INVESTIGATING THE KNOWLEDGE SHARING ACTIVITIES AMONG POSTGRADUATE STUDENTS USING SOCIAL MEDIA TOOLS

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Abstrak

Perkongsian pengetahuan adalah satu proses di mana individu saling bertukar-tukar pengetahuan dan bersama-sama mencipta pengetahuan baharu. Pada masa kini, selain daripada berinteraksi secara bersemuka, para pelajar didapati turut berkongsi pengetahuan melalui perkakasan media sosial. Media sosial dianggap sebagai nilai utama bagi memudahkan perkongsian pengetahuan dan tugas-tugas utama bagi menyokong komunikasi harian dalam kampus. Masih terdapat banyak dimensi perkongsian pengetahuan dalam persekitaran media sosial yang belum dikaji. Banyak juga persoalan yang masih tidak terjawab dan perlu diterokai daripada keseluruhan perkakasan media sosial yang berbeza ini. Oleh itu, kajian ini bertujuan untuk meninjau aktiviti perkongsian pengetahuan dalam kalangan pelajar pasca siswazah tempatan dan antarabangsa di Universiti Utara Malaysia (UUM) serta mengenal pasti manfaat dan halangan dalam penggunaan perkakasan media sosial bagi tujuan perkongsian pengetahuan. Data dikumpulkan melalui pendekatan kualitatif. Seramai 12 orang pelajar pasca siswazah telah ditemuramah dan jawapan diterima melalui temu bual semi-struktur. Kaedah analisis tafsiran telah digunakan untuk mencari tema dengan menggunakan perisian NVivo. Keputusan kajian ini merangkumi empat seksyen berdasarkan teori Nonaka dan Takeuchi, dalam seksyen pemasyarakatan, dapatan kajian menunjukkan bahawa aktiviti-aktiviti pelajar termasuklah pertukaran pengalaman dan perspektif mengesahkan kepentingan media sosial dalam mengatasi masa, jarak geografi dan kos yang menghalang perkongsian pengetahuan serta menyediakan lebih keyakinan bagi para pelajar untuk berkongsi idea. Selain itu, beberapa halangan masih menjadi isu untuk berkongsi pengetahuan seperti kekurangan simbol matematik dan budaya. Dalam seksyen penzahiran (*externalization*), dapatan kajian menunjukkan mereka bentuk gambar rajah dan mendokumenkan fail sebagai aktiviti pelajar serta menggambarkan kepentingan penggunaan media sosial dalam kerja mendokumentasi untuk menyimpan fail dan gambar rajah dalam talian serta meningkatkan penguasaan bahasa Inggeris dan melindunginya daripada virus. Sementara kekangannya pula ialah limitasi dalam kerja memuat turun. Dalam seksyen kombinasi dapatan kajian menunjukkan pengubahsuaian dan refleksi sebagai aktiviti dalam kalangan ahli kumpulan dan menggambarkan manfaat media sosial semasa menggabungkan kerja untuk menyiapkan tugasan dan projek adalah mudah untuk digunakan dan menjimatkan kos kertas. Sementara kekangannya pula ialah limitasi dalam kerja memuat turun. Dalam seksyen penghayatan atau internalisasi dapatan kajian menunjukkan semakan semula dan refleksi sebagai aktiviti dalam kalangan pelajar. Manfaatnya termasuk mencipta idea baharu dan memperoleh pemahaman yang mendalam, manakala kekurangan interaksi peribadi dan kelewatan untuk menjawab merupakan kekangan dalam perkongsian pengetahuan. Kajian ini memberikan sumbangan melalui penggunaan model Nonaka dan Takeuchi dengan institusi-institusi pengajian tinggi. Dalam konteks yang sama, terdapat beberapa kajian empirikal yang memberikan tumpuan kepada penggunaan teknologi maklumat (IT) dengan perkongsian pengetahuan. Oleh itu, penyelidikan ini diperlukan sebagai tambahan kepada literatur dengan mengetengahkan kekangan dan manfaat melalui penggunaan teknologi baharu untuk berkongsi pengetahuan dalam kerja berpasukan.

Kata kunci: Perkongsian pengetahuan, media sosial, siswazah, kerja kumpulan, institusi pengajian tinggi

ABSTRACT

Knowledge sharing is a process where individuals mutually exchange their knowledge and jointly create new knowledge. Recently, it is found that besides face-to-face interactions, students also share their knowledge through social media tools. Social media is considered as the key value in the campus to facilitate knowledge sharing and the main tasks in order to support the daily communication. Many dimensions of knowledge sharing in social media environments have not yet been examined. Also many questions are still unanswered and need to be explored across different social media tools. Thus, this research aims to explore the knowledge sharing activities among local and international postgraduate students at Univirsiti Utara Malaysia (UUM) as well as find the benefits and barriers through using social media tools during sharing knowledge. Data were collected through qualitative approach. A total of 12 postgraduate students were interviewed and received answers from them through semi-structure interview. Interpretive analysis method was used to find the themes by using Nvivo software. The results for this study included four sections based on Nonaka and Takeuchi theory, in the socialization section the findings show the activities for students include exchange experience and perspective as well as confirmed the important of social media in overcome time, geographical distance and cost that is a barriers to share knowledge as well as provide more confident to share ideas for students. As well as, some barriers that still issues to sharing knowledge such as lack of math-symbol and culture. In externalization section, the findings show the design the diagram and document the files as activities as well as show the important of using social media in documentation to save the files and diagram online as well as enhance English language and protect from viruses. While the barriers include uploading limitation. In combination section the findings show the modification and reflection as activities among group member and show the benefit of social media during combine the work for assignment and project is easy to use and saving paper cost. While, the barriers is downloading limitation. In internalization section the findings show the review and reflection as activities among student. The benefits include create new idea and acquiring in depth understanding while lack of personal interaction and late in answering as barriers to share knowledge. This study contributed by using the Nonaka and Takeuchi model with higher educational institutions. In the same context, there is few empirical studies focused on the IT with share knowledge, therefore this research sought to add information into the literature by shed light the barriers and the benefits through utilize the new technologies for share know among the team work.

Keywords: Knowledge sharing, social media, postgraduate, group work, higher education institution

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List of Abbreviations

SOC: School of Computing

CMC: Computer Mediated Communication

IT: Information Technology

ICT: Information Communication Technology

KM: Knowledge Management

SECI: Socialization, Externalization, Combination, Internalization

SNS: Social Network Site

UUM: Universiti Utara Malaysia

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Recently, there has been a growing attention in treating knowledge as an important institutional resource. Regardless of the knowledge forms, it has been increasingly recognized as an important asset in any modern organization (Saad & Haron, 2013). Knowledge is an essential factor and successful application that helps institution to create services and provide products (Adhikari, 2010). Knowledge can be defined as a combination of values, experience, expert idea and context of information that helps to assess and incorporate new information and experience (Akhavan & Hosnavi, 2010).

Since early 1990's, many institutions have been implementing Knowledge Management (KM) to achieve competitiveness (Suhaimee, Zaki, Bakar, & Alias, 2006). KM is known in general as a discipline for identification, collection, storage, and sharing of knowledge and its application. In addition, knowledge and KM have become increasingly the significant features of the management research literatures in recent years. Moreover, the importance of KM and learning subjects are increasing in many institutions to present opportunities and challenges for academic centers (Akhavan & Hosnavi, 2010).It helps the institutions to improve the teaching and learning environment (Adhikari, 2010).

Thus, over the past ten years, several institutions, including higher education institutions, have adopted KM effectively because it is considered as an essential tool

for their success (Saad & Haron, 2013). Specifically, in higher education, universities are considered as knowledge based institutions due to their role in exemplifying knowledge development and KM (Goh & Sandhu, 2013a). To facilitate KM, the management of institutions promotes innovation, learning, and effective knowledge sharing (Bakhuisen, 2012).

Knowledge sharing is a process where individuals mutually exchange their knowledge and jointly create new knowledge. The knowledge should be shared to increase the value of the institution (Saad & Haron, 2013). Knowledge sharing is important because it is the link between individual and institution (Johannessen, Olaisen, & Olsen, 2001). For institution, knowledge sharing is a supporting aspect that represents an important concept in all higher learning institutions (Sohail & Daud, 2009). In universities, knowledge sharing plays a key role in the development of teaching and learning (Qun & Weihua, 2013) and it is particularly important when students are working in groups (Sie, Aho, & Uden, 2014) – for instance, the students in universities share what they learned with their classmates and other students (Gikas & Grant, 2013).

Normally, knowledge sharing activities are implemented by institutional structures by providing the application of technology that stimulate people to share their knowledge for the achievement of institutional goals (Tan, Wong, Lam, Ooi, & Ng, 2010). Nowadays, the use of computer-mediated communication (CMC) in increasingly noted in higher education as a medium for the delivery of educational programs anytime and anywhere (Garrison, 2000). With the help of various suitable IT tools, organizations can use it to facilitate sharing and application of knowledge among teams (Raab, Ambos, & Tallman, 2014).

According to Samoilenko and Nahar (2013), and Panahi, Watson, & Partridge (2013), one of the IT tools that can facilitate knowledge sharing is social media. Social network is considered as the key aspect in the campus to facilitate knowledge sharing and perform major tasks to support daily communication. These activities include teaching, learning and research of campus users. The users in campus universities include students who are the most active users in using internet services, especially emerging services such as social media (Du, Fu, Zhao, & Liu, 2012).

Students can use social media to connect with classmates to work on the assignment and support their learning (Hrastinski & Aghaee, 2011). In addition, students are enabled to engage in discussion forums and communicate with classmates in their Facebook group (Duncan & Barczyk, 2013). Students at the Universiti Utara Malaysia (UUM) group themselves in the social media such as Facebook or twitter in order to share their academic knowledge for example (https://www.facebook.com/groups/307054752743967/). This phenomenon is prevalent particularly among postgraduate students since some of the groups live out of the campus, while others have part time work, preventing daily meetings. In order to defeat this problem, they find social media tools a convenient way to interact, exchange ideas and discuss their academic work by posting their academic issues, ideas, or assignment.

With reference to the descriptions in the previous section, the motivation of this research is based on composition of group work for postgraduate students in UUM University. The group of students consists of local and international students with some local students holding part time jobs that could lead to preventing frequent

meetings to time restraints and geographical dispersion of members (Wendling, Oliveira & Maçada, 2013). So, these factors are considered as a problem that affect knowledge sharing among local and international postgraduate students. In other words, this study is an attempt to determine the effective use of social media in facilitating knowledge sharing among local and international students.

1.2 Problem Statement

Nowadays, a large number of postgraduate students use social media groups in education and in other life aspects. Group-working has now become firmly established in higher education and is used across multiple disciplines for a variety of purposes. Among the benefits of using group-work within higher education are the opportunities for skill-transfer as well as other forms of peer-learning, through the sharing of knowledge, ideas and experiences (Analoui, Sambrook, & Doloriert, 2014). In this regard, Analoui, Sambrook and Doloriert stated that there are numerous factors that can impact the group-work process, including differences in group composition with respect to gender, local versus overseas students, culture and religion as well as peers aversion to each other.

Panahi et al.(2013) argued that face-to-face contact is not the only way to exchange knowledge as there are other ways for knowledge sharing through the use of IT that are effective. It is good to mention that the recent development of social media tools such as IT tools as well as the development of new high-bandwidth connections, allow more real-time interactions and facilitate knowledge sharing.

Moreover, studies that are available in this field focusing on knowledge sharing include the one by Sohail & Daud (2009) that addressed knowledge sharing among teaching staff in Malaysian Universities and by Goh and Sandhu (2013b) who examined the impact of social capital on knowledge sharing among employees in Malaysian public universities. Several other researcher make up a significant portion of literature concerning knowledge sharing through IT (e.g. Fullwood, Rowley, & Delbridge, 2013; Goh & Sandhu, 2013; Samoilenko & Nahar, 2013). Information technology (IT) brings new opportunities for knowledge sharing by using social media technologies (Panahi et al., 2013). In this field, Saw, Abbott, Donaghey and McDonald (2013) confirmed that both local and international students in Australian universities use social networking sites widely for educational purposes such as group work as well as gathering and sharing information.

In a related study, Barczyk and Duncan (2013) found that students perceived Facebook as a media that facilitates knowledge sharing, collaboration, and learner-centered activities. They also found that the students prefer to have discussions by using Facebook rather than other educational technologies due to the related ease in combining between teachings and learning, where students can teach other students some ideas and learn from others through problem solving activities. Meanwhile, DeWitt, Alias, Siraj, and Zakaria (2014) emphasized that first year undergraduate students in government universities use technology application such as social media. The study further investigated the interaction of first year students using online forums. Similarly, Chipangura (2013), students used mobile to exchange data and interact among themselves.

According to Panahi et al. (2013), many dimensions of knowledge sharing in social media environments have not yet been examined. Many questions are still unanswered and need to be explored across different social media tools and these include its role. Based on the literature reviews, studies exploring the use of social media such as Facebook or twitter in the process of knowledge sharing among the postgraduate students at universities especially interaction between local and international postgraduate student, are still few and far between. Therefore, this research aims to fill the gap by focusing on the use of social media for academic purpose and knowledge sharing with the help of Nonaka and Takeuchi model as a guide for supporting knowledge sharing process among international and local postgraduate students at the Universiti Utara Malaysia (UUM).

1.3 Research Questions

The research questions of this study are:

1. What are the knowledge sharing activities among local and international postgraduate students through the use of social media tools?
2. What are the benefits gained from using the social media tools in knowledge sharing among local and international postgraduate students?
3. What are the barriers of knowledge sharing using social media tools among local and international postgraduate students?

1.4 Research Objectives

The research objectives of this study are:

1. To identify the activities for knowledge sharing among local and international postgraduate students through the use of social media tools.
2. To determine the benefits gained from using the social media tools in knowledge sharing among local and international postgraduate students.
3. To analyze the barriers of knowledge sharing using social media among local and international postgraduate student.

1.5 Research Scope

In this study, the research is limited to Universiti Utara Malaysia. The sampling of this study comprises of postgraduate students at the School of Computing (SOC) for IT and ICT department selected through purposive sampling.

1.6 Significance of the Research

This study has theoretical and practical significance. Theoretically, this study investigates the knowledge sharing activities among postgraduate students as well as explores the benefits of social media tools in facilitating knowledge sharing among postgraduate students. Despite the importance of social media in today's era of technology, there is relatively little prior research that used Nonaka and Takeuchi model to discuss the knowledge sharing process in higher education institution using social media tools. Therefore, this study contributes theoretical value because it sought to add new information to literature, such as the benefits and the barriers of the social media in sharing knowledge in the higher education sector. Moreover, the findings of

this research are expected to contribute to a better understanding of the role of IT in knowledge sharing, and to provide a useful guide in using IT to enable and support knowledge sharing. Practically, utilizing the social media tools (e.g. social networking and social messenger apps) will enhance the students' skills (e.g. writing and reading skills) and new technology in general and the social media in particular will improve the team members' communication. This is especially important between international and the local students in their interaction among themselves and understanding of the subject. Thus widespread use of social media tools among the students will result in the development of new ideas through discussions among group members.

1.7 Summary

In this chapter, the researcher provides the introduction for the study, followed by the problem statement, questions, objectives of research as well as, scope, and finally significance of the study. The next chapter presents the literature review of this study.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter presents the discussion concerning the review of relevant literature. To achieve this objective, the chapter is divided into five sections, with the first section providing a brief introduction about the definition and characteristics of knowledge. This is followed by the second section that introduces knowledge management followed by its definition and importance as well as related studies of knowledge management in higher education. The third section is about the knowledge management cycle which includes knowledge creation, knowledge application and knowledge sharing while the fourth section addresses social media in terms of definition of social media, social media tools and usage of social media in higher education. Finally, the fifth section presents the theoretical framework.

2.2 Definitions of Knowledge

Knowledge can be defined in a variety of ways according to specific aspects of the organization. For example, Tan et al. (2010) defined knowledge as “an organized body of data, information, skills and expertise for the purpose to create new information when carrying out a task”. On the other hand, Sharma (2014) mentioned that knowledge is "A combination of experience, values, contextual information and expert insight that help to evaluate and incorporate new experience and information".

Dalkir (2013, p.49) referred to knowledge defined by Nonaka and Takeuchi (1995) as "a dynamic human process of justifying personal belief toward the truth". Furthermore, Wendling et al. (2013) described knowledge as "information combined with experience, context, interpretation, and reflection". On the other hand, Saad and Haron (2013) stated that a number of researches refer to knowledge as combination of data and information.

Based on Saad and Haron's (2013) argument, there is a necessity to clarify and distinguish between the concepts of knowledge and information as there are confusions in the comprehension of both terms. Nonaka (1994) clarified that information is "a flow of messages" while knowledge is grounded on information and justified by individual's belief. However, Bhatt (2001) differentiates between the concepts of information and knowledge by considering information as an systematized and structured set of data, and knowledge as meaningful information.

Correspondingly, Meihami & Meihami (2014) stated that knowledge is distinct from information. Moreover, Wang, Scown, Urquhart, & Hardman (2012) described information as a set of meaningful facts in a particular context, whereas knowledge is considered as larger and longer living structures of meaningful facts. Thus, knowledge is understood as ''information processed by individuals including ideas, facts, expertise, and judgments relevant for individual, team, and organizational performance" (Amayah, 2013).

2.2.1 Types of Knowledge

Knowledge is classified and viewed from different perspectives and theories. According to Saad and Haron(2013), some of the studies categorized knowledge based on cognitive theory, while others classified it through an epistemological perspective. Adhikari (2010) categorized knowledge into two types. The first type is called explicit knowledge, which is also recognized as "hard" knowledge that can be stated through numbers and words. Explicit knowledge can be shared systematically in the form of data. It plays a significant role in everyday professional life, and it can be represented by text books and articles. Thus, explicit knowledge can simply be obtained, and then transferred to others either through courses or books for self-reading.

The second type of knowledge is known as tacit knowledge. Tacit knowledge is also called soft knowledge, which contains insights, intuitions, and hunches. Unlike explicit knowledge, tacit knowledge is demanding and challenging to present, formalize, and share. In fact, this type of knowledge contains personal skills and "know how" that resides inside each individual and cannot be conveyed easily.

Furthermore, Nonaka and Takeuchi (1995) argued that explicit knowledge is documented, structured, fixed and externalized. Explicit knowledge can be presented and shared through information technology. On the other hand, tacit knowledge exists in the human mind, behavior, and perceptions and thus, it is difficult to share this type of knowledge. In other words, tacit knowledge is personal and emerges from personal beliefs and experiences.

