

**A FRAMEWORK OF SOCIAL-BASED LEARNING INTERACTION
THROUGH SOCIAL NETWORKING TOOL**

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SOCIAL NETWORKING TOOL

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To my beloved country, “Yemen”

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ABSTRACT

The purpose of this research is to develop a framework of social-based learning interaction through the use of social networking tool; Facebook. The sample for this study was Masters' students of Educational Technology program. The data collection was done through two phases. Phase 1 involved 49 students who responded to the questionnaire, and phase 2 involved 11 students and 2 instructors who participated in one semester's online interaction via Facebook. This research employed a pre-experimental design, which involved a one-group pretest-posttest to measure the improvement in students' academic performance after going through online interaction via Facebook. A questionnaire was used to collect data about students' perceptions of instructor-student interaction (ISI), student-student interaction (SSI) and students' social presence (SP) while Facebook discussion group was used to collect interaction data among students and instructors. Questionnaire data were analyzed through means and standard deviations and Facebook transcripts were analyzed through frequencies of each investigated category. Next, the data mining decision tree technique was used to identify which SSI categories contributed to higher students' grades and the association rule was applied to establish a social-based learning interaction framework. The findings of the questionnaire showed that students have high perceptions of ISI ($\mu= 4.06$) and SSI ($\mu= 4.18$) via Facebook. Moreover, students showed high perceptions of their SP when using Facebook for learning ($\mu= 4.15$). Findings from Wilcoxon's Signed Ranks Test indicated a significant improvement in students' performance in test after going through interaction via Facebook, while the effect size test confirmed the large effect of the interaction via Facebook on students' performance. The findings from the Facebook transcripts showed that the instructors mostly used facilitating discourse (FD) followed by direct instruction (DI). Instructional design and organization (IDO) was the least frequently used category by the instructors. On the other side, students tended more to deliver clarification (C) followed by the interpretation category. Moreover, students transmitted more support (S) than reflection (Ref) or replies (Rep) to others' questions and asking questions (Q) compare to the Judgment (J) category; which was the least frequently used category. Noticeably, students declined to transmit conflict, assertion and consensus-building statements during their interaction via Facebook. Additionally, students tended to promote more interactive responses (IR) than cohesive responses (CR) or affective responses (AR) in their SP. However, data mining analysis using the decision tree technique showed that students need to transmit more clarification (C) and interpretation (I) categories of SSI in order to achieve grade A in their tests. The social-based learning framework suggested that the FD and DI categories of ISI are associated with the Rep, C and I categories of SSI and the IR category of SP to assist students' learning and enhance academic performance.

ABSTRAK

Tujuan kajian ini adalah untuk membangunkan satu kerangka interaksi pembelajaran berasaskan sosial melalui alat rangkaian sosial; Facebook. Sampel kajian ini terdiri daripada pelajar pascasiswazah dalam program Teknologi Pendidikan. Pengumpulan data dilakukan melalui dua fasa. Fasa 1 melibatkan 49 orang pelajar yang telah menjawab soal selidik, dan fasa 2 melibatkan 11 orang pelajar dan 2 orang pengajar yang mengambil bahagian dalam interaksi dalam talian selama satu semester melalui Facebook. Penyelidikan ini menggunakan reka bentuk pra-eksperimen yang melibatkan satu kumpulan ujian pra-pasca untuk mengukur peningkatan dalam prestasi akademik pelajar selepas melalui interaksi dalam talian melalui Facebook. Soal selidik telah digunakan untuk mengumpul data mengenai persepsi pelajar terhadap interaksi pengajar-pelajar (ISI), interaksi pelajar-pelajar (SSI) dan kehadiran sosial pelajar (SP) manakala kumpulan perbincangan Facebook telah digunakan untuk mengumpulkan data interaksi antara pelajar dan pengajar. Data soal selidik telah dianalisis menerusi min dan sisihan piawai dan transkrip interaksi di Facebook dianalisis menerusi kekerapan bagi setiap kategori yang dikaji. Seterusnya, teknik *data mining*, iaitu analisis *decision tree* telah digunakan untuk mengenal pasti kategori manakah yang paling tinggi menyumbang kepada pencapaian pelajar dan analisis *association rule* telah digunakan untuk menghasilkan kerangka interaksi pembelajaran berasaskan sosial. Hasil soal selidik menunjukkan bahawa pelajar mempunyai persepsi yang tinggi terhadap ISI ($\mu = 4.06$) dan SSI ($\mu = 4.18$) melalui Facebook. Selain itu, pelajar menunjukkan persepsi yang tinggi untuk SP apabila menggunakan Facebook untuk pembelajaran ($\mu = 4.15$). Dapatan ujian Wilcoxon menunjukkan peningkatan yang ketara dalam prestasi pelajar dalam ujian selepas melalui interaksi melalui Facebook, manakala ujian kesan saiz menunjukkan kesan yang besar antara interaksi melalui Facebook kepada prestasi pelajar. Dapatan daripada interaksi di Facebook menunjukkan bahawa pengajar kebanyakannya memudahkan perbincangan (FD) diikuti dengan memberi arahan langsung (DI). Reka bentuk pengajaran dan organisasi (IDO) merupakan kategori yang paling tidak kerap digunakan. Dalam pada itu, pelajar cenderung untuk menyampaikan penjelasan (C) diikuti oleh kategori tafsiran. Selain itu, pelajar lebih banyak memberikan sokongan (S) berbanding refleksi (Ref) atau membalas komen kepada soalan-soalan orang lain (Rep) dan bertanya soalan (Q) berbanding kategori penghakiman (J) yang paling kurang digunakan. Antara lain, pelajar enggan menyatakan konflik, penegasan dan kenyataan yang menyatakan persetujuan semasa berinteraksi melalui Facebook. Selain itu, pelajar cenderung untuk menggalakkan lebih banyak maklum balas interaktif (IR) daripada jawapan yang padu (CR) atau respons yang afektif (AR). Walau bagaimanapun, analisis *data mining* menggunakan teknik *decision tree* menunjukkan bahawa pelajar perlu menghantar lebih banyak penjelasan (C) dan tafsiran (I) dalam kategori SSI untuk mencapai gred A dalam ujian mereka. Kerangka interaksi pembelajaran berasaskan sosial mencadangkan bahawa kategori FD dan DI oleh ISI berhubung kait dengan kategori Rep, C dalam SSI dan kategori IR dalam SP untuk membantu pembelajaran pelajar dan meningkatkan prestasi akademik mereka.

