the two coders and they then compared their results. The result across all categories reached a Cohen's Kappa value of 0.81 compared with individual categories such as interactive with 0.84, social with 0.74, cognitive with 0.71 and information processing (surface and deep) with 0.72. According to previous researchers (Rourke, et al., 2001; Neuendorf, 2002; Wever, et al., 2006) a value above 0.75 (sometimes 0.80) is considered to be excellent agreement beyond chance; a value below 0.40 indicates poor agreement beyond chance; and values from 0.75 to 0.40, represent good to fair agreement beyond chance. This study's yielded 0.81 Cohen's Kappa value for the consistency of inter-raters' agreement which can be considered highly reliable (Wever, et al., 2006).

Qualitative analysis was conducted on the data collected from interviews with students. The verified interview transcripts by participants were analysed constant comparative method at two levels: within-case analysis and cross-case analysis, in order to generate meaningful qualitative themes (Maykut & Morehouse, 1994; Huberman & Miles, 2002; Merriam, 2009). In this method, each individual group of transcript was studied and emerging themes from the data will be coded and compiled for each group. The emerging themes were then compared across groups and subsequently categorise into similar units of meaning. The categories were continually refined, changed, merged or removed and grouped accordingly. Cross-case analysis within and between groups were conducted to explore relationships and patterns that emerged from the interactions within each individual group case.

### *5.4. Phase 4: Reporting the findings*

The final phase of this study research is the stage of reporting the findings of the study. Creswell (2008) suggests that the report of a study that include both quantitative and qualitative methods depending on whether the strategy for conducting the study was sequential or concurrent. A sequential study is one where qualitative and quantitative phases are conducted separately in the research and a concurrent study is one in which the quantitative and qualitative methods are applied concurrently, as was the case of this study. Therefore, the report of the findings in this study is structured to answer the research questions using both analysis and interpretation of quantitative and qualitative data. This was the structure adopted for reporting the findings for this study.

## **6. Online interaction dimensions in TELC**

Previous research in the literature suggests that monitoring and facilitation of online learning environment can be initiated by providing learners with appropriate support by adjusting the TELC activities based on learner's interaction dimensions (Henri, 1992; Pozzi, et al., 2007). For this study, the researcher has established four developed dimensions with added categories are elaborated upon as follows:

- The participative dimension categories were developed to include categories based on the level of participation determined through students' number of postings and viewings (Mohamad Said, Forret & Eames, 2011). These categories were based on two types of indicator of students' active and passive participation. Active participation was measured through the number of postings students made in the online discussion while passive participation measured the frequency of students viewing particular posts in the online discussion.
- The interactive dimension categories were developed to include categories based on thematic units referring to physical aspects of the online communication such as the frequency of explicit and implicit (or collaborative) interactions, and independent (or cooperative) statements (Mohamad Said, Forret & Eames, 2011). The research also considered the

qualitative aspects of students' interactions by identifying students' ways of interacting online (such as used in this research: providing information, sharing views, sharing experiences, agreeing and disagreeing, posing questions, suggesting new ideas, giving feedback, and clarifying ideas) during the intervention activities (Pozzi et al., 2007).

- The social dimension categories were developed to include categories based on thematic units characterized by affection and cohesiveness exhibited during communication in online discussions (Mohamad Said, Forret & Eames, 2011). Thematic units characterized by affection include the use of emotional expressions (such as used in this research: emotion icons or emoticons) and thematic units characterized by cohesiveness including the use of social cues (such as used in this research: greetings, salutations, concern, encouragement, apology, jokes and humour, and thanking).
- The cognitive dimension categories were developed to include categories based on cognitive presence revealed by thematic units referring to (1) revelation (renamed as clarification) that is, recognizing a problem, explaining or presenting a point of view; (2) exploration (renamed as judgment) that is, expressing agreement or disagreement, argumentation, exploring or negotiating; (3) integration (renamed as inference) that is connecting ideas, making syntheses and creating solutions; (4) resolution (renamed as strategies) that is, reflecting on real-life application suggestions or references to real-life solutions (Mohamad Said, Forret & Eames, 2011).
- Additionally, the information processing (e.g. surface and deep) categories were developed to include categories based on thematic units referring to (1) surface learning that includes reproducing an approach (not wanting to understand the issue or finish with minimum of effort); or staying inside course boundaries (repetition of what is being discussed or required); or an unthinking approach (jumps to a conclusion with an uncritical acceptance of ideas); or fear of failure (focus on negative aspects of the coursework); or extrinsic motivation (more concerned about passing the assessment than learning); and (2) deep learning includes looking for meaning (focus on what is signified, asking questions to understand new information); or relating ideas (relating ideas to previous information or knowledge to generate new ideas); or using evidence (finding alternative ways of interpreting information or justifying with an example); or intrinsic motivation (desiring to learn more about the topics) (Gerbic & Stacey, 2005; Mohamad Said, Forret & Eames, 2011)