2.2.2 Knowledge Characteristics

Knowledge has numerous features, characteristics, and dimensions, and it can be documented or undocumented. Explicit knowledge, also identified as codified knowledge, refers to the type of information and skills that are easily transferred and documented. Examples of explicit data can be found in processes, patterns, templates, and data that are presented in media. Therefore, it is easier to reuse explicit knowledge across an organization. On the other hand, tacit knowledge is highly personal knowledge. This type of knowledge can be obtained through experience and it is mostly influenced by personal beliefs, viewpoints, perceptions and principles rooted in the individual experiences of workers (Rus, Lindvall, & Sinha, 2002).

Brewer and Brewer (2010) classified knowledge as being either common knowledge acquired through experience, education or research-based knowledge. Table 2.1 explains the difference between explicit and tacit knowledge and presents the features of knowledge.

Table 2.1

Tacit and Explicit Knowledge (Brewer & Brewer, 2010)

Variable	Explicit knowledge	Tacit knowledge
Features	Codified	Personal
	Stored	Context-specific
	Transferrable	Difficult to formulate
	Easily expressed and shared	Difficult to capture communicate, share
Sources	Manuals	Informal business processes & communications
	Policies, procedures	Personal experiences
	Databases, reports	Historical understanding

2.3 Knowledge Management (KM)

A historical analysis of today's knowledge management (KM) demonstrates that it is not a new phenomenon but an old quest. Knowledge has been documented by western philosophers for ages (Wiig, 1999). Sharma (2014) defined KM as "a systematic, explicit and deliberate building, renewal and application of knowledge to maximize an enterprise's knowledge relative effectiveness and return from its knowledge assets".

Sharma (2014) added that KM was first adopted in 1975 by one of the most outstanding organizations. Since early 1990's, KM found that acquiring knowledge and communal expertise and transferring it to the right people at the right time, is very crucial to every organization. If the knowledge sources are employed effectively and intelligently, it can promote the organization and can provide the organization a competitive benefit and improvement over other competitors (Sharma, 2014).

In addition, due to the rapid changes and advancements in modern technological life in the 20th century, numerous efforts began to improve the efficiency of learning organization in order to prepare people to be more effective (Cranfield & Taylor, 2008).

Thus, over the past decade, the importance of KM as a management tool and a research discipline has increased significantly (Cranfield & Taylor, 2008). Furthermore, KM was considered as an emerging discipline as the potential uses, and benefits of the current embodiment of KM help numbers of people and institutions to explore this new form of communication in learning institutions (Ivesben et al., 2006).

2.3.1 KM Definition

KM is defined in several ways; for instance, Malhotra (1998) defined KM as a tool that "caters to the critical issues of transitional adaptation, survival and competence in face of increasingly discontinuous environmental change; essentially, it embodies organizational processes that seek synergistic combination of data and information processing capacity of information technologies, and creative and innovative capacity of a human being". In addition, Wiig (2002) defined KM as the essential procedure to recognize and attract "data, information and needed knowledge by an institute from internal/external environment and to transform them to decisions and actions by people and by the institute" .

Along a similar line of study, Gartner Group (cited in Meihami & Meihami, 2014) defined KM as *"a discipline that promotes an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all of an enterprise's information assets. These assets may include databases, documents, policies, procedures, and previously un-captured expertise and experience in individual workers"*. In addition, Davenport and Hansen (1999) stated that KM is associated with the exploitation, progression and improvement of the knowledge resources of an *"organization with a view to furthering the organization's objectives"*. Furthermore, the American Productivity and Quality Center (AQPC) (cited in Jennex, Smolnik, & Croasdell, 2014) described KM as a critical strategy of transferring the appropriate knowledge to the right people at the accurate time and facilitating people transfer and using information in ways that will enhance and develop organizational performance.

Thus, based on the above-mentioned definitions, the researcher defines KM as a procedure that facilitates discovering, capturing and sharing of knowledge to increase experience of individuals in institutions.

2.3.2 The Importance of KM in Education

KM in educational institutions is defined as a structured and organized procedure of generating and distributing information as well as choosing and arranging explicit and tacit knowledge to generate unique value that can be employed to improve teaching and learning context. According to this educational definition, the fundamental role of institutions is to administer tacit and explicit knowledge in order to increase its performance of individuals. It is crucial to generate and enhance value that assists to build an appropriate educational environment for teaching as well as learning (Adhikari, 2010).

In a related study, Akhavan and Hosnavi (2010) argued that KM plays a significant role in educational environments by increasing the effectiveness of research and by providing significance and profits to educational institutions. Meanwhile, Martensson (2000) asserted that KM can be perceived as a system to advance performance, productivity, efficiency, and described it as a way to develop, distribute and use the information within organizations. Due to the critical role of KM, in the last decade, the significance of knowledge management has been emphasized by academics (López-Nicolás, Meroˇ, & No-Cerdán, 2011).

Furthermore, Steyn (2004) believed that an organization inclusive approach to KM can lead to noticeable enhancement in sharing explicit and tacit knowledge and subsequently in developing benefits. For instance, KM in higher education institution has been described as access to information for teaching and learning with the employment of technology to improve the understanding between learners.

As argued above, KM in the education environment is a comprehensive way to find and investigate the resources of the education information. However, KM in education institutions cannot be achieved without the support of the current information technology. The most information technology in education institutions includes: Internet, group technology and knowledge sharing technology (Lu & Liu, 2008).

2.3.3 Related Studies of KM in Higher Education

In the context of higher education, Rowley (2000) studied the applicability of the concepts of KM in UK institutions. He argued that knowledge management projects can be classified according to their objectives. These objectives include creating knowledge sources, improving access to knowledge and enhancing the knowledge environment.

In addition, Adhikari (2010) presented the concept of knowledge to the leaders of campuses and other sections of the university to make them aware of the importance and significance of knowledge management in achieving quality education criteria. The author believed that KM can change the whole institutional learning process to confront and tackle most of the educational challenges. Furthermore, KM helped to improve and strengthen the organizations' teaching-learning environment.

On the other hand, Ramachandran, Chong and Wong (2013) observed the gap between KM practices and key strategic enablers in public universities in Malaysia. They also investigated the level of prominence and employment of KM practices and key strategic enablers in the higher education institution. The findings of their study indicated that the academics of public universities consider KM practices and key strategic enablers important and effective. With regard to the same topic, Lu and Liu (2008) examined several aspects of KM in education institutions to examine the characteristics of the knowledge management in education and the present educational technology. They argued that KM should be considered as the crucial aspect in he education. Furthermore, they concluded that effective technology is highly essential for the continuous progress of education.

2.3.4 KM Cycle

The KM cycle can be defined as the cycle from knowledge creation to knowledge distribution. In KM cycle, knowledge is measured, evaluated and is then contextualized in order to be understood (acquisition of the knowledge) and employed (application of the knowledge). In this cycle, contextualization stage then feeds back into the first stage (creation and dissemination of knowledge) in order to update the knowledge content (Dalkir, 2013).

In this regard, Samoilenko & Nahar (2013) stated that knowledge management involves four major stages entitled knowledge creation, knowledge storage, and knowledge sharing and knowledge application/utilization. On the other hand, Dalkir (2013), defined three major stages for KM cycle. The knowledge management cycle

is demonstrated in the following Figure 2.1. In the subsequent sections, the major components of KM Cycle are further explained.

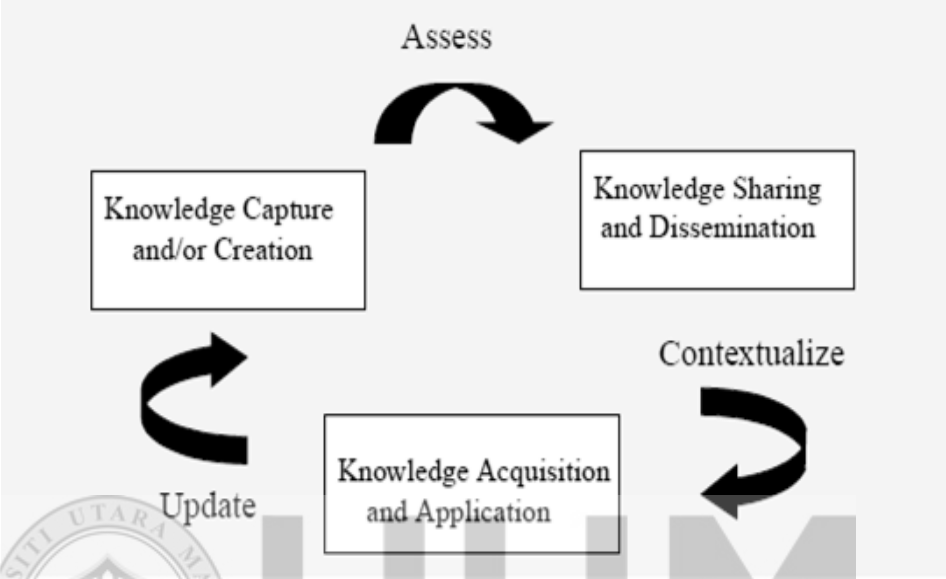

Figure 2.1: Knowledge Management Cycle (Dalkir, 2013)

2.3.4.1 Knowledge Capture and/or Creation

Knowledge creation is a progressing procedure comprising of inspiration, encouragement, and investigation. Knowledge creation is defined as the ability of an institution to improve evaluable ideas and solutions. Moreover, by rearranging and reuniting the background of knowledge through different relations, new realities and meanings in an institution can be created (Bhatt, 2007). The process of knowledge creation interacts regularly between tacit and explicit during the four phases in a spiral model (Dalkir, 2013).

2.3.4.2 Knowledge Acquisition and Application

Knowledge application plays a key role in the improvement of successful new products. It refers to the institution's timely response to technological change by employing the knowledge within technology to produce new products (Song,Van Der Bij, & Weggeman, 2005). It contains numerous activities which are accomplished to assist effective usage of knowledge for accomplishing organization goals (Samoilenko & Nahar, 2013).

Knowledge application can be defined as making knowledge more dynamic, related and applicable for the organization in creating value (Bhatt, 2007). Furthermore, Tuamsuk, Phabu and Vongprasert (2013) declared that knowledge application associates knowledge with activity employment and the direction of the institution's progress. They stated that in the absence of knowledge application, knowledge management will be unproductive and ineffective.

Thus, knowledge application is the most important and critical stage because if knowledge is not applied, it is useless to implement the three previous stages of knowledge management cycle. In other words, knowledge application, which is the actual implementation of knowledge for the advantage of an institution, team or individual, is a highly important stage of the knowledge cycle (Samoilenko & Nahar, 2013).

2.3.4.3 Knowledge Sharing and Dissemination

Knowledge sharing is the third phase of the KM process after knowledge creation and knowledge application. Knowledge sharing is known as a major KM aspect (Hendriks, 1999). This stage is considered as one of the crucial and indispensable process of KM (Yu, Lu, & Liu, 2010). Hendriks (1999) defined knowledge sharing as a process that involves two stages, first, knowledge sharing postulates to an act of 'externalization' that can occur in several forms, such as explaining, codifying the knowledge in an intelligent knowledge system and second, knowledge sharing postulates an act of 'internalization' that can take several forms, such as learning by actions or reading books.

Knowledge sharing occurs between at least two parties. Furthermore, it takes place when an individual is enthusiastic to contribute, and to acquire knowledge from others in the improvement of new competencies (Sohail & Daud, 2009). In the same way, Amayah (2013) stated that knowledge-sharing can occur when a person is keen to cooperate with others to find solutions for the problems, develop innovative ideas, or apply policies or processes.

Generally, it can be concluded that knowledge sharing is about collaborating knowledge within a group of people. This group may entail participants and individuals involved in a formal organizations, such as colleagues in a workplace, or informal organizations such as friends. In both groups, the contact may occur between two or more individuals. The purpose of this communication and knowledge sharing is to employ existing knowledge to improve the performance of the group (Cheng, Ho, & Lau, 2009).

2.3.4.3.1 Knowledge Sharing Definition

Several scholars have defined knowledge sharing in various ways. Li (2010) described knowledge sharing as the activity in which contributors are engaged in the multiparty procedure of contributing, transferring and employing knowledge while Yu et al. (2010) considered knowledge sharing as a procedure that contains three phases. The first phase involves the distribution and conveyance of knowledge by a knowledge sender, the second phase is completion of the transmission and the last phase is successful absorption of the knowledge by the receiver.

Added to the above definitions, Hooff and Ridder (2004) defined knowledge sharing as a process in which participants mutually share their (implicit and explicit) knowledge and cooperatively generate new knowledge whereas Sohail and Daud (2009) described knowledge sharing as a process of exchanging experience, skills, information or understanding of anything to acquire and comprehend deeper insights.

Consequently, considering the above-mentioned definitions of knowledge sharing, this study defines knowledge sharing as an activity to distribute and transfer knowledge such as information, skills, or expertise among people, friends, families and organizations.

2.3.4.3.2 Knowledge Sharing in Education

Knowledge sharing stands at the center of constant development process. It is essential for transforming an individual's process improvement into actual learning (Yu et al, 2010). It is highly acknowledged that knowledge sharing can increase institution's ability to resolve problems and avoid reoccurrences of mistakes by bringing together

an inclusive range of knowledge, information, skills, and experience. Accordingly, knowledge sharing directly affects an organization's knowledge creation, organizational learning, performance accomplishment, development, and competitive improvement (Shoemaker, 2014).

In an institute like a university, knowledge sharing offers high quality instruction, outstanding results, and favorable learning environment (Tan et al., 2010). Furthermore, the universities are known as knowledge based institutions that play the role of the embodiment of knowledge development and management. In an educational environment such as the university, knowledge sharing assists academics to develop teaching ability, improve quality of research and avoid previous mistakes (Goh & Sandhu, 2013 b).

Knowledge sharing is a specific form of individual's effectiveness, collaboration and association. It involves communicating with others within interactive connections with university class-mates and friends (Teh, Yong, Chong, & Yew, 2011). Therefore, knowledge sharing in universities is expected to develop and facilitate students' connections and relations with course-mates, and prepare opportunities for internal and external activities (Fullwood et al, 2013).

Likewise, knowledge sharing activities at higher education institutions may take place with students in groups. These groups of students are from different backgrounds, which have different skills, knowledge and experiences. They cooperate and exchange their knowledge to fulfill the requirements of the given tasks which will then create a new environment (Shukor, Nawi, Basaruddin, & Rahim, 2010).

Knowledge sharing is an important process for everyone, particularly the students as it facilitates exchanging knowledge which is generally known as one of the sources of power (Tan et al., 2010). Accordingly, it is crucial to keep in mind that the key to effective knowledge sharing is the accessibility of the accurate knowledge at the correct time and in the proper location, so that group members are enabled to complete their tasks successfully (Raab et al, 2014). In spite of that, knowledge sharing activities often encounter various obstacles including time and geographical dispersions of the participants (Wendling et al, 2013). However, with the appearance and development of IT devices such as intranets, databases, e-mail, web pages, and electronic media, effective knowledge-sharing methods have been provided (Casimir, Ng, & Cheng, 2012).

Furthermore, social media can considerably develop interaction, support knowledge employment and exploitation, and accelerate knowledge distribution (Samoilenko & Nahar, 2013). Consequently, social media as a technology-enhanced media can assist the creation and formation of collective knowledge. Moreover, it can prepare more knowledge transferring opportunities for people (Zheng, Li, & Zheng, 2010).

2.3.4.3.3 Related Studies of Knowledge Sharing in Education

Saad and Haron (2013) investigated and explained the types of knowledge shared among academicians in a Malaysian public academic organization. The results of their study provide valuable perceptions and insights for the administrations of universities to employ the more beneficial and expedient knowledge types in order to improve institution's performance.

In the same way, Sohail & Daud (2009) examined the barriers that contribute to successful knowledge sharing among teaching staff in private and public universities in Malaysia. The findings of Sohail & Daudstudy provided a useful vision to management of higher education institutions in providing the necessary facilities to improve knowledge sharing between teaching staff.

On the other hand, Fullwood et al.'s (2013) survey conducted in UK focused on knowledge sharing among the academics in UK universities. They examined the factors that affected knowledge sharing activities. The findings showed the importance of positive attitude towards knowledge sharing because the respondents believed that knowledge sharing will improve the relationship with classmates.

In addition, in terms of benefits of knowledge sharing among students, Korpman's (2004) study involved students in higher education in Australia, where he highlighted the potential benefit of peer interaction for learning across diverse cultural and linguistic groups and for improving improved English language skills of international students. Korpman found that the discussion of students with their Australian friends provided the students' further clarification by helping them check grammatical mistakes in their assignments and by enhancing their written English.

2.4 Social Media

2.4.1 What Is Social Media?

Recent forms of social media is different from older, conventional broadcast media in that they facilitate peer-to-peer messages, in contrast to unidirectional transmission of one-to-many media content (DeAndrea, Ellison, LaRose, Steinfield, & Fiore, 2012). Traditional media encompasses communications outlets, such as magazine, newspaper, radio, television. However, recent social media includes messages created and distributed through digital, mobile and internet-based technologies such as social network site. Social media prepares a platforms that links people together, provides an opportunity to create and exchange knowledge with others, extracts and develops knowledge and distributes it (Lewis, 2009).

The 21st century observed an explosion of internet-based messages transferred through modern social media. The appearance of internet-based social media enabled individuals to communicate with hundreds or even thousands of other people simultaneously (Mangold & Faulds, 2009). Thus, social media technology has become an essential part of people's life due to modern technology users that create, share their experiences, information and skills (Tess, 2013), communicate, and share knowledge amongst one another through the internet instead face-to-face discussion (Ractham & Firpo, 2011).

2.4.2 Social Media Definition

Several definitions have been proposed to define the term social media. Social media is a 21st century concept employed to various networked devices or technologies that highlight the social aspects of the Internet as a way for cooperation, communication, and creative expression. Social software can be often used as an alternative for social media (Dabbagh & Kitsantas, 2012). Hrastinski & Aghaee (2011) defined social media as media that facilitates the "creation and exchange of user-generated content".