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LIST OF ABBREVIATIONS

| | | |
|------|---|---------------------------------------|
| A | - | Assertion |
| AR | - | Affective Response |
| C | - | Clarification |
| CB | - | Consensus Building |
| COI | - | Community of Inquiry |
| Conf | - | Conflict |
| CR | - | Cohesive Response |
| DI | - | Direct Instruction |
| FD | - | Facilitating Discourse |
| I | - | Interpretation |
| IDO | - | Instructional Design and Organization |
| IR | - | Interactive Response |
| ISI | - | Instructor-student Interaction |
| J | - | Judgement |
| OSPQ | - | Online Social Presence Questionnaire |
| Q | - | Question |
| Ref | - | Reflection |
| Rep | - | Reply |
| S | - | Support |
| S1 | - | Student 1 |
| SP | - | Social Presence |
| SSI | - | Student-student Interaction |

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Online interaction is becoming increasingly important in light of the higher education trends towards online and blended learning. Universities tend to use various types of media for online learning due to the benefits of online interaction. The emergence of social networking has offered possible tools that can be used as a medium of online interaction in higher education. Compared to learning management systems, social networking tools have features that facilitate social interaction among learners without faculty control. The interactive features of social networking tools make them different from other media among higher education students, as they provide a reliable means of communication (Tasir, Al-Dheleai, Harun and Shukor, 2011). It seems that higher education students' preference for and acceptance of the use of social networking tools to support social interaction for educational purposes is directed by the capacity and features provided by such tools (Jahan and Ahmed, 2016).

In education, student's social interaction with the instructor and peers is important for the occurrence of learning. Interaction among learning participants can be done either face-to-face in a classroom environment or from a distance through an online learning environment. The Community of Inquiry (COI) model identifies the instructor and students as the key participants in the educational process through computer conferencing (Garrison, Anderson and Archer, 2000). Based on the COI

model, educational transaction via computer conferencing can be achieved through cognitive presence, social presence and teaching presence (Garrison et al., 2000). Social presence, on the other hand, is the participants' ability to project themselves as real through the communication medium. Moreover, teaching presence, which reflects the responsibilities of online instructors to design the instructional process and to facilitate discourse among students (Garrison et al., 2000). Additionally, cognitive presence reflects the process of meaning construction through sustained communication/interaction among students. In this study, teaching presence element was used to analyze instructor-student interaction and while students' social presence was analyzed using social presence categories. However, cognitive presence was excluded in this study because this study was looking at students learning from knowledge construction perspective based on social constructivist learning theory by (Vygotsky, 1980). Therefore, to analyze student-student interaction content, this study used knowledge construction categories by Pena-Shaff and Nicholls (2004) which is based on social constructivist learning theory.

In an earlier study, Moore (1989) suggested three fundamental types of online interaction that occur in educational settings, namely learner-content, learner-instructor, and learner-learner interaction. Except for learner-content interaction, Moore's types of interaction highlight the importance of interaction among teaching and learning participants, which connect students with the instructor and with other students. Online interaction between the instructor and the student (Learner-Instructor) and between the student and other students (Learner-Learner) is the interaction that occurs among learning community participants. Instructor-student and student-student interaction are considered as essential elements for students' learning and the effect of online learning (Sher, 2009). This importance raises the need to investigate instructor-student and student-student interaction via social networking tools because no research to date has explored these types of interaction through social networking tools and their effects on students' academic performance.

Social networking tools have been identified as a major medium for social interaction (Keenan and Shiri, 2009). These tools have shifted the way the internet is used from isolated web surfing to social interaction, and this shift has created new

opportunities for social interaction, social presence and social activities (Jaeger and Xie, 2008; Steinman, 2010). Unlike traditional websites, social networking tools enable their users to be active participants in knowledge creation and information production rather than passively consuming knowledge. The abovementioned features of social networking tools have made them valuable tools for course-related interaction in higher education institutions. It is therefore necessary to conduct research to discover the potential of those tools for educational use and to formulate a social-based learning interaction framework in order to bring about change in the online and blended learning environment.

1.2 Background of the Problem

In education, interaction is considered essential for students' learning and for the effectiveness of online learning (Sher, 2009). Shale and Garrison (1990) stated that interaction is "education at its most fundamental form". Based on social constructivist theory, learning is a result of the process at the social level followed by the individual level (Vygotsky, 1980). At the social level, the individual builds knowledge and meanings through interaction with the individuals and groups of people around him/her. Therefore, learning is the activity that takes place among active members of society and not within isolated individuals (Yang and Wilson, 2006; Idris and Ghani, 2012). It occurs in the way that learners interact with knowledge sources in social settings and then play an active role to reconstruct their own meanings and knowledge with their own minds (Gunawardena et al., 2009). Simply, knowledge construction is the result of active interaction with the people around the learner, followed by the learner's personal efforts in building his/her own meanings.

Different types of interaction may guide students' learning in the online learning environment. In education, social interaction occurs through human communication during the learning process. Moore (1989) distinguished between three types of interaction in online learning and distance education, namely learner-content, learner-instructor and learner-learner interaction. Moore (1989) represented

human interaction during the learning process as learner-instructor interaction, which is equivalent to instructor-student interaction, and learner-learner interaction, which is equivalent to student-student interaction in this study. Therefore, the focus of this study is more on the social interaction that occurs between instructors and students and the interaction among students using a social medium. Moore's types of interaction emphasized the importance of inter-learner interaction, which he considered as a "valuable resource for learning and sometimes even essential". On the other hand, Moore regarded instructor-student interaction as essential for many educators and highly desirable for many learners (Moore, 1989). Student-student and instructor-student interaction and collaboration seem to be the keys to the learning process and learning is the result of these interactions (Palloff and Pratt, 1999).

Both instructor-student and student-student interaction have an impact on student learning in a computer-based course. In multimedia-assisted instruction for application development subjects, for example, students face difficulties when working alone on the development of computer application assignments. Novice students feel frustrated while working with errors in computer programs (Deek and Espinosa, 2005), especially when they work without collaboration and support from more experienced others. During classroom sessions, lecturers do not have enough time to explain every detail of the systematic exercises. Therefore, repeated software error messages need instructors' and students' group interaction to share experience and motivate students (Warren et al, 2014) through collaborative discussion to correct the mistakes that lead to these error messages. Outside the classroom, collaborative interaction and discussion with others may help students to overcome the frustration that results from repeated error messages.