## 7. Synthesizing ideas and putting the framework of TELC in action

The ideas from the literature and learner interaction dimensions were integrated into a framework as shown in table 1. Generally, the students' performance is firstly monitored through the participative dimension, which included students' participation and involvement in TELC discussions. In the participative dimension, the TELC group work is facilitated with authentic and relevant tasks that situated the learning in order to accomplish a shared goal. Secondly, the interactive dimension facilitated students' participation in TELC through interactions with their peers and other students. Through these interactions the students could communicate, interact and collaborate with their peers and others in order to access the knowledge, understanding and expertise distributed across the online groups. Thirdly, the social dimension facilitated students' social interactions between their peers and other students. The facilitation of the social dimension used a variety of social cues and emotional expressions in the online posts. Finally, the cognitive dimension facilitated the students' interactions for knowledge construction through their interactions in the TELC discussions.

Table 1. Facilitating students' learning in TELC

<b>Dimension</b>	<b>Facilitation of TELC</b>	<b>TELC Tools</b>
<i>Participative</i> Participation in TELC is situated and goal-directed.	<ul style="list-style-type: none"> <li>• Introduction of TELC by the lecturer via Moodle and self-introductions by students</li> <li>• TELC tasks (online groups):               <ul style="list-style-type: none"> <li>○ Introduction to the case or problem for discussion by posting an overview of it</li> <li>○ All students (Chemistry, Physics and Mathematics) 'read' the case or problem and identify the learning objectives or goals</li> <li>○ Students discuss the learning objectives and problems</li> <li>○ Students apply information gained within an online group to inter-group discussions</li> <li>○ Students discuss solutions and reach a shared understanding</li> <li>○ Students reflect and improve on their group's problem solution</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Course and general online activities (e.g. course content, links, resources, general discussion spaces) that invite active participation</li> <li>• TELC activities that are authentic, relevant and specific to the Malaysian T&amp;L context that accomplishes particular goals</li> <li>• TELC tasks outlined and discussion space for online groups</li> </ul>

<p><i>Interactive</i> Participation in TELC is an interactive process through interacting with students and others.</p>	<ul style="list-style-type: none"> <li>• Facilitating the TELC via Moodle: <ul style="list-style-type: none"> <li>○ lecturer as a moderator to encourage active participation from the students</li> <li>○ Check and monitor the flow of students' activities (recorded by Moodle)</li> <li>○ Check and monitor the flow of the TELC discussions (recorded by Moodle)</li> <li>○ Encourage inputs from group if participation is low</li> <li>○ Encourage cross-references for other students' information or contributions</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Course and general online activities, TELC activities within online groups and inter-groups</li> <li>• Cross-references of students' messages and consideration of other students' contributions</li> </ul>
<p><i>Social</i> Participation in TELC is mediated through social interaction between students and others.</p>	<ul style="list-style-type: none"> <li>• Facilitating the TELC discussions (social) via Moodle: <ul style="list-style-type: none"> <li>○ Check and monitor the discussion and respond appropriately on the subject</li> <li>○ Encourage the use of good online communication (or Net-Etiquette)</li> <li>○ Encourage students to use an informal communication tone and expression, and students' names in the discussion</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Online socialization using social comment characters or emotion icons</li> <li>• Welcome, support and encouragement within online groups and inter-groups</li> <li>• The use of good online communication ethics (or Net-Etiquette)</li> </ul>
<p><i>Cognitive</i> Participation in TELC is distributed through interaction between students and others.</p>	<ul style="list-style-type: none"> <li>• Facilitating the TELC discussions (cognitive) via Moodle: <ul style="list-style-type: none"> <li>○ Lecturer as a moderator to motivate students to contribute substantively in TELC discussions</li> <li>○ Check and monitor the discussion and keep the discussion focused and progressing</li> <li>○ Encourage students to create different perspectives on the discussed topic by contributing new information, negotiating solutions and justifications</li> <li>○ Remind students to cite all quotations, references and sources</li> <li>○ Remind students to continuously reflect on problem solutions and make improvements</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• TELC discussion guides</li> <li>• The use of good online communication ethics (or Net-Etiquette)</li> </ul>

## 8. Evidence for value of learners' interactions in TELC

The evidence of TELC value were marked as a cognitive transformation through groups' developing understanding and gaining expertise, as social transformation through groups developing joint commitment and responsibilities, and emotional transformation through groups developing confidence, attitude and satisfaction. Evidence of interest comes from online transcripts and interviews.