In the same way, Ho, Wah, Yi, To, & Kit (2013) described the concept of social media as

> *"A group of internet-based applications that build on the technological foundations of Web 2.0 that allow the creation and exchange of user generated content"*

While, Panahi et al., (2012) offered a different definition of social media by describing it as;

> *"Collaborative online applications and technologies which enable and encourage participation, conversation, openness, creation and socialization amongst a community of users".*

2.4.3 Characteristics of Social Media

Different social media have different functions, and features. According to Zheng et al., (2010) social media generally has most or all of the following five features. The first typical feature is participation. Social media motivates communications and response from anybody who is interested in that everybody can dynamically contribute in creating, observing, and reviewing media contents. The second common feature is openness. Most of the social media services are open to response, criticism and contribution. In fact, social media offers an open space for social communication and collaboration. Contributors can easily access, provide, share and use information in

social media. The third feature is called conversation. While, traditional media was concerned with broadcasting, social media can be considered as a mutual conversation. The fourth feature is Community and it represents that social media enables communities to connect efficiently. In fact, communities are allowed to exchange common interests. Finally, the fifth and last feature is connectedness where most kinds of social media attempt to improve their connectedness, by linking to other sites, resources and people.

Likewise, Panahi et al. (2012) argued the features of social media are related to knowledge sharing purpose. These features can be classified into six; the first feature is called peer-to-peer communication. It represents linking one to many in a collaborative way, in comparison to old approach of connecting users. The second feature is and it is considered as the chief feature of social media, which allows the user to connect easily in a real-time and in a worldwide scope.

Connectivity is crucial for knowledge sharing. The third feature is networking and this refers to the social media enabling individuals to find each other, share their personal information and profiles, group themselves, improve relationships, and convey their knowledge and experiences. This is followed by the fourth feature, which is multimedia oriented. This major feature of social media applications enables individuals to collect, save and share multiple content forms including text, image, video in a collaborative way. The final feature of social media is known as user friendly, indicating the ease of its availability and everybody can participate and find friends in any social networking sites. Despite the several benefits mentioned above, there are few shortcomings in these social media tools. For instance, Gruzd, Staves,

and Wilk (2012) mentioned that the protection of privacy is considered as a crucial issue in using social media tools owing to its easy accessibility to the public at large.

2.4.4 Social Media Tools

Social media tools refer to the collaborative employment of the internet in the tools where the operator can contribute in terms of creating content, promoting cooperation and communication as well as distributing new knowledge (DeWitt, Naimie, & Siraj, 2013). Dabbagh and Kitsantas (2012) provided some forms of social media that contain experience and resource-sharing platform such as Twitter, and wiki software that assists the cooperative workspaces, media sharing tools including Flicker and YouTube and social networking sites (SNS) such as Facebook and LinkedIn that facilitate social networking.

In the same way, Lewis (2009) stated that social media contains online social networking sites, such as Facebook, LinkedIn and Twitter as well as Blogs while, Laroche, Habibi, & Richard (2013) mentioned that there are several types of social media such as social networking, wikis, weblogs, and discussion environments. The main platforms of social media are described in detail in the following sections.

2.4.4.1 Social Network Sites

During the past five years, Social Network Sites (SNS) have become one of the most important types of social software. It promoted by the Facebook applications that now have hundreds of millions of applicants. SNSs are personal internet spaces for online discussions and chats, and contents exchange (Selwyn, 2009). Social network sites are

web-based services that enable users to: create profile within a system, articulate a list of users, and check and move through their list of friends and relations (Baro, Ebiagbe, & Godfrey, 2013).

According to the above definitions, it is acknowledged that the three fundamental elements of SNS are user profile, user relationships and the availability and visibility of the created contents by the user such as profile, connection, tweets, photos and other privacy setting of users (Du et al., 2012). According to Baro et al. (2013), the most popular websites among SNS are Facebook and Twitter. In the current study, the researcher will focus on Facebook and Twitter as examples for social media tools.

Facebook

Facebook is defined as a "social utility that helps people share information and communicate more efficiently with their friends, family and co-workers" (Baro et al., 2013). In just a short period of time (2005 to 2008), Facebook users significantly increased by over 20 times in size. In 2005, Facebook.com started its activity, with only 3.5 million users. After this period, it grew gradually and by October 2008, Facebook was announced to have more than 120 million recorded users. A vast number of SNS members, identified Facebook as the most used social media site in the world (Wang et al., 2012).

In 2012, Facebook was recognized as the most-used social media network with an approximate 750 million members. Fifty percent of Facebook users log in every day to communicate with community pages, groups and posts from personal networks of friends (Lipp, Davis, Peter, & Davies, 2014). Facebook permits users to create and

share their rich online personal identity with networking friends, through posting pictures, and wall posts. Furthermore, Facebook members can create and join groups based on their interests and can share their information, knowledge, experiences and issues through the built-in applications (Wang et al., 2012).

Twitter

Twitter was first established in 2006 and rapidly acquired global popularity. By 2012, it had more than 500 million registered members, producing 340 million tweets per day, and managing more than 1.6 billion search queries every day (Lipp et al., 2014). Twitter can be recognized as a directed social network, where each member has a set of subscribers or followers. Each applicant upload and share regular status updates, called tweets that contain short messages with maximum size of 140 characters. These updates normally entail personal information of the members, news or links including images, videos and articles (Ho et al., 2013).

2.4.4.2 Blogs

The term blog was first introduced in 1997. Due to its rapid growth, in 2004, Merriam-Webster announced included it as a new word (Tess, 2013). A blog is defined as a web site, typically controlled by individuals to upload comments, explanations events, images and other material such as video. Blogging is an easy process of distributing and sharing the ideas and receiving comments from other users (Baro et al., 2013).

Basically, a web blog is an online journal where several participants contribute by commenting about a specific topic. Similar to other social media, blog contributors

post personal comments, connect to other SNS, and make interpretations and evaluations about other participants' posts (Tess, 2013). Some researchers have identified blogs to play an influential role in forming, expressing, emerging, and distributing ideas and knowledge. Furthermore, blogs are effective in emerging and continuing communal relationships in comparison with traditional technologies (e.g. instance emails) (Ho et al., 2013).

2.4.4.3 Wikis

Wiki is a collective website that can be easily accessed and edited by anyone throughWikipedia.org. A library Wiki is a service that can facilitate social communication among library members and consumers. Within the academic libraries, Wikis are mainly used for the construction of cooperative subject guides (Baro et al., 2013).

In a similar contention, Panahi et al., (2013) reported that wikis can influence both externalization (writing down personal knowledge) and internalization (processing the information of individual knowledge). Wiki facilitates tacit knowledge sharing by preparing a field for cooperative knowledge creation. In other words, wiki platform has similar implications for learners. Learners who employ a wiki platform found that they were academically successful, and that it assisted them in constructing interactions and connections with one another. Commonly, wikis allow co-constructed learning experiences while improving and supporting students' engagement (Creighton, Foster, Klingsmith, & Withey, 2013).

In addition to the above social media tools, there is another social media called Google docs that is considered as a collaboration social media (Lee & Kwak, 2012). Google Docs is a Web-based document management application for creating and editing private and public, word processing and spreadsheet documents. These documents can be stored both online on the Google cloud and/or on the user's computer. Access to these files is available from any computer with an Internet connection and a fully-featured Web browser (Janssen, 2007).

2.4.5 Usage of Social media in Higher Education

Social media is increasingly becoming popular in higher education contexts as lecturers employ technology to facilitate and improve their instruction as well as encourage active learning for students (Tess, 2013). Increasing numbers of educationalists start to consider the possible implication and probable consequences of social media on education practice and provision—particularly in the context of further education (Selwyn, 2012). Therefore, the future role for social media as a facilitator and supporter of education is worthy of investigation (Tess, 2013).

In the past decade, social media like blogs, SNS and wikis, has expanded promptly and altered the ways of communication between individuals. Lately, social media, with their unique characteristics that allow practical and active contribution, social connections and operator cooperation, have become crucial tools in simplifying and assisting knowledge management procedures in education organizations (Ho et al., 2013). Educators have constantly been early adopters in terms of employing new technology within their domain (Ractham & Firpo, 2011) particularly today when

generation of learners trained and grew in the shadow of digital technologies, in a world of interactions and wide accessibility of information (Popescu, 2012). Marwick (2001) claimed that physical interaction is very important for sharing ideas whilst, Ractham and Firpo (2011) confirmed that social media tools, such as file uploading and discussion meetings, empowered educators and learners to improve the education and knowledge sharing process in order to enhance the learning procedures.

Furthermore, some of interaction and collaboration technology forms have assisted learners in educational contexts. To be more specific, web logs (blogs) have been employed for various educational purposes (DeAndrea et al., 2012). In addition, Facebook assisted learners to exchange and create knowledge amongst each other within the group environment (Ractham & Firpo, 2011). Similarly, there are many benefits offered by social media, such as, sharing the documents between users, modifying and save it, and retrieving it anytime and anywhere (Siriwardana, 2012)

Korpman (2004) mentioned that online environment can be used to create virtual communities of learners. Indeed, numerous universities currently have profiles and groups on social networking sites like Facebook, where learners and faculties can communicate and exchange resources (Selwyn, 2012). For example, SNS increases the classroom communication level and assists learners to get to know each other and conveys information in a supportive environment. In this context, social media technology is a tool to send information and knowledge to the learners who have a difficult time getting involved in the learning process (e.g. students facing difficulty in attending classes owing to time and place restrictions) (Duncan & Barczyk, 2013).

2.4.6 Related Studies Using Social Media in Higher Education

Campus users of universities including students are the most active operators of internet services, particularly emergent services such as social networking services. One of the fundamental purposes of campus social network system is to assist knowledge distribution (Du et al., 2012). Furthermore, Ractham and Firpo (2011) explored the probability of employing social networking to support graduate-level classroom context in order to improve learning. The findings of their interview surveys revealed that Facebook offers an easy way to be employed and familiar technology for learners to influence and motivate social networking to exchange and create knowledge among each other within the small group environment.

In addition, Selwyn, (2009) focused on the use of Facebook among undergraduate students in a UK university. He conducted a qualitative analysis of the participants' comments and messages and recognized that these could reveal the university's experience, exchange of academic information, and provision of social support that often included comments.

Some researches indicated that Facebook can be employed efficiently for academic discussions. For instance, Barczyk & Duncan (2013) studied the prospective of Facebook group and discussion facilities for intensive and concentrated academic usage. By studing 35 postgraduate distance-learning students who joined an optional Facebook group to have a discussion on academic content, it was undrestood that education and knolwedge acquisition were improved. In addition, according to Hrastinski and Aghaei (2011), social media can help team work through the

coordination between the team to retrieve information as well as asking questions and seeking answers.

2.5 Theoretical Framework

Since the early 1990's, attention to the concept of knowledge, such as knowledge management, knowledge sharing and knowledge creation, has increased significantly in both the general and academic literature (McLean, 2004). This dramatic increase can be attributed to the fact that knowledge is related to organizations and it is value making for organizations. All of the proposed models of knowledge management offer diverse perceptions and standpoints on the main conceptual features, which forms the organization of KM (Dalkir, 2013).

The KM models plays a strategic role in certifying a particular application for KM that guarantees important factors to be considered. Another practical benefit of KM models is not just to facilitate a more inclusive explanation for what is happening but also to present the best instruction and recommendation for fulfilling institutional objectives. The following are the major theoretical KM models based on the literature.

2.5.1 The von Krogh and Roos Model

The von Krogh and Roos model is applied in organizational knowledge theory. It takes an epistemological method to manage structural knowledge called the organizational epistemology. In KM model for organizational epistemology, knowledge is present and exists in both the individuals of an organization and at the social level through relationships between the individuals. So, in this model knowledge

is considered as “embodied”; which means that “everything is known by somebody” (Dalkir, 2013).

2.5.2 Choo’s Sense-making Model

Choo presented a model for KM that emphasizes on sense making based on Weick’s model, knowledge creation based on Nonaka and Takeuchi’s model, and decision making based on Simon’s model. The Choo model centres on the process in which information components are chosen and consequently, they provide institutional actions.

This theory designates organizations as systems where the procedures of sense making, knowledge generating and decision-making are constantly interacting. Sense making is associated with how the organization comprehends and makes sense of its altering situation and context, which leads to communal meanings and intent (Choo & Johnston, 2004).

2.5.3 The Wiig Model

According to Sousa (2006), Wiig’s (1993) model describes how innovation itself was a procedure of generating new knowledge. It is highly acknowledged that knowledge requires innovation. This model focused on building as well as using knowledge. Wiig (1993) introduced this KM model with some principles including – in order to achieve beneficial and valuable knowledge, it needs to be systematic. Knowledge should be structured and systematized in different ways according to the employment and usage of it (Dalkir, 2013).

2.5.4 Complex Adaptive System Models of KM

Complex adaptive systems entails several independent agents that communicate with each other locally. Complex adaptive systems are known to "self organize" through the developing phenomena (Dalkir, 2013). Complex adaptive systems model presents a highly clear description of how education and innovation occur in the systems, in terms that both the KM and organization learning groups can be associated. Moreover, it presents interest in its description and presentation of complex systems (McElroy, 2009).

2.5.5 Nonaka and Takeuchi's model

In this study, the researcher employed the Nonaka and Takeuchi's model as the theoratical framework. This model has been recognized as one of the most suitable models in the field of knowledge managment, and it can be continuously applied in various settings (Dalkir, 2013). It represents the main theoretical to support the understanding of how knowledge is created, transferred and shared in an organization (Rai, 2011). The Nonaka and Takeuchi model has been proven to be more powerful in the domain of KM. One of the greatest strengths point is its simplicity in terms of understanding the essential view of the model as well as in terms of its ability to internalize and apply the KM model expediently (Dalkir, 2013).

Moreover, Isika, Ismail and Khan (2013) mentioned that Nonaka and Takeuchi's model created a template that explains the process of converting tacit to explicit knowledge. The knowledge conversion template stresses the importance of knowledge sharing in the knowledge conversion process. Isika et al. (2013) also explained that

knowledge sharing is a vital part in knowledge management by making the knowledge available for use in an organization and transforming this knowledge to a form that can be understood and utilized easily by others working in the organization.

In this study, Nonaka and Tackeuchi's model helps the researcher to investigate how people transfer/share knowledge among each other. This model is very suitable to study the transfer or sharing knowledge between individuals within group work. Based on the analysis from Table 1.1, the researcher concludes that most researches applied Nonaka and Takeuchi model in organizations such as firms and company of industries. In contrast, a few research applied this theory in education context especially between students in higher education institution. Thus, in this study Nonaka and Takeuchi's model is used to describe the process of knowledge sharing through the use of social media tools among UUM postgraduate students.

Table 1.1
The Application of Nonaka and Takeuchi's Model

Authors	Topic	Context
(Rus & Lindvall, 2002)	Knowledge Management in Software Engineering	The purpose of this research is to describe the state of Knowledge Management in Software Engineering. The report starts by presenting a set of problems faced in software development and shows how KM can solve them by using Nonaka & Takeuchi model to transfer knowledge between individuals and in organization groups.
(Nonaka, Umemoto, & Senoo, 1996)	From Information Processing to Knowledge Creation: A Paradigm shift in Business Management	This study presents the Nonaka & Takeuchi theory of organizational knowledge creation to support the activities of individuals and groups in the organization as well as to use IT in enhancing business organizations.
(Begon & Peris-Ortiz, 2014)	Knowledge creation. The Ongoing Search for Strategic Renewal	The purpose of this study is analyze the effect of innovation and work teams on the creation of knowledge within organizations by applying the Nonaka & Takeuchi theory. The findings of this study can help firms to understand and appreciate the changes that may occur in certain organizational design variables that affect knowledge creation.
(Feller, Parhankangas, Smeds, & Jaatinen, 2013)	How Companies Learn to Collaborate: Emergence of Improved Inter-organizational Processes in R&D Alliances	This study focuses on investigating how partner firms may learn how to better manage their collaborations and organization process by using knowledge conversion process through Nonaka & Takeuchi model.

Authors	Topic	Context
(Song, Ji Hoon Uhm, Daiho and Yoon, 2011)	Organizational Knowledge Creation Practice Comprehensive and Systematic Processes for Scale Development	The purpose of this study is to develop and validate a measurement tool for assessing organizational knowledge creation practices based on the knowledge creation theory of Nonaka & Takeuchi. This study was conducted in the context of a Human Resource organization.
(Akhavan, Ramezan, & Yazdi Moghaddam, 2013)	Examining the role of ethics in knowledge management process Case study: an industrial organization	The study looks into the impact of ethics on KM process according to the Nonaka and Takeuchi model in some areas of an industrial organization.
(Mehralian, A. Nazari, Akhavan, & Reza Rasekh, 2014)	Exploring the Relationship between the Knowledge Creation Process and Intellectual Capital in the Pharmaceutical Industry	This study adopts the (SECI) of Nonaka & Takeuchi model to examine the format of knowledge creation processes (KCP) and uses a model to demonstrate the relationship between KCP and intellectual capital (IC) and its components in the industries.
(Chen, Ragsdell, O'Brien, & Nunes, 2012)	A Proposed Model of Knowledge Management in the Software Industry Sector	This study reports on a research project that aimed to identify the different aspects of knowledge management (KM) in the software (SW) industry sector
(Rih & Guedira, 2014)	Entrepreneurship Education: Tacit Knowledge and Innovation Transfer. An Analysis Through Nonaka's Model	The main purpose of this study is to introduce entrepreneurship education in higher education systems to promote the innovation of the company using Nonaka & Takeuchi model that allow the company to understand knowledge transfer.

Authors	Topic	Context
(Atkočiūnienė, 2014)	Knowledge Management: Collaborative Knowledge Management Aspect	This research applied the Nonaka & Takeuchi model as a part of theoretical collaborative KM process that was conducted in learning organization to encourage employees to store, share and apply the knowledge.
(Song, Yoon and Yoon, 2011)	Identifying Organizational Knowledge Creation Enablers through Content Analysis: The Voice from the Industry	The main purpose of this research is to identify the factors that facilitate the process of knowledge creation for organization by using the Nonaka & Takeuchi model as a theoretical framework.
(Gendreau & Robillard, 2013)	Knowledge Acquisition Activity in Software Development	The purpose of this study is to analyze the pattern of activity for knowledge acquisition. The data were collected from industries and codified based on the information source model related to the Nonaka & Takeuchi model.

Nonaka and Takeuchi (1995) identified four parts of processes (socialization, externalization, combination and internalization), shortly known as (SECI) by the new knowledge created through conversion between the types of tacit and explicit knowledge (Rai, 2011). The next subsections discuss the four parts in detail.