In online interaction, technology has provided a new avenue for students and instructor to communicate out of classroom time and extended learning beyond spatial and time boundaries. As a result, learners and instructors' discussion is no longer limited to face-to-face interaction. Therefore, instructor-student and student-student discussion can be achieved through the online medium at anytime and from anywhere. The desired online discussion can be achieved better through a medium that is favored by learners and has features that support students' online interaction.

The quality of online discussion depends on students' perception of the online medium (Lee, Cheung and Chen, 2005), the design of the interaction session and the guidance of the instructor (Nir-Gal, 2002).

Student interaction out of classroom time is strongly recommended to allow them to discuss their course-related matters and support each other in the knowledge construction process through online media. Nowadays, most university students are active users of social networking technology. The good features of the emerged social networking tools are that they can allow their users to interact, collaborate, and to create their own content. University students support the idea of using social networking tools as e-learning platforms and have expressed their readiness to use them for educational purposes (Tasir et al., 2011; Aydin, 2012). Because of the openness of social networking tools, students feel encouraged to participate in course-related discussion, interaction and knowledge sharing with other class members. Additionally, researchers and practitioners have found social networking tools to be an appropriate space for learners' interaction and collaboration when negotiating their study (Selwyn, 2009) and they are considered as powerful tools for social interaction in constructivist learning environments (Bruns and Humphreys, 2005). In social networking tools, student-student text-based interaction can take different themes and meanings, as reflected in students' posted notes during the process of knowledge construction in the online learning environment. Therefore, there is a need for a study that analyzes the patterns of student-student course-related interaction via social networking tools and to measure its effect on their learning.

Instructors' role of guidance in online interaction is to maintain students' interaction and discussion in line with the course objectives. The presence of the instructor in online interaction is a critical component of students' engagement that leads to effective learning. In the online learning environment, the instructor could play the role of course designer, discussion facilitator, and course planner (Anderson, Rourke, Garrison and Archer, 2001). Similarly, using social networking tools, the role of the instructor is no longer limited to initiating and guiding the knowledge construction process, as it was in the traditional learning context (Choy and Ng, 2007). Instead, the instructor acts as a model who maintains an appropriate form of

students' online interaction in the social media environment (Hurlburt, 2008) and as a course designer by employing the appropriate pedagogy that matches the tools used in the online learning environment (Committee, 2009).

The key issue in achieving the quality and frequency of the types of interaction required is the selection of the appropriate interaction medium. The policy brief reported by the Organization for Economic Co-Operation and Development (OECD) stated that the essence of learning management systems like Blackboard, Moodle and other systems is their focus on course management (OECD, 2005) controlled by the instructor and administration staff. Interaction through learning management systems' forums is totally controlled by the instructor. Frequent interaction, social presence, a sense of community and the social constructivist approach, which emphasize students' learning activities, are not promoted by learning management systems in the way that social networking tools do (Dalsgaard, 2006; DeSchryver et al., 2009).

One of the most widely used social networking tools, especially among young people, is Facebook. The range of Facebook users' ages show that most of them are at university age. The latest Facebook statistics showed that there are 13.3 million Facebook users in Malaysia (Adnan and Mavi, 2015) and that most of these users are aged between 18 and 34, representing 54 percent of the total Facebook users in the country. Additionally, young people spend a great deal of their time on Facebook for different purposes. Therefore, as a widespread and acceptable tool and also as a platform for social interaction in learning among university-aged youth, research that investigates the potential of Facebook use as an online course-related tool in tertiary education is strongly needed.

Facebook has several features that make it a possible tool to mediate course-related interaction. Facebook supports personal messaging, where user can send text messages, documents, photos, video and links. Additionally, chat feature on Facebook allows voice and video call and group conversation. Moreover, user can post or share information using Facebook "Wall" space; Facebook also has features that allow users to comment, reply to comment and like post or comment. Facebook

also has “Events” feature which is visible on the wall to remind users about specific events and “News Feed” feature to report the activities that done by the user social circle (Mouns and Twoner, 2011). Similar to Facebook wall, Facebook’s group allow its members to post text, share different types of documents, videos, links, photos. Moreover, group members can comment, reply to comment, like and tag selected members. Conversations through Facebook’s group can reduce the instructor and students’ privacy concern and make the work more professional (Al-Dheleai and Tasir, 2015).

Higher education students spend a great deal of their time and energy on Facebook. Unfortunately, students use Facebook almost entirely for social purposes and give it little attention in terms of study. The time and energy spent on Facebook has an effect on students’ academic performance. Students’ learning can be affected positively or negatively by the purpose of the use of Facebook. Researchers have found a positive effect on students’ academic achievement when they use Facebook for learning purposes (Junco, 2012). Because many students are daily users of Facebook, researchers have suggested that Facebook offers great teaching and learning potential (Wang, Woo, Quek, Yang and Liu, 2012).

Facebook has been the subject of previous research in the field of education from various aspects. Most of these studies have focused on faculty and students’ perceptions of Facebook use as a communication tool and for academic purposes (Hurt et al., 2012; Arteaga, 2014; Roblyer et al, 2010; Grossecket al, 2011). Additionally, other studies have investigated the role of Facebook in social integration and community formation among university students (Duncan and Barczyk, 2013; Madge et al., 2009). Moreover, some studies have focused on Facebook group features that facilitate collaborative learning (Choi, 2013; Wang et al, 2012).

At present, there are a few empirical studies that have examined the potentiality of Facebook and Facebook groups to facilitate course-related instructor-students and student-student interaction and its effect on students’ academic performance. Most of these studies have focused on the potential of Facebook as a

learning medium and its effectiveness (Kabilan et al., 2010, Wesseling, 2012, Idris and Ghani, 2012, Jumaat and Tasir, 2013). The existing studies have not focused on producing any framework or guidelines for instructor-student and student-student social interaction. However, one study has developed a framework for the use of Facebook in education: this study was conducted in the Malaysian context and developed a framework of metacognitive scaffolding that enhanced students' performance (Jumaat and Tasir, 2016). As a result, there is still a gap in research and knowledge about the potential of social interaction in enhancing students' learning and also about how such interaction benefits learners. Moreover, there is a lack of a framework to guide instructor-student and student-student social interaction via Facebook. Therefore, the present study is an effort to investigate student-student and instructor-student interaction and to develop a framework to guide course-related interaction to enhance students' learning and academic performance.