### 8.1. Cognitive transformation: Developing Understanding and Gaining Expertise

All groups' responses from the online group discussions in the course indicated that students had developed understanding and gained knowledge and expertise about Authoring Language, computer and ICT. All nine groups reported becoming more knowledgeable about authoring software, computer and ICT, as reported by Brian from Group 9:

As a learner before I have entered this course, I have never heard of Authorware, let alone the processes of building interactive presentations. My weakness is that I am not highly creative when it comes to building interactive presentations. After entering this course, I have learnt not only about building an interactive presentation but also including other media, display, and so on. These are all available in this course and I am glad that I have participated in it. (Brian, Group 9)

Six groups highlighted the value of participating in the course in helping them improve their computer-related knowledge, as they responded in their online group journal entries. Ain from Group 5 reported:

I felt that my involvement in this course had improved my computer knowledge, in a way that I know more about computers, particularly about authoring and web authoring. Before entering this course I didn't have any knowledge about Authorware, and now I would like to learn more about it. (Ain, Group 5)

Meanwhile, data from interviews corroborated findings from the analysis of online discussion transcripts and revealed a majority of students' mentions about cognitive skills and abilities (more than 42 per cent) were focused on clarification skills, indicating students developing and gaining an understanding of the Authoring Language as well as computers and ICT in general. This also indicated how students participating in the course gained expertise and knowledge in Authoring Language, computers and ICT - from that of a novice at the beginning of the course towards becoming more expert-like at the end of the semester.

### *8.2. Social transformation: Developing Mutual Responsibilities and Relationships*

Students' interactions as a result of participating in online group collaborative learning in the course fostered social outcomes with students changing from competitive and individualistic viewing of learning towards appreciating others' contributions at the end of the course. Ruhi from Group 6 reported how she appreciated her increasing responsibilities for participation in the course:

One of our responsibilities is to remind them and care about others participating in discussions because when we discuss we need feedback, so, by reminding other students to participate in the online discussion, we can get responses for those who are online. (Ruhi, Group 6)

Hami from Group 9 added that through sharing contrasting ideas and disagreement in the discussion he was able to see valuable ideas for learning and develop a mutual relationship with other students in the course. Hami reported:

When I disagree with someone's point, it doesn't mean I'm fooling around, but I want to identify what are the points. I want to see the points and the explanation and also the supportive ideas. If there are points that we can support and argue with our ideas, we are free to point out our view. We are university students, so critics and compliments are a normal thing that we should accept. This is my effort to build partial agreement [mutual relationship] in the discussion so that we can expand the discussion with new ideas. (Hami, Group 9)

Meanwhile, data from online transcripts and interviews corroborates findings indicating students' developing roles and responsibilities towards working together. This also described how students developed mutual responsibilities and relationships in online discussions while learning about Authoring Language, computer and ICT which were evident through their reports of their increasing mutual responsibilities, relationships and commitment within their group and across other groups.

### *8.3. Emotional transformation: Developing Confidence and User Satisfaction*

From the interviews and online discussions set up at the end of the course, all groups commented on how much they had gained confidence through discussion and learning about Authoring Language in particular and computers in general. Ruhi from Group 6 reported:

We have to think critically on how to do the task together because when the lecturer asks us to discuss it in the classroom, we will feel very shy to do it, but the case is different when we do it in eLearning where we feel more confident to do [discuss] it. (Ruhi, Group 6)

Seven groups reported that their participation in the course had changed their attitudes towards learning about Authoring Language, computer and ICT. Busyra from Group 7 reported:

Before entering this course, I was a person who knew nothing about Authorware but after entering this course, I now know what is Authorware and my participation in discussions through eLearning somehow has changed my attitude to be involved more in eLearning and learn more about computer subjects especially this course where we have to participate in an interactive eLearning forum. (Busyra, Group 7)

In addition, six groups responded in the online group discussions that they would recommend the course to other students. All students generally agreed that they enjoyed learning online in the course and were satisfied with their group work outcomes. This described how students reported that they developed their confidence and satisfaction by participating in the course.

## **9. Conclusion**

This paper has highlighted several useful ideas of learning from the socio-cultural perspective in guiding and developing the educational teaching and learning practice. The emphasis of learning with the consideration on social, cultural and historical

contexts mediated by cultural artefacts provides a useful way of analysing the learning context for this research. In this way, this study is able to characterize the process of designing and supporting the incorporation of TELC for learning tertiary ICT education in a Malaysian classroom. The TELC activities in which learning is embedded serve as the core of this research. From these TELC activities, the researcher is able to analyze learning processes and outcomes for the purpose of designing instruction and facilitation. Rather than focusing on knowledge state, the research is focused on the activity in which students are engaged. Articulating each of concepts and approaches that are associated with TELC activity and their dynamic interrelationships is important, because the richer the context and the more embedded the conscious actions are in the context, the more meaning learners could construct both for the activity and the learning. Designing TELC for collaboration and interaction in the classroom is a complex activity that can be difficult to characterize and describe to others because of its dynamic social nature. The investigation would therefore focus on how the incorporation of TELC in a tertiary classroom might create new tools and forms of activity based on the students' collaborative endeavors that would be transformed into learning outcomes.

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