2.5.5.1 Socialization (tacit-to-tacit)

Socialization is the first dimention of spiral model that entails exchanging knowledge in face-to-face, natural, and normally social communications. It involves reaching at a shared and common understanding through the exchange of mental models, and

brainstorming to come up with new ideas (Dalkir, 2013). Socialization is characterized by dialogue through which individual knowledge is converted into shared ideas and concepts (Rodrigues, Gayathri & Rao, 2006). According to Rice and Rice (2005) personal knowledge is exchanged by sharing experiences face-to-face. The key to acquiring tacit knowledge is experience because without some form of shared experience, it is extremely difficult for one person to project her- or himself into another individual's thinking process(Noordhoek, 2013).More generally, socialization is a process that converts existing tacit knowledge into new tacit knowledge through shared experiences, which takes place through everyday social interaction and cultural processes linked to ongoing organizational activities (Martín-de-Castro, López-Sáez & Navas-López, 2008). This connects it to theories of group processes and organizational culture (Nonaka & Takeuchi, 1995). Socialization typically occurs in traditional apprenticeship type learning rather than through written manuals or textbooks and often takes place in informal social meetings outside the workplace, where tacit knowledge such as world views, mental models and mutual trust can be created and shared during interaction (Nonaka, Toyama & Hirata, 2000).

In addition, Gordeyeva (2010) pointed that tacit knowledge is usually difficult to articulate and context-specific, tacit knowledge can be proposed and acquired only through shared experience, such as spending time together, conversations, and doing things together. With respect to the Nonaka and Takeuchi's Model, Panahi *et al.*, (2013) referred contended that information Technology can influence SECI model through using the socialization of knowledge by facilitating interaction between individuals.

2.5.5.2 Externalization (tacit-to-explicit)

Externalization is the second dimention of spiral model that makes the tacit knowledge visible and transforms it to explicit knowledge. Dalkir(2013) identified externalization as:

> *"A quintessential knowledge creation process in that tacit knowledge becomes explicit, taking the shapes of metaphors, analogies, concepts, hypotheses, or models"*

Externalization happens when the firm or individual expresses formally its internal rules of functioning or when it explicitly sets written organizational or personal goals (Nonaka et al., 2000). Documenting the outcomes of dialogue is an effective method to articulate one's tacit knowledge and converting it into explicit knowledge. Moreover, the sequential use of metaphors is a basic method of externalizing tacit knowledge. Metaphors assist individuals in explaining tacit concepts that are difficult to articulate by imagining the symbolic nature of such knowledge (Nonaka & Takeuchi, 1995). Knowledge is crystallized, articulated and becomes ready to be codified (written down) after which it can be more easily shared by others (Gordeyeva, 2010). Externalization based on Song et al., (2011), tends to take place through formal team meetings and collaborative work assignments to create and codify applicable concepts. In this regard, symbols (such as metaphors, figures, diagrams, and analogies) play a critical role in converting collaborating individuals' inductive and deductive thinking to new and mutually understandable perspectives and insights.

2.5.5.3 Combination (explicit-to-explicit)

Combination is a process that converts the knowledge explicitly into more systematic sets of knowledge (Weng, Chou& Wu, 2011). In relation to this, in the spiral model, the explicit knowledge is collected from inside or outside the organization or among the team work and then combined and edited. The new explicit knowledge is then disseminated among the members of the organization. Creative use of new technologies (for instance, computer, Mobile and Internet) can facilitate this mode of knowledge conversion(Easa, 2012). In the empirical study for spiral model in the business sector, Nonaka et al. (2000) clarified that the synthesis of knowledge may itself form new knowledge when, for example, the auditor of a company collects information from various departments and puts it together in a financial report. That report is now new knowledge in the sense that it is synthesized knowledge from various sources.

In the same context, Dalkir (2013) stated that combination is the third dimension of spiral model, and it is the process that transforms distinct pieces of explicit knowledge into a new form. In sum, combination takes place when concepts are arranged, structured and organized in a knowledge system. In this context, the individuals exchange and combine knowledge through media as documents, meetings, telephone conversations, or computerized communication networks. Reconfiguration of existing information through sorting, adding, combining, and categorizing of explicit knowledge as conducted in computer database can lead to new knowledge. Knowledge creation carried out in formal education and training schools usually takes this form (Noordhoek, 2013). According to Song et al., (2011) technologies facilitate the process

of gathering, organizing, editing, categorizing, and incorporating newly converted explicit knowledge into existing organizational knowledge by creating and disseminating documents, routines, and work rules to be applied across the organization.Explicit knowledge is collected from inside or outside of the team work in organization and then combined, edited or processed to form new knowledge. The use of IT can facilitate this mode of knowledge conversion and later dissemination of new knowledge (Gordeyeva, 2010).

2.5.5.4 **Internalization**

Internalization is the last and fourth dimension of spiral model. Internalization is a process that recycles explicit knowledge back into tacit knowledge. Through internalization, explicit knowledge is shared throughout the organization as well as among the team work and then converted into tacit knowledge by individuals. Internalization is closely related to "learning by doing" and/or organizational learning (Nonaka & Takeuchi, 1995). For example, training programmers can help trainees to learn new skills and understand more about their organization and themselves. By reading documents or manuals about their jobs and the organization, trainees can also internalize the explicit knowledge written in such documents to enrich their tacit knowledge base. In brief,

> *"For explicit knowledge to become tacit, it helps if knowledge is verbalized or diagrammed into documents or manuals. Documentation helps individuals internalize what they experienced and thus enriching their tacit knowledge. In addition, documents or manuals facilitate the transfer of explicit knowledge to other people, thereby helping them experience the experiences of others indirectly" (Nonaka & Takeuchi, 1995).*

In terms of Information Technology (IT) and internalization, Panahi *et al.* (2013) stated that IT can influence the internalization process by facilitating discussions and conversations to the individuals.

Based on the wide discussion above about the four diminsions of the Nonaka and Takeuchi model (also known as the Spiral Model), the following Figure 2.2 is presented to depict these components.

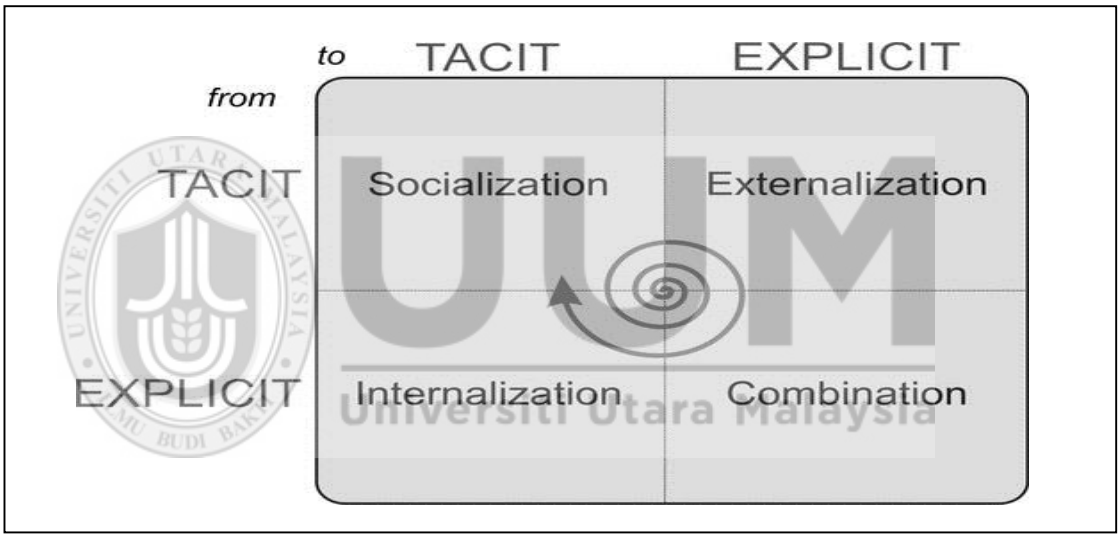

*Figure 2.2:*Nonaka and Takechi Model (Nonaka & Takeuchi, 1995)

2.6 Summary

This chapter presented the relevant literature to the present study. It comprises of the presentation of the following major sections; the concept of knowledge, knowledge management, knowledge sharing, social media and theoretical framework. The process and the method to attain the objectives for this study are discussed in the next chapter.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodology used and the conceptual framework of this study. In this chapter the methodology used is qualitative in natures which include the collection of data and the technique of analyzing it. The main contents of this chapter are the research design, conceptual framework, and the samples of the study and how the instrument is used for analyzing the data collected as well as the process for analysis and validity section.

3.2 Research Design

Research design is defined as "a blueprint for conducting a study with maximum control over factors that may interfere with the validity of the findings" (Burns & Grove, 2003). It is also defined as "a plan that describes how, when and where data are to be collected and analyzed" (Parahoo, 1997). Research designs are often equated with qualitative and quantitative research methods (Creswell, 2003).

This study aims to identify the knowledge sharing among local and international postgraduate students as well as the barriers and benefits of the using social media tools in knowledge sharing. In order to analyze the proposed questions in this study, a qualitative research method is chosen to provide a complete understanding from respondents' behavior. According to Kothari (2004) qualitative research is concerned with qualitative phenomenon, a phenomenon involving the kind or quality. In behavioral sciences, when the aim is to discover the underlying motivation of human

behavior, the interview method is used. Qualitative research is an umbrella term under which a variety of research methods that use data are gathered primarily in the form of spoken or written language rather than in the form of numbers. Qualitative methods are specifically constructed to take account of the particular characteristics of human experience and to facilitate the investigation of experience. Whereas in Quantitative methods, data gathering, such as short-answer questionnaires with Likert scales that only gather information are inadequate to capture the richness and fullness of an experience (Polkinghorne, 2005). In this study, the researcher uses qualitative methods comprising interviews and online questionnaires.

3.3 Conceptual framework

In this study, the main research question aims to determine the knowledge sharing process among local and international students. The conceptual framework of this study assists in carrying out the study while the research questions highlight the relationship between knowledge sharing and group work. The relationship between knowledge sharing and group work is presumed to be moderated by social media tools. Thus, this framework explains the role of social media in conducting and facilitating the knowledge sharing process. Such a process generally includes bringing knowledge and getting knowledge (Hooff & Ridder, 2004). In the context of this study, the knowledge sharing process takes place in group work among local and international students using social media tools based on the Nonaka and Takeuchi model which consist of four part; SECI (Socialization, Externalization, Combination, and Internalization). The conceptual framework is presented in figure 3.1.

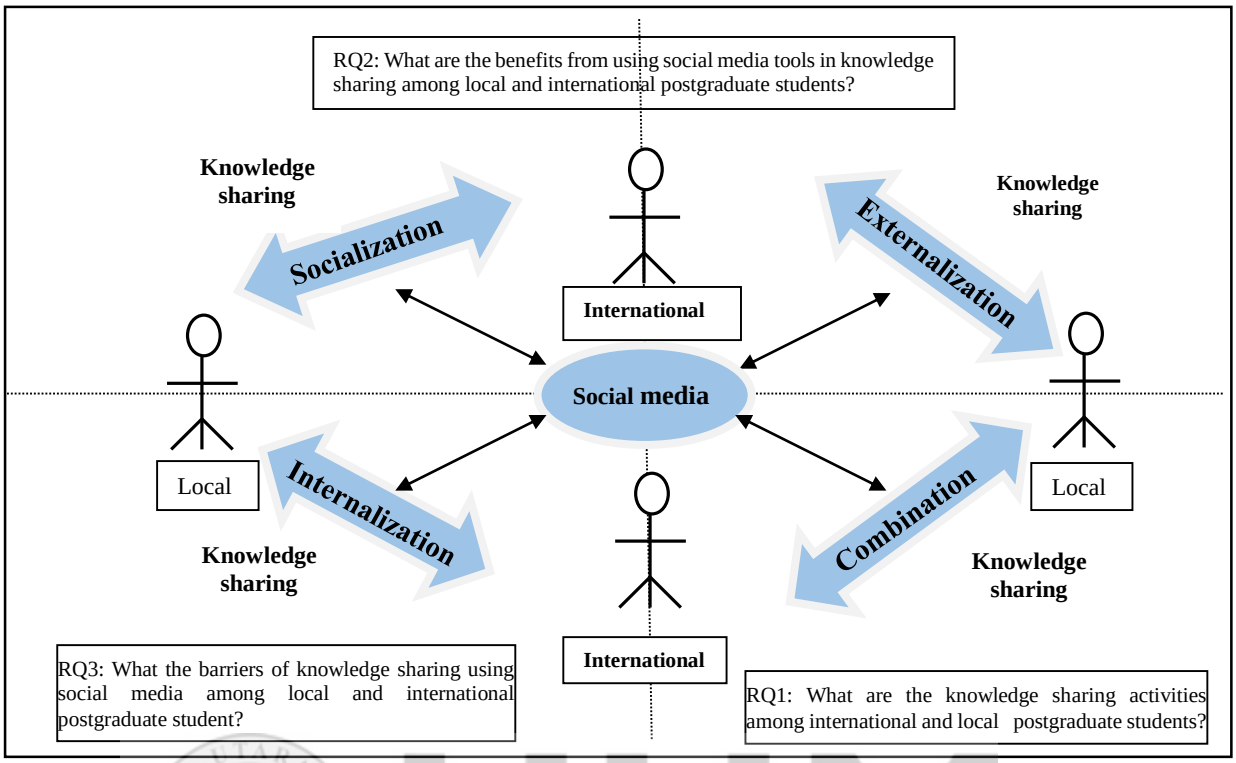

Figure 3.1: Conceptual Framework

3.4 Sampling

Sampling is the process of selecting elements in some way from the populations. The purpose of sampling is to save effort and time, as well as to obtain appropriate and fair estimate of the populations' status in terms of whatever is being researched. The objective of sampling is to obtain the sample that correctly reflects the population it is designed to represent (Nokhal, 2013).

This study will investigate the gap in knowledge sharing using social media among local and international postgraduate students. The sample of this study comprises postgraduate local and international students enrolled in the School of Computing (SOC) for IT and ICT in Universiti Utara Malaysia (UUM).

3.4.1 Sampling Size

According to Sekaran (2000), sampling size is very important. Appropriate sampling size can help the researcher to make conclusions that can be generalized to the whole population. In a qualitative study, a sample of five or six may be sufficient for the researcher intending to achieve additional supported data by the way of validation (Cohen, Manion, & Morrison, 2007). Moreover, many researchers such as (Yin, 2009) and (Creswell, 2007) recommends at least six interviews. Qualitative studies usually use small sample sizes due to their intensive nature. There are two main reasons for this. First, the information of qualitative studies is rich in details. There is significant amount of information from every unit of data collected and as such, sample sizes need to remain small. Second, qualitative research requires a very intensive process of data collection and thus, would be unmanageable to conduct and analyze large number of interviews and it would be time and effort consuming (Ritchie, Lewis, Nicholls, & Ormston, 2013). Therefore, the arguments mentioned above supported the researcher samples.

3.4.2 Sampling Technique

There are number of sampling techniques used by researchers such as purposive sampling, snowball sampling and quota sampling (Cohen et al., 2007). In this study, purposive and snowball sampling techniques are used because employs a qualitative method of study.

3.4.2.1 Purposive Sampling

Purposive sampling is a feature of the qualitative research. Researchers usually select the cases to be inclusive in the sample on the basis of their judgment. In this way, they build up a sample of their specific needs and the sample is chosen for a specific purpose. For example, some members of the wider population are excluded while others are included in a way that every member of the population does not have equal opportunity to be included in the sample. It means the researcher purposely selects the particular portion of the wider populations to include in or exempt from the sample (Cohen et al., 2007). Based on this technique the researcher choose the samples for specific purpose for example choose just postgraduate students from IT and ICT who have experiences with technologies.

3.4.2.1 Snowball Sampling

Snowball sampling is defined as a technique for finding research subjects. These subjects can other subjects to the researcher, and the second group of subjects can recommend the third group and so on. Snowball sampling is mostly used to conduct qualitative research, especially through the interview method and is employed for two major reasons. Firstly, it is applied as an informal method to reach the population in qualitative study and secondly, it is applied as the formal method for conclusion about the population of individuals who are difficult to enumerate (Atkinson & Flint, 2001). The snowball techniques help the researcher to determining the group team who use the social media as the tool for share the document. Where, the researcher asking the first participants who is used social media in group work, the first participants

recommend the second participant and second participants recommend third participants and continuous until arrived to saturation.

3.5 Data collection

Data collection methods are essential part of the research design. Data can be collected in multiple ways and from diverse settings. Data collection methods include interviews, questionnaires and observation (Sekaran, 2000). Likewise, (Kothari, 2004) mentioned that there are many ways for collecting the data which varies in context of time, cost and other different resources for the researcher. Primary data may be collected through interviews, online open ended survey and observation. In this study, the researcher gathers primary data through the following methods:

3.5.1 Interview

There are many qualitative data collection techniques such as interview and focus group interview and others (Saleh, 2006). Among these techniques, this study uses the interview technique. Interview can be carried out through different ways such as telephone interviews and personal interviews.

The method of collecting data and information is generally done in a structured way through personal interviews. The interviewer in a structured interview follows strict procedures and asks some questions in a specific form and order while semi-structured interviews are characterized by flexibility in the approach of asking questions – it does not follow a system to determine the questions and the interviewer allows himself freedom to ask additional questions when required (Kothari, 2004).

In this study, a semi-structured interview was used. Semi-structured interview allow the interviewer to uncover a specific list of hidden issues of research issues and to explore underlying motives and attitudes towards sensitive issues (Saleh, 2006). Specifically, in this study, the postgraduate students are requested to answer open-ended questions. This type of question has many advantages including flexibility, allowing the interviewer to probe more in depth and clear up any misunderstandings, allowing the interviewer to test the knowledge of the respondents, encouraging cooperation and helping to establish the relation and allowing the interviewer to create a right review of what the respondents really believes (Cohen et al., 2007).

According to Sekaran (2000) qualitative data obtained by interviewing individuals may assist in understanding the phenomenon at the investigative stages of a study. Furthermore, the main advantage of interviews is that the researcher can adapt the questions just when necessary, clarify the doubts, and ensure that the answers are understood correctly by paraphrasing and repeating the questions and the researcher can also pick up oral signals from the respondent. Because of the benefits of the interview discussed above, this study uses the interview method among local and international postgraduate students.

According to Creswell (2007) while there are several kinds of data, all data falls into four basic categories, “observation, interview, documents and audiovisual materials”. Therefore, to control the interview process, this study was adopted the interview protocol from Creswell (2009), where in the first section for the interview questions, the researcher asked the participants general information such as gender, age and the qualification level. Whilst, the crucial questions lunched from the second section. This

study seek to attain the objectives that mentioned in the Chapter one, in order to achieve these aims the researcher utilizing from the previous study for instance Easa (2012) as well as Nonaka and Takeuchi theory (1995). Jacob and Furgerson (2012) stated that, the previous studies are important for the new researchers in qualitative approach for developing the interview questions. And they also add, the novice qualitative researchers should look to the literature to help them decide what the background data is important to collect.