As mentioned earlier, educational researchers and practitioners consider interaction as a key point of learning and knowledge building. As a result, it is imperative to conduct a study to investigate Facebook's potential to facilitate instructor-student and student-student interaction, types of students' social presence and how it enhances students' academic performance. The suggested study gains its importance from the need to provide a framework that can guide the use of Facebook for course-related interaction. Such a framework might lead to more productive use of students' time and energy spent on Facebook for the benefit of their learning and thus enhances their academic performance. Previous studies have reported that Facebook is the social networking tool that is most widely preferred and used by university students (Tasir et al., 2011; Aydin, 2012). Therefore, the purpose of this study was to examine the affordance of Facebook as a medium for course-related instructor-students and student-student interaction as a tool that meets students' needs and preferences.

1.3 Problem Statement

From an educational perspective, students' learning and academic performance are highly affected by the quality and the frequency of interaction. More interaction among learning participants can positively contribute to students' academic performance (Sher, 2009; Long et al, 2011). In the online learning environment, the nature of the medium of interaction influences the quality and the frequency of the interaction. The problem with some online interaction media is that they have features that facilitate certain type of interaction but not others (Moore, 1989), while some media fail to support the social constructivist approach, which emphasizes students' self-governed learning activities (Dalsgaard, 2006). On the other side, some courses or subjects need more interaction among course participants to facilitate learning and achievement and enhance academic performance.

On computer-based courses, students need more interaction with their peers and with instructors to overcome learning difficulties, as they may find it difficult to achieve complex tasks on their own (Jumaat, 2014). On courses such as the Authoring System course examined in this study, students are involved in technical aspects of using Authoring System software to develop learning applications and interactive webpages as well as in theoretical aspects. In this regard, students need to improve their technical skills to work with the basic functions of Authoring System software to develop interactive multimedia applications and web-based applications. To be able to work with authoring tools, students need knowledge and capabilities of using such tools (Sindhu and Ramesh, 2006). While working with such software, novice learners often become frustrated because of their lack of sufficient preparation to grasp the concepts and the speed with which instructors teach programming concepts (Deek and Espinosa, 2005). Therefore, novice students who do not have a clear understanding tend to fall behind and find it difficult to catch up compared to those who have prior experience (Deek and Espinosa, 2005). Additionally, students seem to find it hard to develop multimedia applications and web-based applications while facing unexpected errors and problems that are difficult to solve by themselves. These difficulties are particularly evident among Authoring System course learners, most of whom come from non-computer backgrounds. To help them

to overcome such difficulties, students need to engage in more interaction with peers and instructors to be provided with help and scaffolding through online discussion to solve the problems and improve their skills of building such applications. Instructor-student and student-student interaction in such courses may reduce students' frustration and help them in knowledge construction, leading to assignment achievement and better academic performance.

Therefore, to achieve the desired interaction, it is important to select an online medium that has the potential to facilitate instructors' and students' discussion to support students' learning. The researcher hopes that the appropriate use of Facebook may facilitate such interaction and therefore help students to overcome the difficulties that appear during their work in developing multimedia and web-based applications. In this study, Facebook was used to enable students to discuss through clarification and interpretation, ask questions, reply other students' questions, agree or disagree with others' ideas. Moreover, through Facebook interaction students may build consensus or assert on certain idea, judge the suggested solution and evaluate learning topics, reflect on their learning and lastly provide support and share feelings and empathy with others. On the other side, the instructors' role was to guide students' knowledge construction through discourse facilitation, direct instruction and instructional design and organization.

Fortunately, unlike learning management systems, Facebook is an open environment for instructors' and students' online interaction that can support students' learning. Through Facebook, instructors and students can share information resources, initiate course-related discussion, construct knowledge and solve shared problems. It is expected that through Facebook, students will have the opportunity to reflect their social presence due to the social nature of the medium. Moreover, the presence of the instructor in such a tool to guide students and facilitate discourse could be the factor that grants the effective use of Facebook as a medium to facilitate students' learning and to enhance their academic performance.

Therefore, this study explored students' perceptions of the use of Facebook for instructor-student and student-student interaction and students' social presence. Moreover, the study analyzed the frequencies of the instructor-student, student-student interaction and social presence categories use during Facebook interaction and the effects of the interaction on students' performance. At the end of this study, the researcher developed a framework of social-based learning interaction via the social networking tool Facebook.

1.4 Research Objectives

The objectives of this study are as follows:

- i. To investigate students' perceptions of instructor-student and student-student interaction and students' social presence via Facebook.
- ii. To identify the most frequently used categories of instructor-student and student-student interaction via Facebook.
- iii. To identify the most frequently used categories of students' social presence in interaction via Facebook.
- iv. To analyze students' performance in tests before and after instructor-student and student-student interaction via Facebook.
- v. To develop a framework of social-based learning interaction via Facebook that guides students' learning.

1.5 Research Questions

This study will answer the following research questions:

- i. What is students' perception of instructor-student and student-student interaction and students' social presence via Facebook?
- ii. What are the most frequently used categories of instructor-student and student-student interaction via Facebook?

- iii. What are the most frequently used categories of students' social presence in interaction via Facebook?
- iv. Is there any significant difference in students' performance in tests before and after instructor-student and student-student interaction via Facebook?
- v. What is the framework of social-based learning interaction via Facebook that guides students' learning?

1.6 Theoretical Framework

The theoretical Framework is the base theory or concepts that will be used to organize the work and guide the researcher throughout the study. In this study, several instructional concepts and strategies will contribute to the development of the framework of social-based learning through instructor-student and student-student interaction and social presence on the social networking tool Facebook. Reflective thinking theory was selected in this study as community of inquiry (COI) model is grounded in reflective thinking theory. However, COI was the source of measuring instructor-student interaction and students' social presence in this study. Moreover, social constructivist theory, social interaction, COI model and problem-based learning principles are the concepts that will be used to achieve the targeted quality and outcomes of online interaction on the social networking tool Facebook. Figures 1.1 and 1.2 show the theoretical and conceptual frameworks that will be implemented in this study.

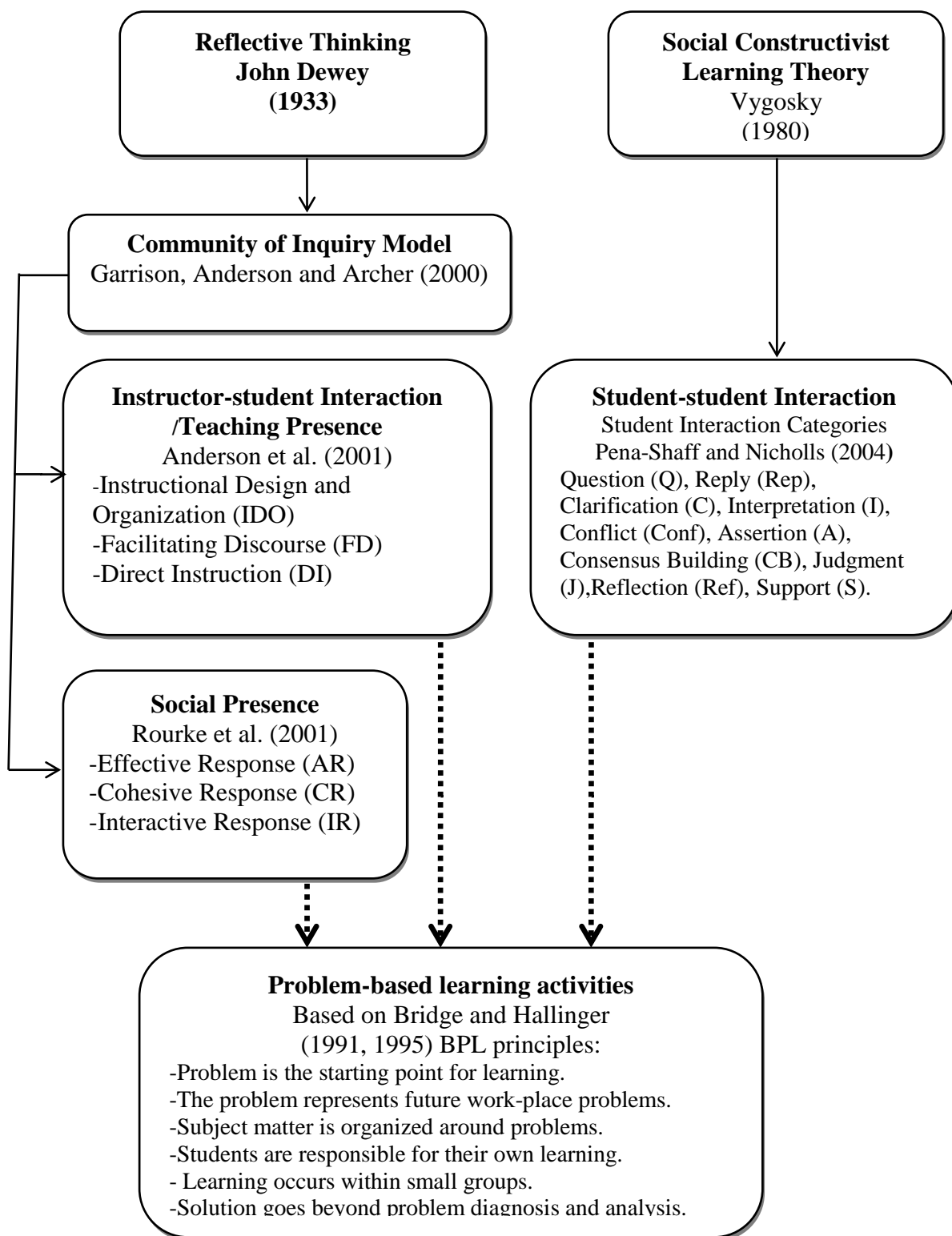


Figure 1.1: Theoretical Framework

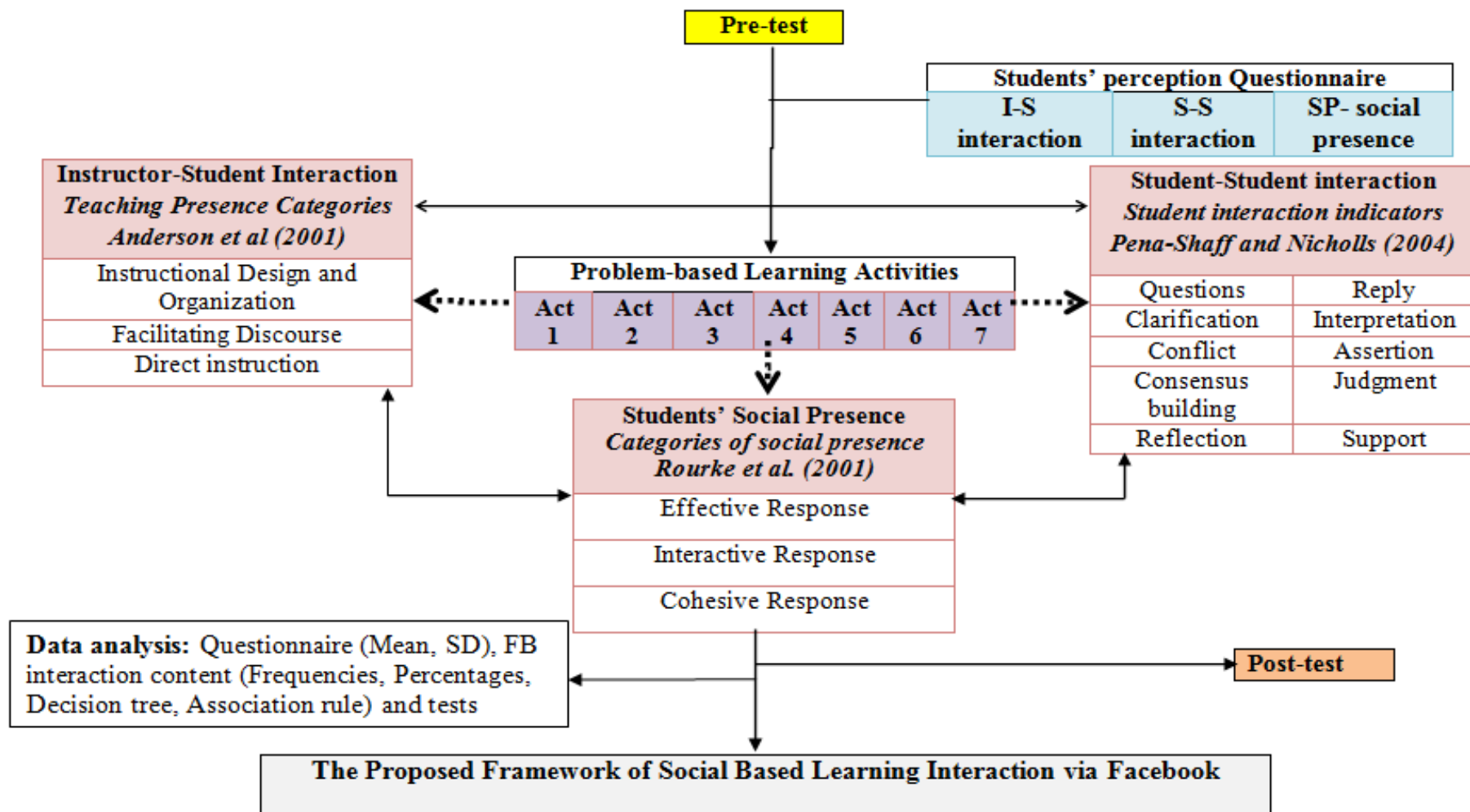


Figure 1.2: Conceptual Framework

1.6.1 Social Constructivist Learning Theory

In social constructivist learning theory used in figure 1.1, learners' interaction with the social context around them is the source of learning. Vygotsky's social constructivist learning theory emphasizes the importance of social and cultural interactions in the learning process. Social constructivists views knowledge construction as the product of social interaction, interpretation and understanding (Vygotsky, 1980) and the reality is constructed through human activity (Lim, 2001). The social aspect in Vygotsky's theory came from his opinions that knowledge is co-constructed, individuals learn from each other, learners' engagement in the learning process is vital, and learning occurs with the assistance of others. Social interaction plays an important role in the learning process and therefore Vygotsky suggested the concept of the Zone of Proximal Development, in which the learner constructs new knowledge through socially mediated interaction with more knowledgeable others.

1.6.2 Social Interaction

Social constructivist learning theory highlights the importance of social interaction in the learning process. Interaction plays a primary role in the development of cognition. In social interaction, the negotiation of meaning is allowed within the culture of the community. Within the community, individuals are able to develop these higher mental functions through their use of tools and symbols, especially language (Barbour and Rich, 2007).

Thurmond (2003) defined interaction as the learner's engagement with the course content, other learners, the instructor, and the technological medium used in the course. Muirhead and Juwah (2004) described interaction as "a dialogue or discourse or event between two or more participants and objects which occurs synchronously and/or asynchronously mediated by response or feedback and interfaced by technology". From the perspective of social learning theories, social interaction is a process of communications or conversations that lead to the

accomplishment of the learning tasks or the development of the cognitive understanding of the course content. Learner participation in learning activities, group based-projects and discussion with peers and the instructor are examples of such interaction (Tan, 2006). Therefore, learning is the result of the social exchange of ideas, knowledge, and experience.

1.6.3 Community of Inquiry Model

Community of Inquiry (COI) is a model that focuses on educational communities of inquiry that are formed from a group of individuals who collaboratively engage in a critical discourse and reflection for the purpose of learning. It is a theoretical framework that shows the process of creating a deep learning experience through developing three elements, namely cognitive, social, and teaching presence (Garrison et al., 2000). The basis of COI comes from Dewey's (1933) conception of practical inquiry, which included three situations: pre-reflection, reflection, and post-reflection (Garrison et al., 2000). In this study, the researcher adapted two elements from COI, namely teaching presence and social presence.

Teaching presence is the role of the online instructor in managing online learning through providing the course design and facilitating discourse and direct instruction in a way that influences students' learning outcomes. On the other hand, social presence focuses on three categories which represent learners' expressions of emotions towards the course and other learning participants, open communication and recognition of others' contributions and lastly the focus on group cohesion, which basically reflects the learners' sense of belonging to the learning community which can lead them to share personal meaning as a part of the community (Garrison et al., 2000).

1.6.3.1 Instructor-Student Interaction as Teaching Presence