With regard to the interview questions for this study, the literature review was used to make the interview questions related to the problem statement. In addition, analysis of data from previous interviews were used to understand the issues which need to address in this phenomena. More specifically, in the second section, the interview questions was adapted from Easa (2012). Easa's structure involve four parts: Socialization, Externalization, Combination, and Internalization. These parts were used as a starting points for interview questions for this study, where the research methodology scholars agreed with used the literature review as the guide for adapted or generate the interview questions such as Creswell (2013). Some of the questions were customized in term of this research.

The questions for Easa is asking people about examine some popular models of knowledge management and in particular its effect on innovation in banks but in this time the researcher change the questions based on the research questions of this study that related to knowledge sharing process in higher education institution using social media tools. Each part from the Nonaka and Takeuchi theory related to the social media tools posed as the questions to the participants, the activities, benefits and the barriers

consider as the main issues are focused, more detail for the interview questions in Appendix A.

3.5.2 Online Open Ended Survey

Since 1995, the use of online survey has rapidly increased. It is considered as a new way of data collection via the Internet (Stieger & Reips, 2010). The emergence of the Internet opened the door to developing conventional research techniques such as online questionnaire. The online survey is the most widely used data collection mechanism through the internet (Cohen et al., 2007).

The significant benefits of data collection via internet include synchronism, flexibility, and automation, self-selection and documentation (Stieger & Reips, 2010). Other benefits include lower respondent error, lower costs, faster transformation, higher response levels, and flexibility in the form of adapting questions (McDonald & Adam, 2003).

Similarly, Cohen et al. (2007) mentioned that there are many advantages to using an online questionnaire compared with paper questionnaire and such advantages include; reduction of costs of paper and printing, reduction of time taken to distribute and collect data, completion of questionnaire at the respondent's convenience, reduction of researcher's bias, and fewer missing entry compared to paper survey.

In this study the researcher used online questionnaire for two reasons. First, this study was conducted with local and international postgraduate students. Some of the local postgraduate students have part time job and they cannot come to campus every day.

Therefore, it is difficult to meet them and make interview with them. Thus, the researcher found that online questionnaire is a convenient way to collect data by send email to the respondents. Second, the online questionnaire helps the researcher to capture more data and collect adequate number of data until reach to saturation.

In addition to the interview, the researcher used Google docs website to design the form for the questions. After design the questionnaire, the researcher sent it by e-mails to the participants with an attached URL address for the open ended questions and an introduction of the study (see Appendix B). The online open ended survey adapted from (Easa, 2012). The answers for the open ended questions were delivered from the participants after one month for sending the questions.

3.6 Data Analysis

After gathering the data, the researcher moves to the tasks of analyzing it. The researcher collected data from 12 participants and stopped collecting when arrived to saturation. Data saturation entails bringing new participants continually into the study until the data set is complete, as indicated by data replication or redundancy. In other words, saturation is reached when the researcher gathers data to the point of diminishing returns, when nothing new is being added (Bowen, 2008). Data analysis involves several operations like creating categories, coding categories and tabulating raw data. Coding operation is done by transforming data into symbols that can be counted and tabulated (Kothari, 2004). As a qualitative research, this study engages in interpreting data through interpretive techniques as recommended by Saad & Haron (2013). Interpretive techniques can be used to decode, patterns decipher, translate, and

find out the meaning of the occurring phenomenon. this approach is concerned about the nature of understanding and comperhending the results based on the participants' and researcher's perspective. According to Sekaran (2000) stated that data analysis involves data tabulation, coding and entering into computer for analysis. Thus, in the first sense, the researcher analyzed the interviews into codes manually, and then apply the codes using the software for NVIVO 10, to understand the raw data more deeply (see Appendix C). For more details the analsis is to explained Figure 3.2 hilighted that as below:

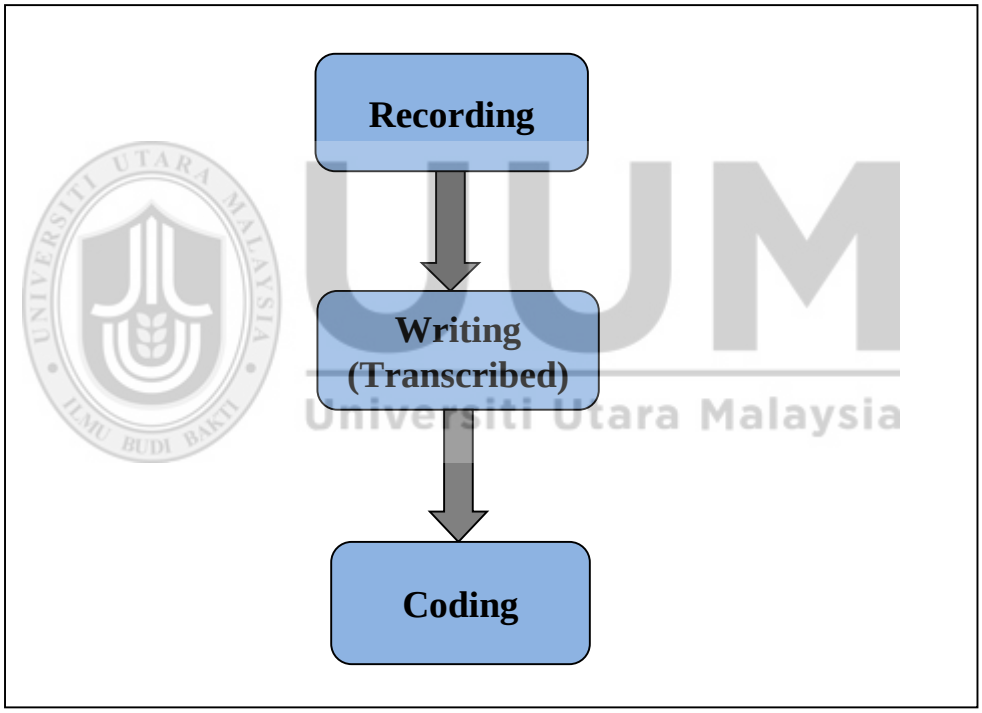

Figure 3.2 Processes for Analysis

3.6.1 Recording

In this study, the researcher starts collecting data by recording the interview with participants. Recording research interviews used to capture qualitative data in thesis

or dissertation research and ensures descriptive validity. While taking notes, writing down the observations is equally important, but the interviewer will miss out on some details. An audio recording of an interview also allows the researcher to refer back to the interview and take a fresh look at the interview data. In general, academics prefer to record rather than not record interviews because they do not have to focus on writing a lot of information down and can instead focus on conducting the interview. The major advantage of a recording device is that it provides a exactly script of the interview and the interviewer can focus more on engaging with the participant (Harvey, 2011). As well as, when the interviewer listens to the recordings of the interviews one after another they will start to become familiar with the various key points being made by the respondents, and start to understand their various perspectives (Rowley, 2014). Therefore, the researcher used MP3 and smartphone as a tool to record the answer for participants after take the permission from them.

2.5.6 Transcribe

In qualitative research, the interview is usually tape-recorded and transcribed whenever possible. This procedure is important for detailed analysis required in qualitative research and to ensure that the answers for interviewers' are captured in their own terms. The recordings are transcribed, passing from the original oral form into written form (Seidman, 2012). The purpose of the conversion into a written account is to allow the detailed required in the analysis of the qualitative data (Polkinghorne, 2005). In this study, the transcribed is the second step after recording. The researcher listened to the interview recording, and takes time to think about what

the interviewee has said and then translate the answers for some participants those talked in Arabic into English.

2.5.7 Coding

Code is a word or short phrase that assign summative, essence-capturing of data, the data may consist of journal, document or interview. The coding described as the "critical link" between data collection and the explanation of meaning. In qualitative data analysis, a code is a researcher generated construct that symbolizes and interpreted meaning to each categories and theory building (Saldana, 2012). In this study, the first step in coding process was coded manually by hard copy that gained the researcher experience in coding and understanding the fundamental of data analysis. Afterwards, the researcher applied the codes using NVivo software. This software is used to storage and categorizing interview transcripts and documents, categories through computer-assisted coding and conducting searches that relevant to analysis, in order to create reports (Kan & Parry, 2004).

3.7 The Validity

The concept of validity is described by a wide range of terms in qualitative studies. This concept is not a single, fixed or universal concept, but "rather a contingent construct, inescapably grounded in the processes and intentions of particular research methodologies and projects" (Golafshani, 2003). Although some qualitative researchers have argued that the term validity is not applicable to qualitative research, but at the same time, they have realized the need for some kind of qualifying check or measure for their research. Qualitative research need to know how to evaluate

qualitative findings, it is also important to understand that methods of research validity can be constructed into a study (Creswell & Miller , (2000). Kuzel and Like (1991) summarize four techniques that researchers can utilize during data collection and may increase the validity of research findings. This techniques include member checking, Disconfirming Evidence, Triangulation and Thick Description.

In this study, member checking is used to validate the findings. Therefore, the researcher sent the findings for current study to five participants to check the results, and this agreed with Creswell (2009), who stated that five participants are adequate to validate the findings. Thus, the researcher in this study chose five participants to validate the theme by taking their opinions about these findings. The participants were agreed with the themes that the researcher find it.

3.8 Summary

This chapter explains the method of collecting data from the available resources. Qualitative approach is employed to answer the research questions and data is collected through the study sample. After data collection, it is analyzed with the help of interpretive techniques and Nvivo software. This method enables the researcher to complete the study with expedience, accuracy and ease.

CHAPTER FOUR
FINDINGS

4.1 Introduction

The preceding chapter provided a discussion of the study methodology phases to achieve the research objectives. In the present one, the researcher presents the interview findings after the analysis was carried out. As explained in the prior chapter (Chapter Three), the researcher interviewed twelve participants (see Table 4.1), with ten of them through face-to-face interviewed and with two through online questionnaire. Owing to the brief answers provided for the online questionnaire, the researcher selected the two best answers among them. The present chapter discusses the interpretive analysis through the use of In Vivo, Simultaneous and Provisional Coding and Nvivo software. When the analysis was going on, the themes collected were more than 12 although there were only 12 participants because some of the participants provided more than a single theme and this led to variations in the coding number.

4.2 Participants Demographic

The researcher interviewed twelve participants comprising of postgraduate students in UUM, particularly those studying in IT and ICT fields. The participants' information in terms of their gender, age, and nationality are presented in Table 4.1.

Table 4.1
The demographic for participants

ID	Gender	Age	Semester	Nationality	Program
P1	Male	29	Third	Iraqi	PHD/IT
P2	Female	38	Fourth	Malaysian	MSC/IT
P3	Male	39	Fourth	Egyptian	MSC?IT
P4	Female	30	Fifth	Malaysian	MSC/IT
P5	Male	28	Third	Jordanian	MSC/ICT
P6	Male	41	Third	Nigerian	MSC/IT
P7	Male	34	Fourth	Iraqi	MSC/IT
P8	Female	28	Fourth	Malaysian	MSC/IT
P9	Female	26	Fourth	Iraqi	MSC/IT
P10	Female	30	Third	Yamani	MSC/IT
P11	Female	30	Third	Iraqi	MSC/IT
P12	Female	39	Third	Iraqi	MSC/IT

4.3 The Findings for Research Questions

The study interview was developed according to the Nonaka and Takeuchi theory, where the questions therein are categorized into four parts namely socialization, externalization, combination and internalization. Every part has its set of questions (See Appendix A)

4.3.1 Findings for Research Question One: What are the knowledge sharing activities among local and international postgraduate students?

4.3.1.1 Socialization part

The interview question one that related to socialization part is: What do you share with your group mates during the conversation about the assignment and project report using the social media?

According to Nonaka and Takeuchi model socialization Socialization refers to the transformation of tacit knowledge into new tacit knowledge and it involves sharing the experiences among the members of the organization (Akhavan et al., 2013). This section provides a description of the answers to the first part of the Nonaka and Takeuchi theory relating to the research's first question. It examines the students' activities involving assignment sharing and project reports through the use of social media tools. It also determines other activities that take place among the students while they use the social media tools. This section is categorized into three themes. The interviews outcome based on Nvivo 10 is presented in Figure 4.1.

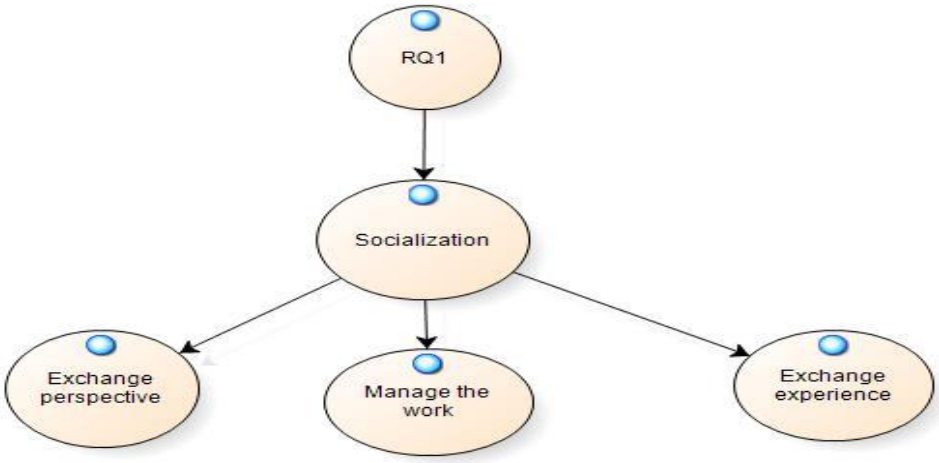

Figure 4.1 Themes of Socialization

4.3.1.1.1 Theme 1: Manage the Work

Majority of participants (7 out of 12) contended that they created social media groups through Facebook to conduct their assignments and to complete their project reports. Their primary action is to determine the time required to complete the work and to submit it, and to make appointments for meetings with the supervisor. Every member has a responsibility to fulfill in completing the assignment and project report. This is exemplified by the Participant 12 who stated,

> *"The assignment and project report is initiated by exchanging ideas through social media that will assist in completing the work effectively. Every participant has his/her appropriated role and the schedule of the project completion is decided on"*

Moreover, the students stressed on their use of social media tools to plan the group work for the assignment or project. Specifically, they use social media tools to remind them of the deadline as this is a significant step prior to starting work. According to the Participant 5,

> *"The work is initially separated into parts, formatted and managed for time submission and the group members are reminded of the remaining days prior to submission and the days required to collect data and to correct it"*

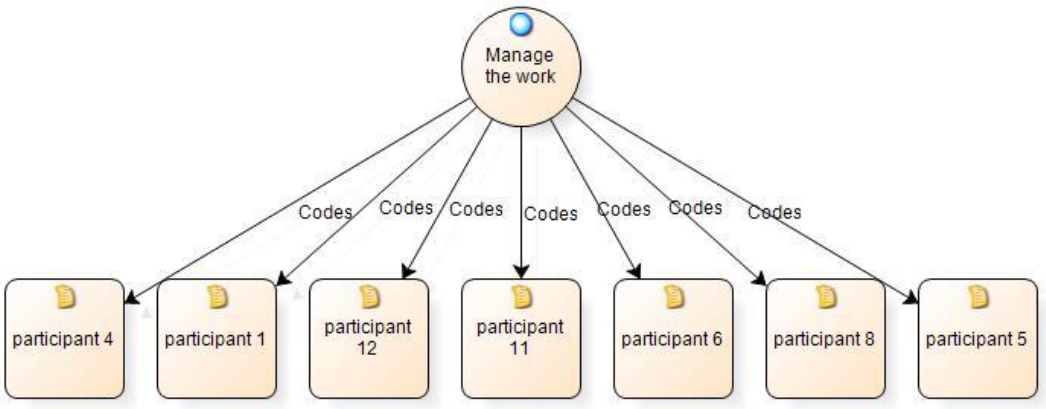

Figure 4.2 the Participant for Manage the Work

4.3.1.1.2 Theme 2: Exchange Perspective

In the socialization phase, knowledge is transformed from tacit to new tacit knowledge indicating that individuals can share their views, and insights as to the solutions and answers to the assignment and their personal feedback. In this phase, 6 out of 12 participants (See Figure 4.3), stressed on the importance of social media tools for perspective exchange among group members. Specifically, the participants explained that they have online meetings through social media tools as these meetings provided them the chance to discuss and exchange views concerning the assignment or project. In this regard, Participant 7 stated that,

> *"We, the group members, determine the time for work submission and exchange our perspectives and feedbacks through social media tools on the basis of our experience for effective work completion"*

The members also discuss the action points for the work required and this entailed sharing of ideas to arrive to final decision on the basis of the thoughts shared through the use of social media. According to Participant 3

> *"The task is divided among us and the solution to the assignment is discussed (for instance, solution for system analysis). Sharing of ideas occurs in such discussions and the determination of solution hinges on all our contributions"*

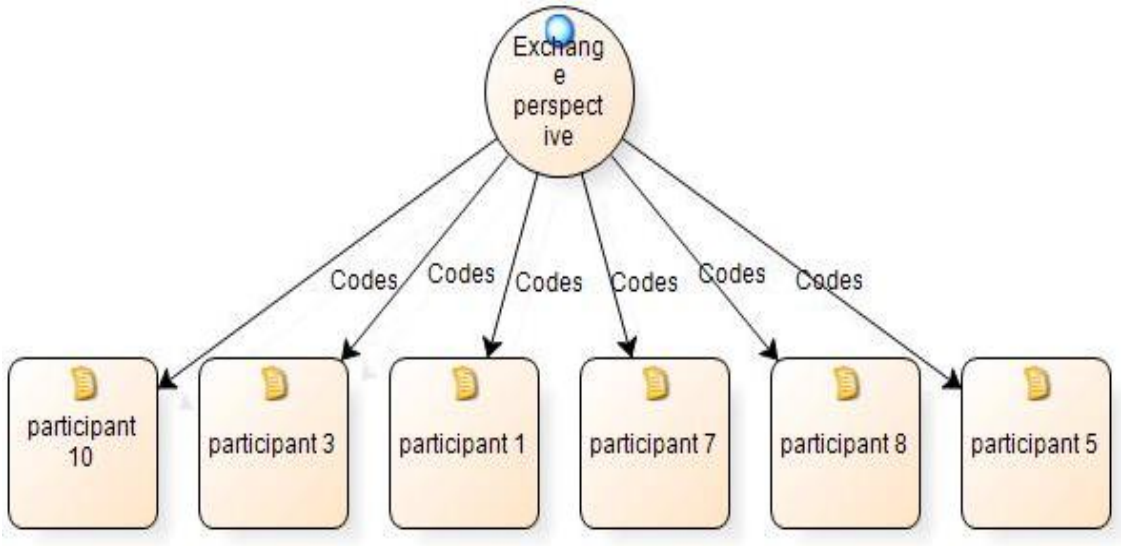

Figure 4.3 Participant for Exchange Perspective

4.3.1.1.3 Theme 3: Exchange Experience

The students discuss their work assignments or how to go about completing their project reports online. According to four out of twelve interviewees, (See Figure 4.4), the students share their experience through the chatting option and that such an option facilitates and improves their communication. Specifically, Participant 5 explained,

> *"Through social media, every member of my group is enabled to provide his/her opinion depending on experience. For instance, in our assignment in usability engineering, we had to come up with a systematic literature review and one of the group members happened to have an experience on the subject. So he divided the work among us through social media according to each member's experience"*

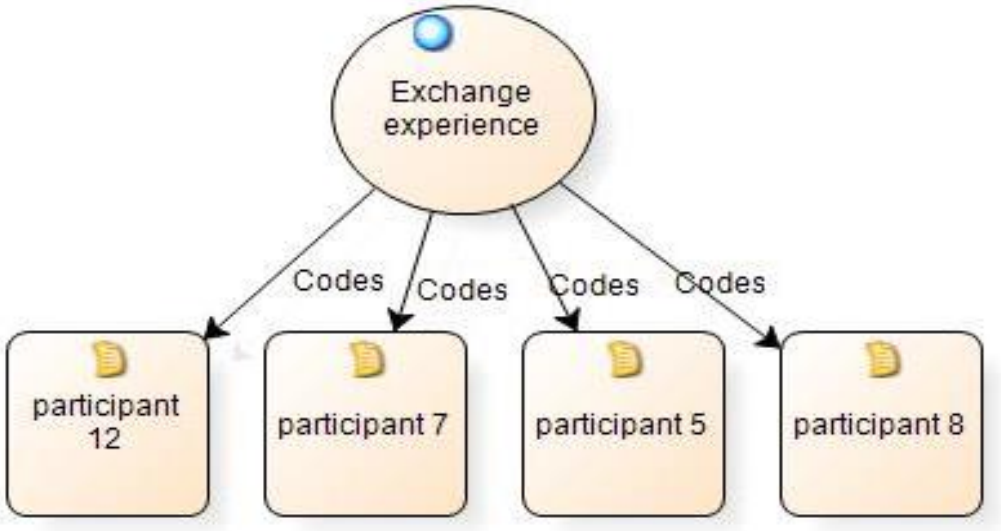

Figure 4.4 Participants for Exchange the Work

4.3.1.2 Externalization part

The interview question that related to externalization part is: What are the main actions that you do when converting idea to text or image by using the social media tools? Explain in detail?

In order to understand the social medial tools facilitation of knowledge sharing, the externalization section is given importance in Nonaka and Takeuchi's theory as the starting point for any initiative. This phase is significant owing to the fact that any idea pertaining to the work or project has to be documented (tacit knowledge) and transformed into something tangible (explicit knowledge) for its modification and development. The NVivo 10 analysis results of the semi-structured interview with the participants are presented in themes in Figure 4.5:

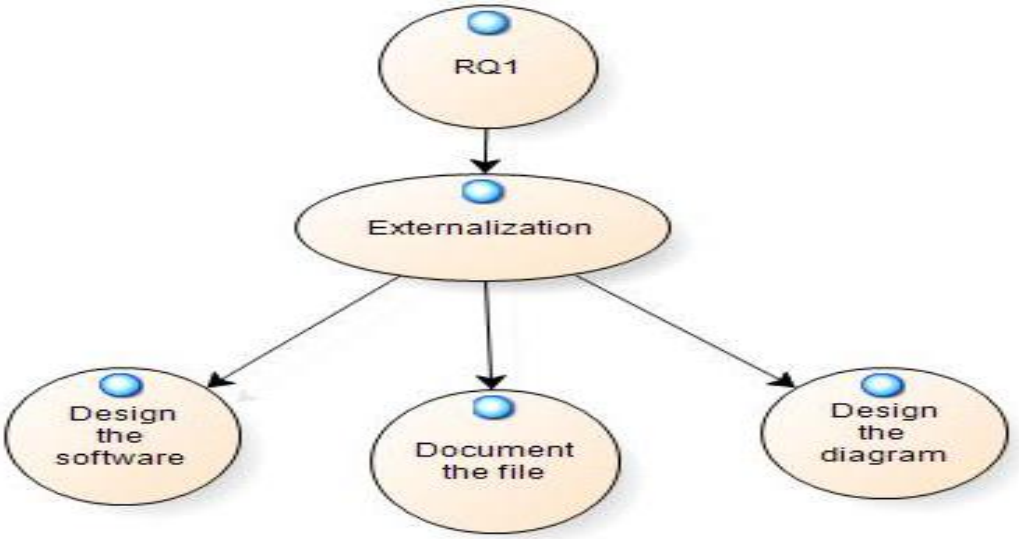

Figure 4.5 Themes for Externalization

4.3.1.2.1 Theme 1: Document the file

This theme involved the students' conversion of the idea into symbols or the conversion of thoughts into documents. Majority of the participants (9 out of 12) (See Figure 4.6) confided that they made use of social media tools to solve the assignment and to draw up the project report. They think about the assignment first after which, their thoughts are converted into text and the file/image is uploaded as a file online. Specifically, Participant 10 volunteered that,

> *"Social media enables me, as the user, to write my thoughts and post the writing as documents or file in an MS word and upload them. When the files are completed, I can upload them to the social media group site so that every group member can access it"*

Similarly, the fifth participant elaborated the way social media can assist in the sharing of figures related to the work assignment by distributing it to the group members and agreeing to upload the relevant file or figure. He explained that,

> *"During the discussion, I send sample figures to my group members for their feedback. Specifically, in our assignment for*

usability engineering, three models were relevant and all three had its own distinct figure. Every one of my group members gave their opinion about them until a consensus was reached and eventually, the agreed figure was included in the file"

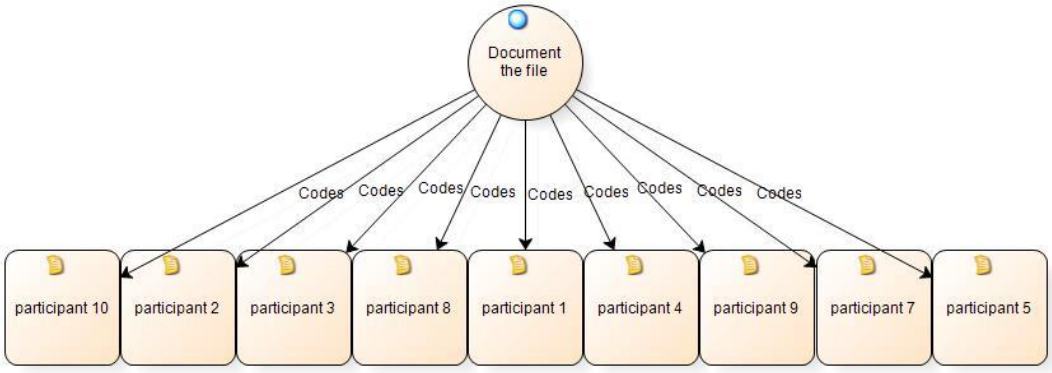

Figure 4.6 Participants for Document the File

4.3.1.2.2 Theme 2: Design the diagram

The students in IT and ICT learn advance system analysis and advance data base, subjects that include diagrams for elaboration. For instance, the sequence diagram in advance system analysis and conceptual and logical diagrams in advance database. In this case, the groups of students who are working on the same assignment or work project share a subject diagram between them through the use of social media tools. Several of the interviewees (See Figure 4.7) enumerated the group members' tasks when they solve the assignment among them. One of the mentioned tasks is to design the diagram that is related to their work with the help of a drawing software, after which the diagram is sent to every group member by uploading. An alternative would be to draw manually and send a snapshot of the drawing by uploading with the help of social media tools.

This theme was stressed by the participants particularly Participant 1, who contended that,

"The group initially talks about the division of work depending on each member's role, and my role happened to be drawing the sequence diagram using EDRAW program and saving the image drawn after which I can send it to the other group members later"

The participants also addressed the importance of technology to communicate the students' thoughts after they convert the idea into drawings. Participant 6 elaborated on this when he said,

"When drawing the diagram, I think of the subject first and when the idea is solidified in my head I can draw it on paper and send it as a snapshot to the group members through Facebook group. For instance, in our actual system analysis project, some of my group members had to draw while the others documented ideas, all of which were shared through social media"

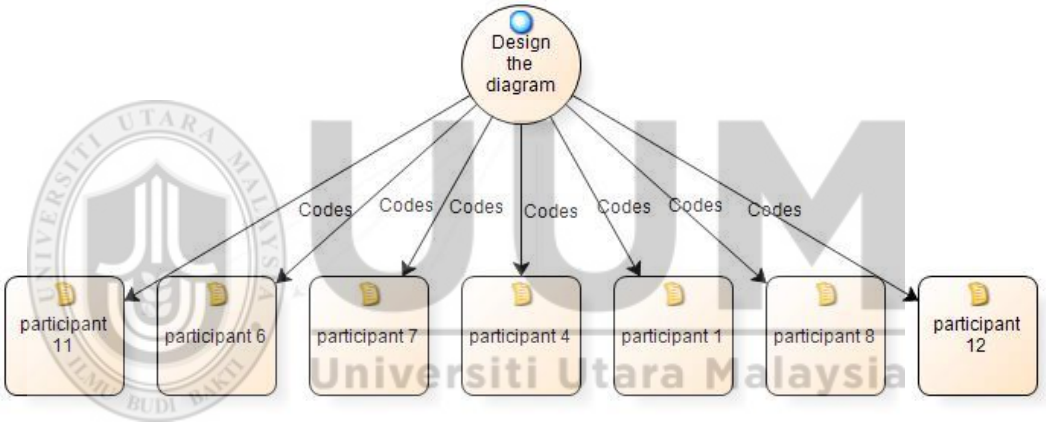

Figure 4.7 Participants for Design the Diagram

4.3.1.2.3 Theme 3: Design the Software

Majority of the assignments and projects that IT and ICT students have to complete are related to programming (e.g. interface prototype). Hence, the students have to make use of programming language. Under this theme, three out of twelve participants as presented in Figure 4.8 stated that the ability to use social media to upload files for programming language is required in order for the other group members to avail of such programs where they can download and debug their files. Online tools also

facilitate the sending of codes by MS in case some group members face some issues in downloading files. For instance, Participant 11 stated,

> *"I send the files for programming language (e.g. for database interface project) and not all of the group members have the programming language in his/her computer and this may cause problems in their part to download the files – to steer clear of such a problem, I also send the codes by MS word"*

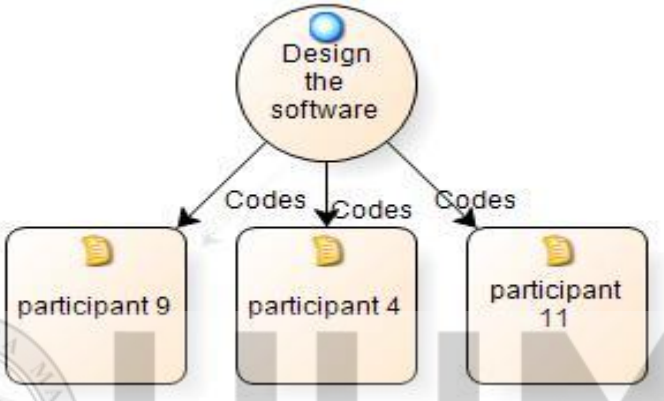

Figure 4.8 Participants for Design the Software

Along a related contention, the fourth participant revealed that students making use of Facebook group to send codes for MS programming language upload their files to other Facebook group members – this is considered as the conversion of thoughts into documents/files. Participant 4 further explained that

> *"The group members are assigned tasks, where I was sometimes responsible for programming (e.g. advanced programming) using java programming language. I copy the code for programming language to MS as I find this easier to upload the files to other group members in Facebook"*

4.3.1.3 Combination part

The interview question that related to combination part is: What activity do you do when collecting data from group members using the social media tools to create a good assignment/ project report? Give an example.

In the combination part of the process, knowledge is converted from explicit knowledge to new explicit knowledge and in order to comprehend the way students generally make use of social media tools to share knowledge, this part can be referred back to Nonaka and Takeuchi's (1995) method, where they drew on the process of the spiral model. Based on their model, the group can convert explicit knowledge by collecting files and figures in one file to compile the final assignment or project report. The researcher obtained three themes from raw data in this part as presented in Figure 4.9.

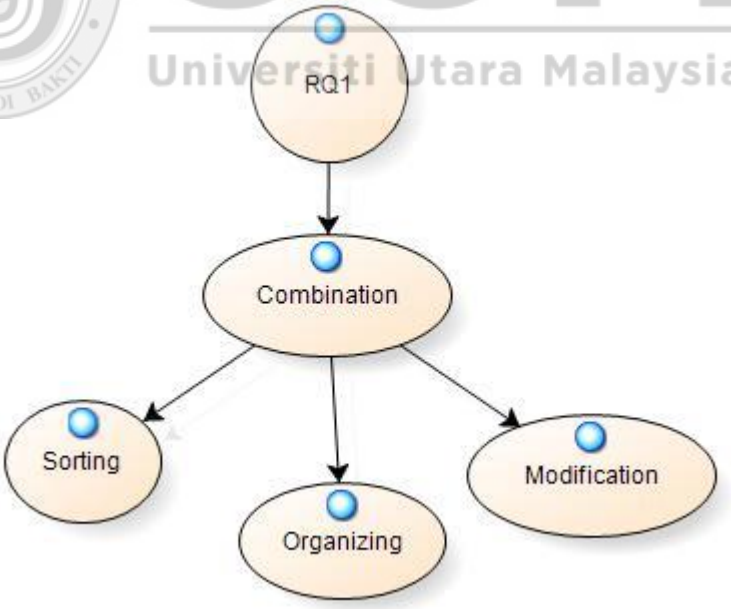

Figure 4.9 Combination Themes

4.3.1.3.1 Themes 1: Organizing

Organizing refers to a systematic process that involves the structuring, integrating and coordinating task goals and activities to resources to achieve the objectives. Majority of the participants (6 out of 12) (See Figure 4.10) revealed that when every group member has completed his part for the assignment and project, data is then collected from all of the group members and compiled into one file (e.g. the documentation is combined with the programming figure). The steps entailed organization of work to compile a convincing assignment and project. In this regard, Participant 1 stated

> *"Sometimes one of my group members is appointed as the leader and he becomes responsible for collecting data from all the other group members, organizing collected data and sending it back as a whole to the Facebook group. Specifically, such data is collected and saved in one file as MS word to distribute it to the other members as a complete and valid work".*

Moreover, according to Nonaka's model, an individual can transform explicit knowledge to new explicit knowledge and this is exemplified by the group leaders' or the coordinator's collection of data from each group member, organizing the work, combining them, and eventually present new knowledge in the final work (Participant 5). He elaborated,

> *"In our usability assignment, every group member completes their appropriated part of the work after which he/she sends the part to the coordinator and the coordinator follows a step-wise copy and paste of the work until a final draft is completed complete with documentation and figures".*

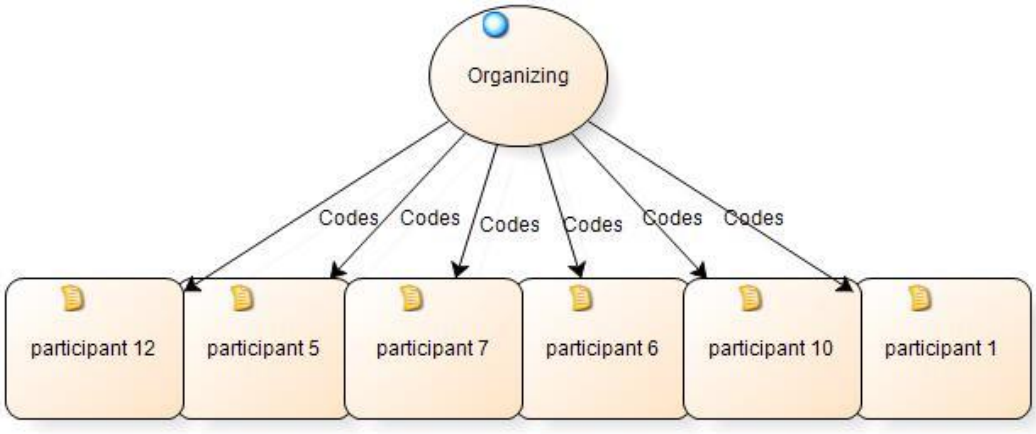

Figure 4.10 Participants for Organizing

4.3.1.3.2 Theme 2: Modification

Modification explains the action of modifying or altering any subject with the help of methods. Figure 4.11 presents that 3 out of 12 participants mentioned that following the completion of their work, they submit it to the leader, after which the later begins to modify the file to rectify contents or format. Following the modification, the group then receives the file back from the leader through social media for their final opinion. In relation to this, Participant 11 explained,

> *"In instances when I was the leader of the group, the other group members submit their work to me and I collect all the work, rectify and send it back to them for their opinion. Also, sometimes the group members themselves requests modifications of their work from me and so I do it accordingly".*

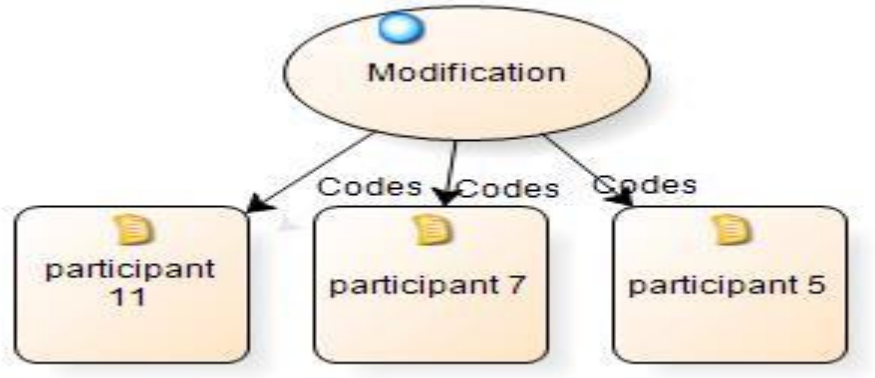

Figure 4.11 Participants for Modification

4.3.1.3.3 Theme 3: Sorting

Sorting refers to the grouping and labeling of items having similar properties. Two out of twelve participants related their statements of this part (Figure 4.12). They explained that the leader has many entailed work when combining files and figures, particularly when the work is bulky and the members are more. Specifically, the leader downloads the entire files and figures through the social media group and he goes through them to make sure which of them are relevant. According to the Participant 8,

> *"After everyone is made aware of the decided deadline, the leader downloads all the files from the introduction until the conclusion part of the project in order to post the final file through social media. In case the pictures and documentation are many, the leader will select some that are really relevant to the assignment or project".*

Similarly, if an assignment requires figures or diagrams to explain the detailed work process, the leader can choose and separate the most relevant ones and add it to the final work – this creates new explicit knowledge according to the model proposed by Nonaka and Takeuchi. In this regard, Participant 11 explained,

"When we have so many available pictures to choose from in one folder, the leader selects the best one to represent the work and will drop the others".