Instructor-student interaction in this study is based on the teaching presence element of the COI model (Garrison et al., 2000). Teaching presence is the role of the instructor in computer conferencing or the online learning environment and includes the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes (Anderson, Garrison, & Garrison, 2001). Teacher presence in online learning is represented in three categories, namely instructional design, facilitating discourse and direct instruction (Anderson et al., 2001). Therefore, this study will use these teaching presence categories to understand the role of online instructors during instructor-student interaction to enhance students' academic performance.

1.6.3.2 Social Presence

Social presence is the second element of the COI model (Garrison et al., 2000). Social presence is defined as “the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships” (Short, Williams and Christie, 1976). Although Short et al.'s model was applied to telephone, audio and video interaction, it has had a great influence on CMC and all current approaches to social presence (Becker, 2012). Social presence is also defined as “the degree of person-to-person awareness, which occurs in the computer environment” (Tu, 2002) and as the “level of awareness of the co-presence of another human, being or intelligence” (Biocca and Nowak, 2001), as the sense of “being with others” (Heeter, 1992) and as “the degree to which a person is perceived as a ‘real person’ in mediated communication” (Gunawardena and Zittle, 1997). Social presence was also defined as the learners' ability to project themselves socially and affectively into a community of inquiry (Garrison, 1997). However, social presence in online learning is the perception of “we are here” rather than the perception of “I am here” in physical presence case (Lee and Nass, 2005). Rourke et al. (2007) identified three indicators of social presence in Computer-Mediated

Conferencing (CMC) as interactive responses, affective responses and lastly cohesive responses. The present study will use these three categories to analyze the transcript of students' social presence during student-student interaction via Facebook.

1.6.4 Student-student Interaction

Student-student interaction stands for inter-learner interaction that occurs between one learner and others alone or in group settings, with or without the real-time presence of an instructor (Moore, 1989). Student-student interaction is also defined as the degree to which students feel connected to other members of the class (Becker, 2012). Researchers have considered student-student interaction as an important part of instructional design in distance learning and in face-to-face learning because it supports the use of more accepted learning approaches such as constructivism, which is a teaching approach that emphasizes learners' self-construction of knowledge through experience (Andersen, 2013).

Pena-Shaff and Nicholls (2004) developed a form of knowledge construction through several categories to measure student interaction in computer conferencing for course-related discussion. Student interaction categories are question, reply, clarification, interpretation, conflict, assertion, consensus building, judgment, reflection, support and finally 'others', which represents messages that could not be identified under the aforementioned categories (Pena-Shaff and Nicholls, 2004). The content of student-student interaction in the present study was analyzed using Pena-Shaff and Nicholls' categories.

1.6.5 Problem-based Learning Principles

Problem-based learning (PBL) is a student-centered, constructivist learning method (Hallinger, 2005). It is also defined as an instructional method in which students learn through facilitated problem solving (Hmelo-Silver, 2004). In problem-based learning, students have more control over their learning than in the traditional approach: they work in a small group and acquire new knowledge to be able to solve authentic, ill-structured, and cross-disciplinary problems that represent future professional practice (Barrows, 1996). Through the tutorial process and instructor guidance, problem-based learning supports students to construct their knowledge during their learning and problem-solving processes (Hmelo-Silver, 2004).