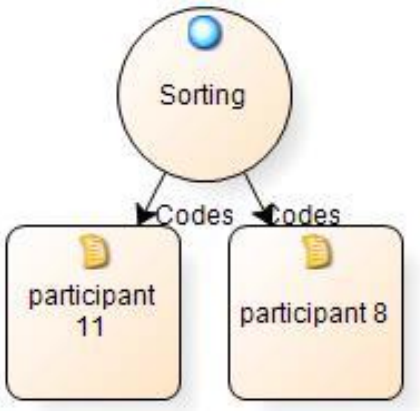

Figure 4.12 Participant for Sorting

4.3.1.4 Internalization part:

The interview question that related to Internalization part is: What are the main activities after collecting data and getting the final work done for the assignment and project report using the social media tools?

Internalization is described as the conversion of explicit knowledge into new tacit knowledge like learning from written collective discussions (Akhavan et al., 2013). This part elaborates on the answers of the fourth part of the model proposed by Nonaka and Takeuchi that is related to the first research question. The researcher synthesized two themes from the interview raw data (See Figure 4.13).

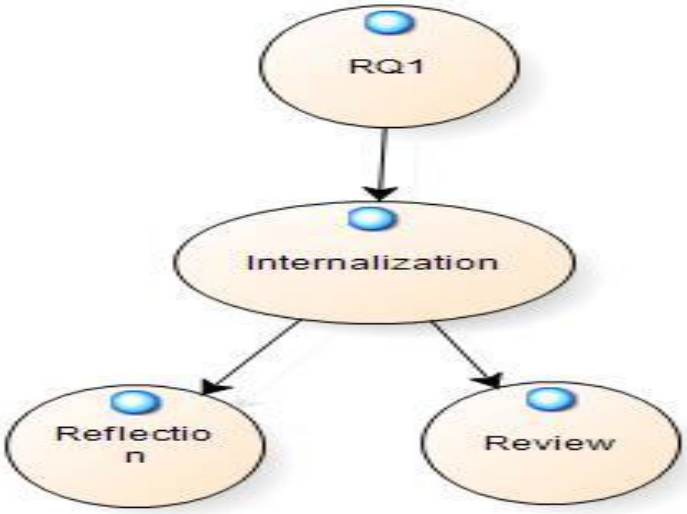

Figure 4.13 Themes for Internalization

4.3.1.4.1 Theme 1: Review

Review is the examination of evaluation of the assignment or project in a formal manner with the intention of carrying out required modifications. Seven out of twelve participants (Figure 4.14) stated that after their work completion, and the combination of all the members' contributions in a file, the file is checked for any mistakes. Each group member reads the file from the beginning until the end for the final submission. The process involves reading and understanding the whole work and through this revision, any errors or ambiguous ideas can be rectified. According to Participant 7,

> *"After the work is combined, the whole file is reviewed and discussed and the programming is tested for any error. During these discussions carried out through social media, I take the opportunity to learn from other group members and all of us can contribute to the solution of any problem that crops up"*

In other words, the comments that are provided through social media tools are important for every group member as it provides them the ability to discuss and write

their thoughts after reviewing the final work. Such discussion can urge scrutiny of the work and further elaboration when needed. Specifically, Participant 8 contended,

> *"After I compile the work into a single file, the file is uploaded again to the social media group and I inform every member about it for their review and feedback. The comments provided by my group members can elaborate on the errors. This holds true for our slides as well, where all the slides are combined into one and each group member explains the context of each slide by leaving comments in the Facebook group"*

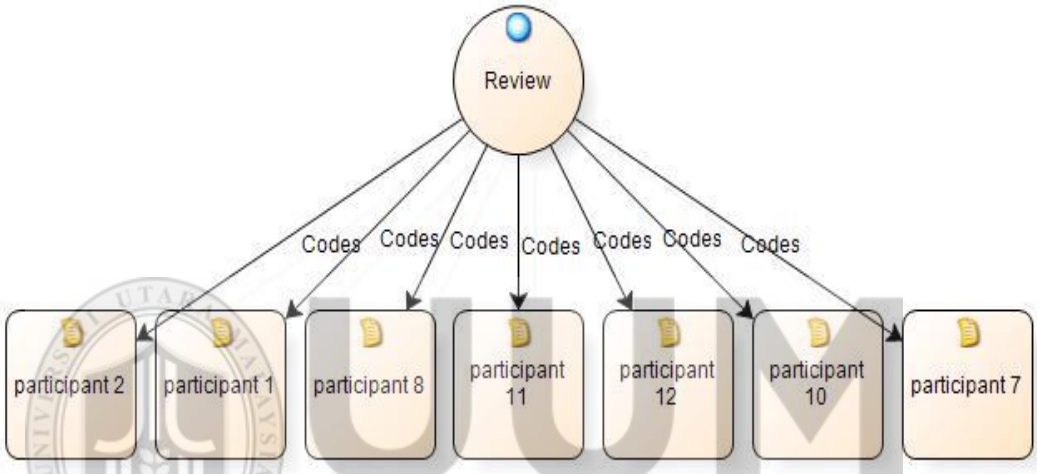

Figure 4.14 Participants for Review

4.3.1.4.2 Theme 2: Reflection

Reflection is considered as reading, thinking and understanding and in this regard, using social media to post group work to be made available to all the group members enables the members to read the file, think about it and ask for any ambiguities therein. Figure 4.15 presents the participants' feedback on this part. The discussion involves reading and commenting through social media tools and from the provided comments, other group members strive to understand the topic of the assignment. Participant 4 explained,

> *"On the basis of my experience, my group members are appropriated different project parts after which all the parts are combined a few days prior to submission. The members are then provided with the opportunity to go through the whole file and comprehend the whole gist. For instance, when I was appointed as the programmer, I had to elaborate on my part for the rest of the members to understand and learn from"*

Added to the above, the social media discussion would enable the group members to understand the topic of discussion and assignment and by reading the comments it enables them to think of the main idea for the final work. According to the Participant 1

> *"Social media enables my understanding of ambiguous paragraphs and reading comments facilitate my thinking and understanding. We can explain to the rest of our members what we understand from the comments and from our experience, after which our peers who are more experienced (in programming for example) can explain the way the interface is designed and the codes utilized"*

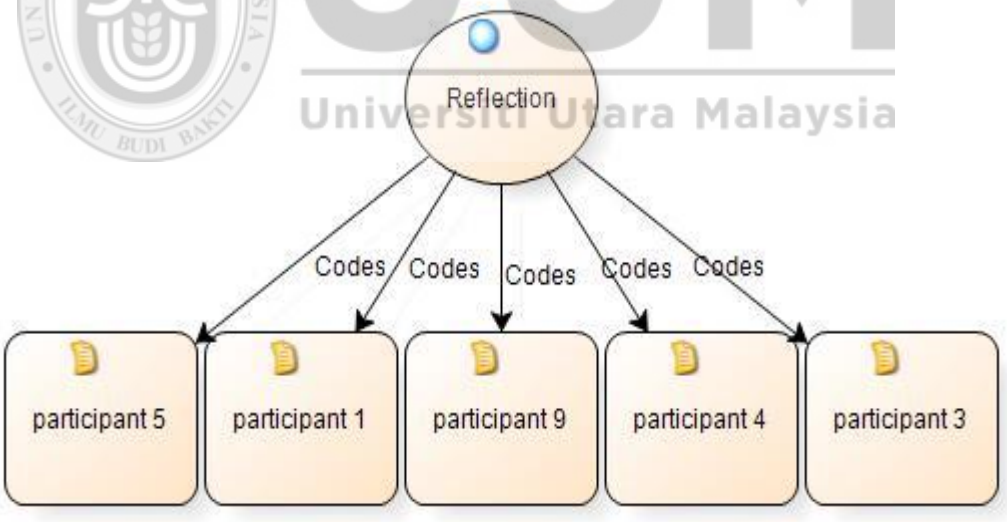

Figure 4.15 Participants for Reflection

4.2.2 Findings for Research Question Two: What are the benefits from social media tools during knowledge sharing among local and international postgraduate students?

4.2.2.1 Socialization part:

The interview question that related to Internalization part is: What benefits do you perceive from using these social media tools in the conversation with your group mates? How do they help you? Explain in detail.

This part describes the benefits of using social media tools in terms of converting tacit knowledge to new tacit knowledge. This section attempts to transfer ideas among the participants. The synthesized themes based on the interviewed participants' statements are presented in Figure 4.16.

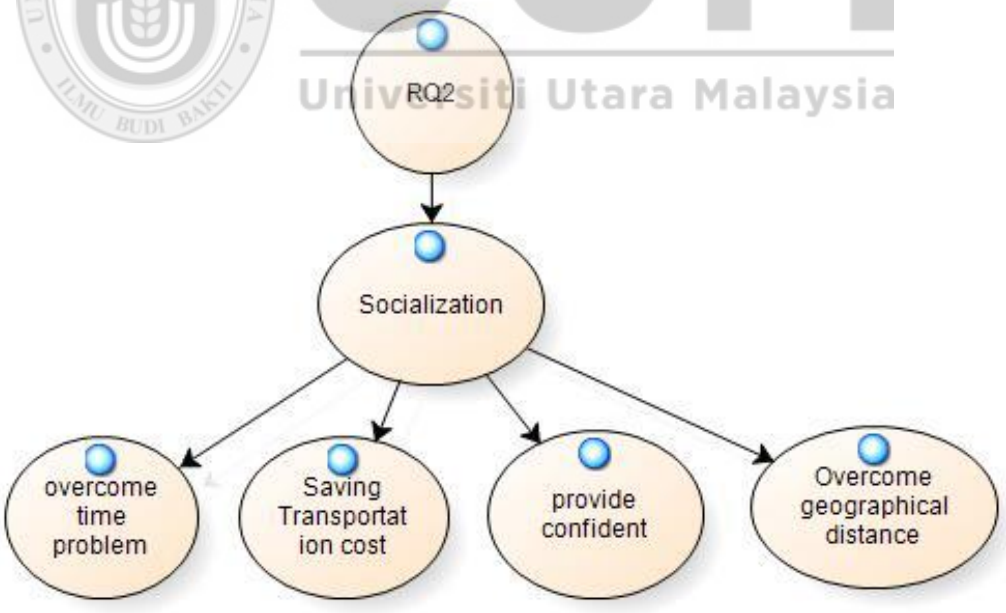

Figure 4.16 Themes for Socialization

4.2.2.1.1 Theme 1: Overcome time issues:

A college student's life is rife with a number of activities related to home, school and sometimes work. The students are faced with making various decisions and tackling issues relating to their studies on a daily basis. In regards to this, the use of social media tools simplifies their decision making and it can also help them solve issues.

Concerning this part of the research, majority of the participants (8 out of 12), as presented in Figure 4.17 contended that social media is a useful tool that overcomes their time issues as in some instances, they are busy with some activities and this prevents them from meeting their group members face-to-face. In other instances, some students are busy with their families or local students hold part-time jobs as explained by Participant 6;

> *"Social media assists in my communication, knowledge sharing and responsibility distribution with his peers. For instance, in the previous semester when I made use of social media to share my part of the group project and I benefited from such a time saving tool. Social media provides students to send and receive files if they are too busy to have face-to-face meetings, which is especially true in case of local part-time working students who only visit the campus two days a week".*

Added to the above, are other issues that prevent students from attending face-to-face meetings particularly when it comes to female students who are sometimes limited in their outings and are not free to meet at any time. In this context, the tools of social media can be used conveniently to steer clear of this problem. Participant 11 elaborated,

> *"Sometimes, the meeting time clashes with my schedule (e.g. at night) and this makes it impossible for me to meet my group members and in these instances, we hold meetings through social media to discuss the work to be done, the files to be sent and received, and the assignment to be completed".*

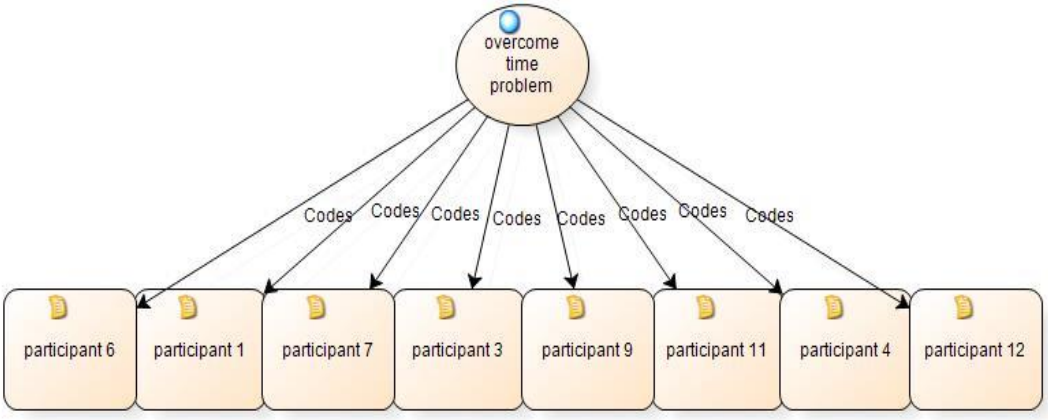

Figure 4.17 participants for overcome time issues

4.2.2.1.2 Theme 2: Overcome geographical distances

Some postgraduate students live within the campus while others live external to it. Based on the difference in geographical distances, group members may face difficulty in attending face to face meetings and this problem can be solved if they use social media. This theme shows that six out of twelve participants (See figure 4.18) contended that social media makes it easy for everyone to collaborate regardless of their living arrangements. In other words, social media facilitates easy communication among the members; Participant 4 commented on this theme by saying,

> *"I prefer face-to-face meetings but in instances where some of the group members are working part-time or are living outside of the campus, social media makes it easy for us to discuss and communicate among one another"*

This contention is supported by the tenth participant who explained that social media facilitates easy contact among students and easy sharing of tacit knowledge (e.g. ideas created during discussion of the assignment among the members through social media group). He stated,

"Social media assists me to contact group members in an easy and convenient manner, share ideas, and discuss the assignment and project with members who live in far locations"

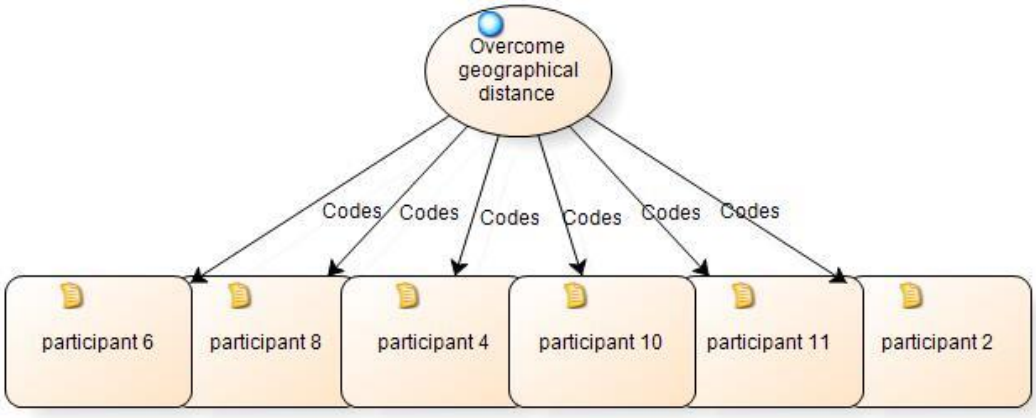

Figure 4.18 Participants of Overcome Geographical Distance

4.2.2.1.3 Theme 3: Provide Confident

In this theme, four out of twelve participants emphasized on the benefits of using social media tools (Figure 4.19) in that it provides them with a greater confidence when communicating with their members through chatting. The tools also assist the students who are shy when talking face to face with their peers – particularly when the group is comprised of students hailing from different countries and are of different genders. This was emphasized by Participant 9, who said,

"I prefer the social media to communicate with my classmates as it gives me confidence, enables me to talk freely and to express myself freely without them having to look at me while I'm talking"

This was echoed by the fifth participant who also emphasized on the social media as the best tool to communicate with compared to face-to-face communication as he feels shy from his female group mates when talking to them in the latter. He also confided that,

"Social media chatting is a better way to convince the group members of any of my ideas concerning the assignment or project report and this holds true particularly when my group members comprise of mixed genders. This makes some members shy from talking to another and in this context, it is preferable to me to chat through social media to get my points across. It also saves me face if my female group member is not too keen in accepting my idea. For instance, in the previous semester when one of the female group members had the wrong idea of going about doing the assignment, I convinced her through social media gradually and patiently until she understood her mistake".