Bridges and Hallinger (1991, 1995) identified the following principles for problem-based learning and this study used the principles in crafting the PBL activities:

- i. The starting point for learning is a problem.
- ii. The problem represents what students might face in the future workplace.
- iii. Subject matter is organized around problems rather than disciplines.
- iv. Students are responsible for their own learning process.
- v. Most learning occurs within the context of small groups rather than lectures.
- vi. The solution to the focal problem has an implementation focus that goes beyond problem diagnosis and analysis.

1.7 Rationale for the Study

The social networking tool Facebook has become the most widely used tool among university-aged youth. It is therefore vital to conduct a study to examine the affordance of this tool for learning. The findings of the study are useful, as it first identifies Facebook's ability to facilitate online social instructor-student and student-student interaction during the learning process. The findings of this study also reveal

students' perceptions about social interaction and social presence on Facebook as a tool for course-related interaction. Based on the findings of this study, higher education institutions can take decisions about the future adaption of Facebook as a course-related interaction tool.

Furthermore, this study has identified students' learning processes through social interaction via the social networking tool Facebook. It also revealed how instructors interact with students during their teaching presence in online learning and the impact of their role as guides and facilitators of online learning rather than as the controllers of the online learning environment, as in learning management systems (LMS). Instructors' roles in the learning environment include instructional design and organization, facilitating learners' discourse and providing direct instruction. These findings illustrate how instructors' roles through instructor-student interaction support students' learning process and its effect on students' academic performance when using Facebook as a medium of online interaction.

Additionally, the findings of this study provide a clear picture of how students process their learning through student-student interaction with the presence of the instructor taking the role of learning facilitator through instructor-student interaction on Facebook. Facebook enabled students to initiate interaction any time they needed without waiting for the instructor's permission to do so, as their interaction was happening in a social networking environment without the restrictions of an LMS. Therefore, the benefit of the openness of Facebook as a tool was reflected in students' actual interaction, their perceptions of course-related interaction and in their academic performance through the observation of the changes that occurred between their pretest (before Facebook use) and posttest grades.

Lastly, this study enabled the researcher to develop a framework of social-based learning interaction in social networking tools. The developed framework outlined the required categories in the process of learning through social-based learning interaction, especially on computer-based courses. The framework can provide guidance to computer course instructors and students in designing and managing online interaction.

1.8 Importance of the Study

The findings of this study are important for instructors, students, and higher education institutions, as explained in the following sections.

1.8.1 Instructors

One of the objectives of this study was to develop a framework that facilitates social-based learning interaction via the social networking tool Facebook. The existence of such a framework can help instructors in engaging their students in course-related interaction that will lead them to better learning and enhance their academic performance. The framework will guide instructors in planning online interaction for educational purposes using the social networking tool Facebook. Additionally, the findings of this study will guide instructors' role in online interaction with their students on Facebook. Instructors will be able to design courses, give students direct instruction, and facilitate students' discourse. Through this role, instructors will be able to motivate students, encourage their participation in the discussion, and keep their discussion in line with the course objectives.

1.8.2 Students

The findings of this study will be used to guide students' use of Facebook for course-related interaction. This study will provide students with a means of course-related interaction via Facebook that can lead them to better academic performance. Students will refer to the interaction patterns that appear in this study to help them to negotiate meaning and construct new knowledge. As this study will analyze students' social presence on Facebook, students will be guided by the framework that will be formulated at the end of this study during their efforts to socialize their online learning interaction to establish higher participation in the discussion, which will lead to better academic performance.

1.8.3 Higher Education Institutions

The findings of this study revealed the potential affordance of Facebook as an online medium for course-related interaction at the university level. Additionally, this study has developed a framework of social-based learning interaction through instructor-student and student-student interaction on Facebook that can enhance students' academic performance. Therefore, higher education institutions will work to harness the ability of Facebook for their students' benefits. On the other hand, the existence of such a framework will encourage higher education institutions to move towards the implementation of social-based learning through Facebook course-related interaction to meet their students' needs and preferences and to enhance their academic performance.

1.9 Scope of the Study

This part explains the capacities involved in this study in terms of sample size, participants' demographic variables, subject matter, and the method used to assess students' performance.

- a. **Sample size** :The respondents of this study were limited to postgraduate students who are enrolled in the Educational Technology program in the Faculty of Education at a Malaysian University. Some of the students enrolled in this program do not have backgrounds in computer science, and thus struggle to cope with the requirements of the computer-based courses. To overcome this problem, students need more interaction with their instructors and peers when working on their assignments.
- b. **Subject Matter**: The experiment for this study used only one computer-based course offered by the faculty, namely the Authoring System course. This course teaches students how to develop multimedia and web-based applications as educational materials. Students thus have to work with the

development of learning applications. However, their lack of computer application development skills may make their assignments more difficult: therefore, they need more help from the course instructor and more skilled peers through online interaction.

- c. **Performance Assessment:** Students' performance level was assessed through conducting a pre-test and a post-test. The study measured the change in students' performance after their engagement in the interaction via Facebook.

1.10 Operational Definitions

In this study, the researcher uses several terms repeatedly. The following section provides definitions of the key terms used in this study.

i. Social-based Learning Interaction

Social-based learning interaction in this study is the interaction that occurred between instructor-students and among students in a social context using social tool for the purpose of students' learning.

ii. Social Interaction

The definition of social interaction in this study is the process of communication, discussion or conversation that occurs among participants to accomplish learning tasks and develop cognitive understanding of the course content via Facebook. It is the dialogue or discourse between instructors and students, and between students and other students, to negotiate meaning and construct knowledge. In the literature, interaction had been defined as the "reciprocal events that require at least two objects and two actions. Interactions occur when these objects and events mutually influence each other" (Wagner, 1997). In this study, social interaction is

represented by the interaction that occurs between instructors and students and among students.

iii. **Instructor-student interaction**

The term instructor-student interaction in this study was adapted from learner-instructor interaction as identified by Moore (1989). Therefore, instructor-student interaction in this study reflects the same component of teaching presence that was identified in the COI model, which considered the role of online instructors in the community of inquiry (Garrison et al., 2000). Teaching presence was defined as the instructors' roles of instructional design and organization, facilitation discourse, and direction instruction through cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes (Garrison et al., 2000; Anderson et al., 2001). Teacher presence in online learning environments can be achieved through three roles, categorized as instructional design and organization, facilitating discourse and direct instruction (Anderson et al., 2001). Interaction is related to the role of online instructors to maintain students' interest in what is to be taught, motivate students to learn, maintain students' interest in learning, make information presentations or cause them to be made by learners, demonstrate skills, or model certain attitudes and values.

- **Instructional Design and Organization:** The online instructor achieve the role instructional design and organization through posting statements of setting curriculum, designing methods, establishing time parameters, utilizing medium effectively and establishing netiquette.
- **Facilitating Discourse:** The online instructor facilitate discourse through posting statements that help students in identifying areas of agreement/disagreement, seeking to reach consensus/understanding, encouraging, acknowledging, or reinforcing student contributions, setting climate for learning, drawing in participants, prompting discussion and assessing the efficacy of the process.

- **Direct Instruction:** The online instructor provides students with direct instructions through posting statements include presenting content/questions, focusing the discussion, summarizing the discussion, and confirming understanding, diagnosing misconceptions, injecting knowledge from diverse sources and responding to technical concerns.

iv. **Student-student interaction**

Student-student interaction is the adapted form of the type of interaction labeled by Moore (1989) as learner-learner interaction. Student-student interaction, according to Moore, is the inter-learner interaction that occurs between one learner and other learners alone or in a group setting, with or without the real-time presence of the instructor (Moore, 1989). Several categories can explain student interaction in computer conferencing for course-related discussion. For example, Pena-Shaff and Nicholls (2004) identified eleven categories that included in student-student interaction which are question, reply, clarification, interpretation, conflict, assertion, consensus-building, judgment, reflection, support and an 'others' category, which represent messages not identified under the aforementioned categories (Pena-Shaff and Nicholls, 2004). Therefore, this study used Pena-Shaff and Nicholls (2004) categories to analyze student-student interaction transcript. However, other category exempted from the analysis as this study also used student-student interaction transcript to analyze students' social presence.

- **Question:** students' statements for the purpose of asking information seeking question, Discussion questions and Reflective questions.
- **Reply:** students sent statements to reply to others through direct responses to information seeking questions, elaborated responses that include information sharing, clarification and elaboration, and interpretation
- **Clarification:** Students statements that include stating or identifying ideas, assumptions and facts, linking facts, ideas and notions, identifying or reformulating problems, explaining ideas presented by....., using

examples, describing personal experiences, Decomposing ideas, identifying or formulating criteria for judging possible answers or to justify own statements (Making lists of reasons for or against a position), arguing own statements, defining terms, establishing comparisons, presentation of similarities and differences, listing advantages and disadvantages, using analogies and identifying causes and consequences

- **Interpretation:** students' statements show that they **are** reaching conclusions, making generalizations, predicting, building hypotheses, summarizing and proposing solutions,
- **Conflict:** students' statements which show that students are presenting alternative/opposite positions (debating), Disagreements and Friction.
- **Assertion:** students' statements that include re-statement of assumptions and ideas, defending own arguments by further elaboration on the ideas previously stated.
- **Conesus-building:** students' statements that include clarifying misunderstandings, negotiating and reaching consensus or agreement.
- **Judgement:** students statements which show that they are judging the relevance of solutions, making value-judgments, topic evaluation, evaluating text orientation and authors' position about the subject being discussed.
- **Reflection: students' statements that show** self-appraisal of learning, acknowledging learning something new and acknowledging importance of subject being discussed in their learning.
- **Support:** Acknowledging other participants' contributions and ideas, Empathy through sharing of feelings with other participants' comments and feedback.

v. **Social presence**

In this study, the researcher looks at social presence as the learning participant's ability to project themselves socially and affectively into a community of inquiry as defined by (Rourke et al., 2007). Students social presence transcript was also analyzed based on (Rourke et al., 2007) social presence elements which are interactive response, affective response and cohesive responses. Moreover, students' perception of social presence was measured based on Sung and Mayer (2012) five factors of online social presence, which are social respect, social sharing, open mind, social identity, and intimacy.

- **Interactive Response:** students show interactive response through posting statements with expression of emotion, use of humor and self-disclosure.
- **Affective Response: students posts that show** continuing the discussion thread of discussion, quoting from others' messages, referring explicitly others' messages, asking questions, complimenting, expression appreciation and expressing agreement.
- **Cohesive Response: students' statements that include** vocatives, addressing group using inclusive pronouns and phatic and salutations.

vi. **Problem-Based Learning Principles**

Bridges and Hallinger's (1991, 1995) Problem-based learning principles were implemented in the learning task of this study which includes learning activities and performance test. Bridges and Hallinger's (1991, 1995) principles are

- the starting point for learning is a problem,
- the problem represents what students might face in the future workplace, subject matter is organized around problems rather than disciplines,
- students are responsible for their own learning process,
- most learning occurs within the context of small groups rather than lectures, and

- the solution to the focal problem has an implementation focus that goes beyond problem diagnosis and analysis.

vii. Problem-based Learning Activities

It is the activities that developed in this study that followed problem-based learning principles by Bridges and Hallinger's (1991, 1995). In this study, the researcher developed seven learning activities that used by the instructor during the course as a part of students' learning tasks and to trigger students' interaction.

viii. Social Networking Tool

Social networking tools are described as tools that support the social relationships between people using the web (Mathiasen & Dalsgaard, 2006). Bonds-Raacke and Raacke (2010) defined social networking tools as "virtual places that cater to a specific population in which people of similar interest gather to communicate, share, and discuss ideas" (Raacke and Bonds-Raacke, 2008). Social networks play instrumental roles in learning environments as a major conduit of resource and knowledge exchanges (Cho, Stefanone and Gay, 2002), and as a source of social support and socialization for distributed learners (Haythornthwaite, 2002). In this study, the term 'social networking tool' refers to Facebook.

ix. Facebook

Facebook is an online social network tool essentially designed for college students (Golder, Wilkinson and Huberman, 2007). Facebook was founded by Mark Zuckerberg with his friends in Harvard University. Facebook membership was given first to Harvard University students. Facebook is the most popular of all social networking sites. It has become a phenomenon and an integral part of young people's daily lives in the past decade. This study made use of Facebook's group facility.

1.11 Summary

Interaction with others is considered as an important component of learning experience. In formal learning, students and the instructor work together to achieve the desired learning goals and objectives through interaction. Human interaction, represented by instructor-student and student-student interaction, provides the opportunity for learning through sharing and discussion with others. Social interaction is the key mediator for the construction of shared perspectives and knowledge. However, online interaction through social networking tools seems to provide better learning processes and higher academic achievement. Therefore, examining the affordance of the social networking technology Facebook as a medium for instructor-student and student-student interaction can produce a framework to facilitate social-based learning in social media tools. Chapter 2 will review the literature and discuss in detail the previous research related to this study.

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