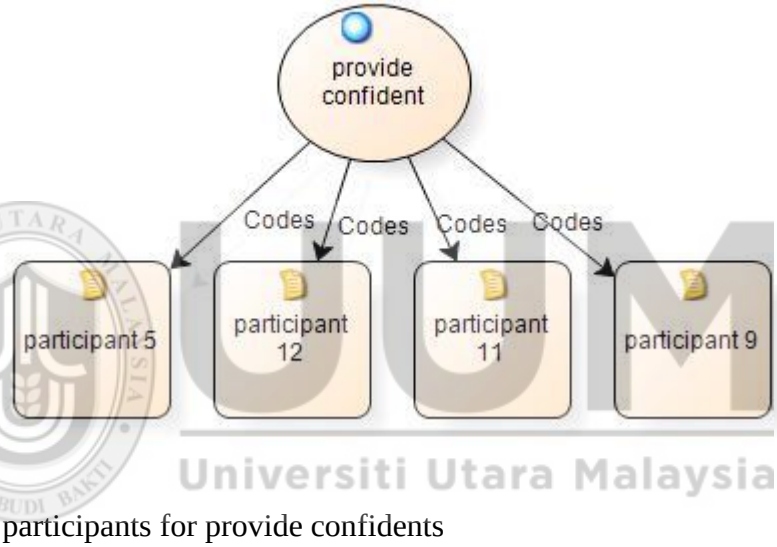

Figure 4.19 participants for provide confidents

4.2.2.1.4 Theme 4: Save transportation cost

Under this theme, two out of twelve interviewed students (Figure 4.20) stressed on the advantage of social media features among students, which include saving transportation costs (e.g. renting a taxi or buying fuel for a private car). The transportation cost issue can be solved by using social media to share ideas and discuss them with group members rather than meeting face-to-face. According to the Participant 6,

"When using social media, I save on transportation costs to go and meet group members in another location"

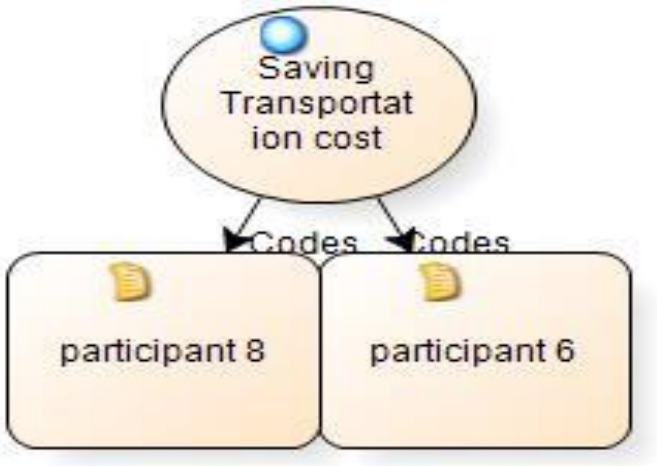

Figure 4.20 Participants for Saving Transportation Cost

4.2.2.2 Externalization part:

The interview question that related to externalization part is : As a group mate, can you explain the benefits of the social media when you and your group transfer ideas to become more tangible?

The advantages offered by social media are not confined to the socialization part (tacit-tacit), but it also covers the externalization part. In this part, social media converts tacit knowledge to explicit in that the group's idea is transformed into a document/draft for the assignment or project. Based on raw data, the researcher synthesized three themes under this part (Figure 4.21).

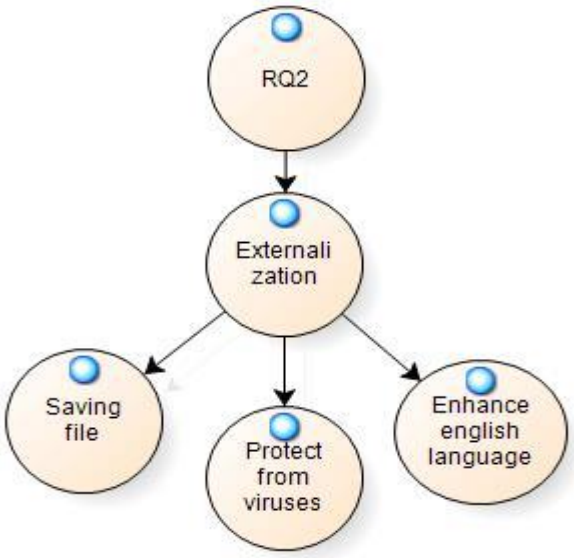

Figure 4.21 Themes for Externalization

4.2.2.2.1 Theme 1: Saving the Files:

The assignment or project can be saved through social media tools in the form of files or figures as volunteered by seven out of twelve participants to the interview and as presented in Figure 4.22. In this context, the students can save the data as soft copy and all the group members can access such data from any computer when they require it and if any issue comes up with their computers, they can access it from anywhere at any time. Participant 5 elaborates,

> *"When the document is sent through social media, the data is saved inside the computer and it can be retrieved and if it is lost, it can be retrieved from any other device on account of the fact that it is saved online"*

Added to the above, online saved projects can also be obtained by the group members from any computer, where Participant 7 stated that saving file in social media provides space in the personal computer and makes it easy for the students to retrieve it online. He mentioned that

"Social media enables me to save data and provides me access to data provided by the rest of the group, and saving such data online will allow all the others to access it without having to save it on the PC and occupy much needed space"

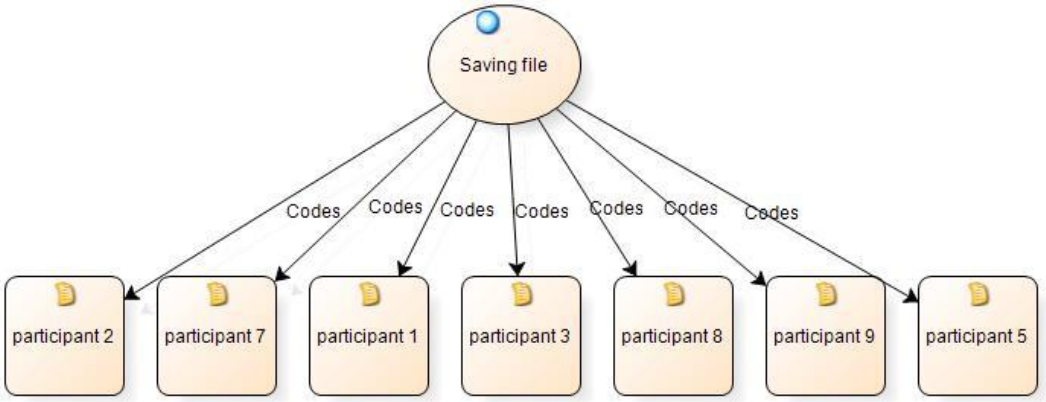

Figure 4.22 Participants for Saving File

4.2.2.2.2 Theme 2: Enhance English Language

Language is deemed to a crucial aspect in academics and as a consequence, students continue to seek to enhance their language through different ways and tools. One of the tools that can realize such a feat is social media. From the interview sessions five out of 12 participants (Figure 4.23) stressed on the importance of social media to improve English language as they chat and write to their peers in English and not their own native tongues as they all come from different countries, different backgrounds and culture. Writing and chatting with their group mates assist students in correcting their spelling and grammar use and learn new English phrases. In this regard, Participant 1 stated,

"When I first start to do an assignment, I chat with the rest of the group members in English (the rest of whom are Arabs or locals). When the rest of the members receive my texts, some of them correct my written English in terms of grammar and spellings as they are more proficient on the language than I am"

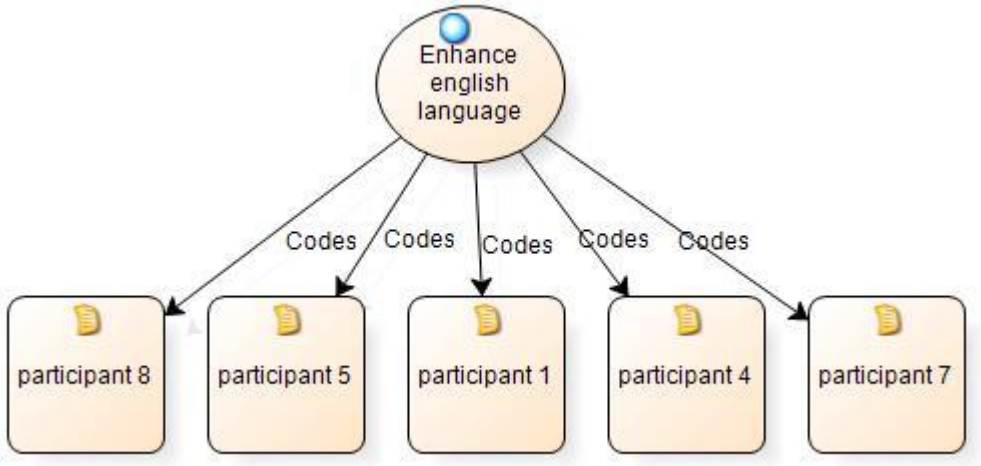

Figure 4.23 Participants for Enhance Language

4.2.2.2.3 Theme 3: Protect from Viruses

As mentioned, the study sample comprises of ICT and IT students and thus, technology issues are significant to them. Under this theme four out of 12 students (Figure 4.24) mentioned the social media tools safeguarding of their drafts and files from viruses that are often present through the use of external RAM, when sending and receiving files. According to the Participant 11,

> *"Social media use protects my computer from viruses when the rest of the group members send their files and images to the group sans pen drives that are virus carriers"*

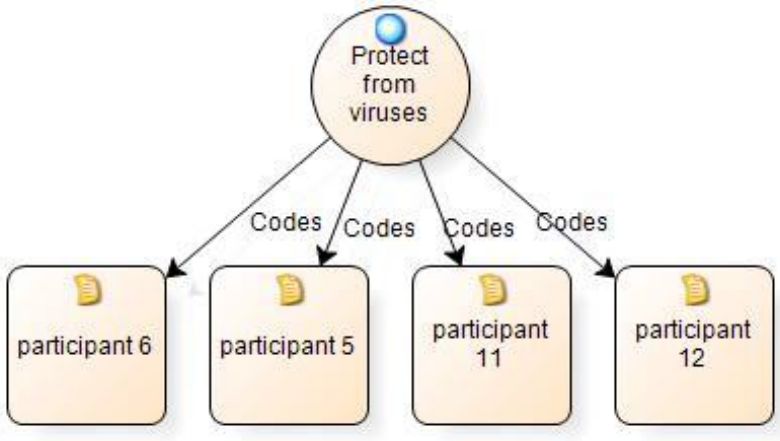

Figure 4.24 Participants for Protect from Viruses

4.2.2.3 Combination Part:

The interview question that related to combination part is: As a group mate, how do social media tools help you to gather your work elements (for assignment or project)?

Under this section, the benefits of using social media when converting the ideas and materials to the project or converting explicit knowledge to new explicit knowledge are enumerated. According to the Nonaka and Takeuchi model, combination entails the combination of materials from different data sources to come up with new knowledge and develop new ideas. In this context, the students make use of social media to send and receive files for their assignments headed by the leader of their group. In other words, the leader collects the sources to obtain new knowledge in the form of the combination of all the sources. Two themes are highlighted under this part on the basis of the interview data (Figure 4.25).

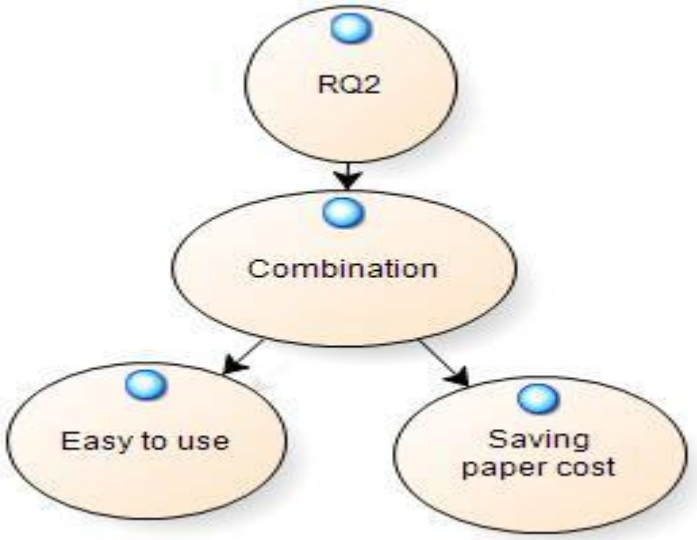

Figure 4.25 Themes for Combination

4.2.2.3.1 Theme 1: Easy to use

Social media is characterized by its ease of use and accessibility to data by the users. In the present study, the group leader makes use of social media group and reaps the benefits of such tools in terms of data collection and combination of individual members' work. Eight out of twelve participants as presented in Figure 4.26 volunteered that when combining the work assignment of each member, the social media tools facilitate such combination and collection of data through the sending and receiving of files and image features among the group members. The group leader collects data from the rest of the group with ease. Participant 1 mentioned,

> *"The use of soft copy files and social media gave me and the members of my group the ability to download any file easily, to copy and paste during data collection and to file all the work under one document".*

This is supported by Participant 7 who stated that social media is beneficial when used to collect data as it makes such collection easier, can duplicate faster through copy and paste, and can make more than one file. He elaborated that,

> *"Social media offers easy access to each group member when any file is exchanged and collected for the drafting of the final assignment copy and the leader may also duplicate the work through copy and paste".*

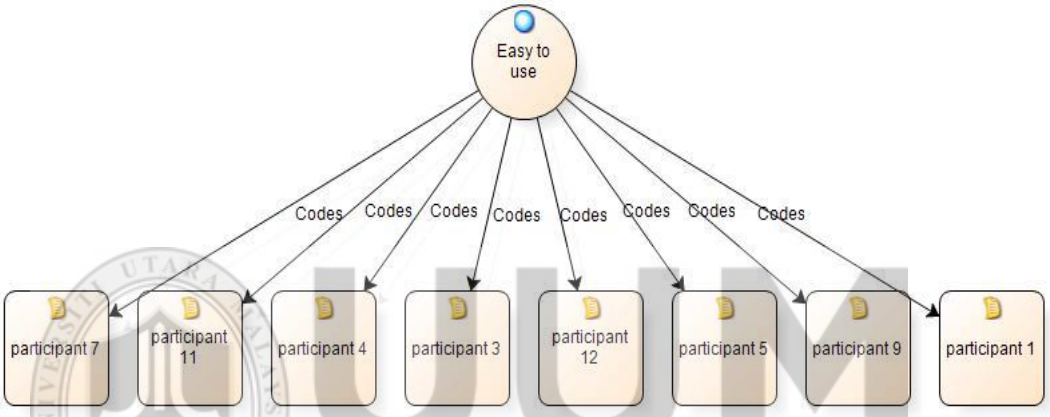

Figure 4.26 Participants for Easy to Use

4.2.2.3.2 Theme 2: Saving paper cost

Generally speaking, students are individuals who attend educational facilities and as such, most of them are unemployed and this makes their funds to spend on extra requirements limited. In this context four out of twelve participants (Figure 4.27) explained that social media tools use in whole file collection as a soft copy saves cost for printing particularly, when the context of the file needs modification and when more than one copy is needed at one time. In this regard, Participant 6 stated,

> *"Social media technology tools save costs by facilitating my sharing of soft copy online. I can send my draft without printing it and paying the cost for printing"*

This contention was supported by the eighth participant who enumerated the social media benefits and included cost savings for printing the whole work in hard copy. This also saves the group members form printing their work and submitting it to the leader as this is all in soft copy through online. Participant 8 volunteered that,

> "*The use of soft copy saves cost as the file doesn't need to be printed and social media enables the file sharing at any time and any place"*

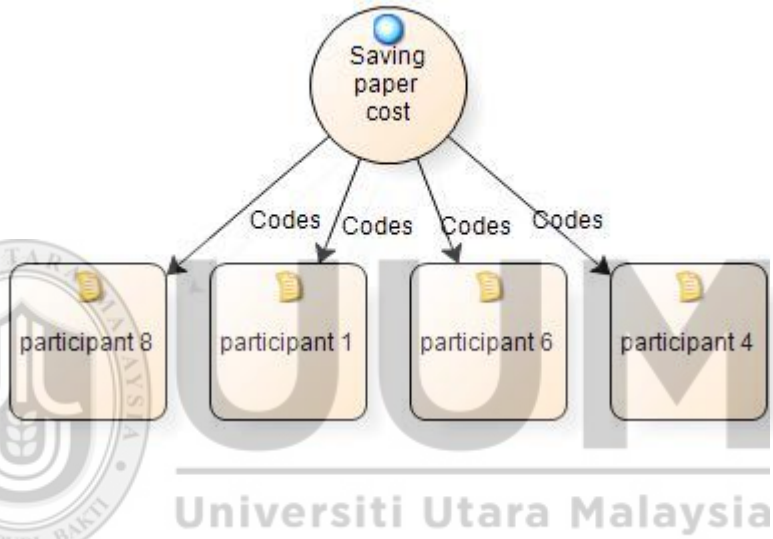

Figure 4.27 Participants for Saving Paper Cost

4.2.2.4 Internalization Part:

The interview question that related to internalization part is: What do you benefit from the discussion and comments of the group about the social media tools?

This part involves the conversion of explicit knowledge to tacit knowledge to achieve the second objective of the research. The answers are categorized into two themes on the basis of the raw interview data obtained from the participants. The list is presented in Figure 4.28.

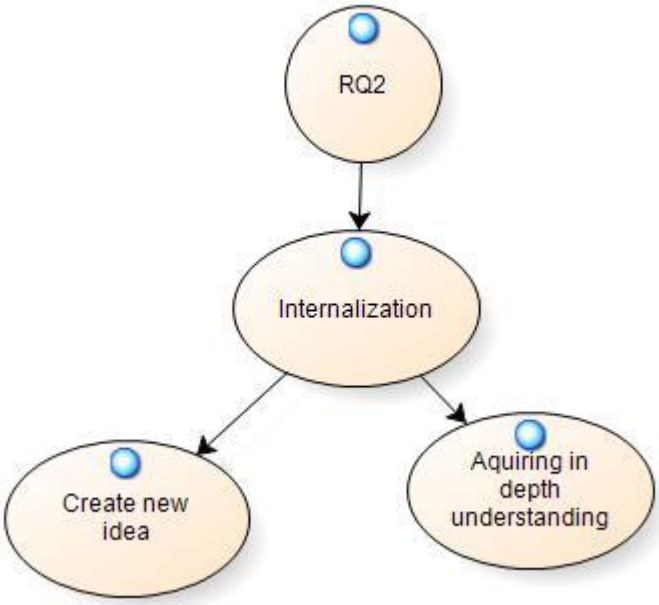

Figure 4.28 Themes for Internalization

4.2.2.4 .1 Theme 1: Create new idea

In this part of internalization, explicit knowledge is converted into tacit knowledge indicating that the document is converted into tacit knowledge in the minds of the reader of the document (group members) in the form of an understanding and learning. The sending and receiving of files through social media facilitates the posting of the final work after combination of individual works. This then provides individuals members the opportunity to read the file context and to provide their comments on social media of the contents that are ambiguous to them. Other group members are obliged to clarify such ambiguities after which such comments will be beneficial for those who did not understand at first – in other words group members will learn from the comments as they read them through social media tools and internalize them. Under this theme, Participant 5 relates that,

"I ask my group member of some ambiguities that I encounter on the final file and through the comments in the discussion site I observe some ideas, clarify and understand it"

Similarly, Participant 9 also mentioned that,

"I need to understand the topic first and discuss it with group members and social media tools assist me to do so. I learn through comments as sometimes I get the wrong idea but through discussion and provided comments, and relevant information in the form of documents sent by the other members, I understand what I appeared to be confusing to me before"

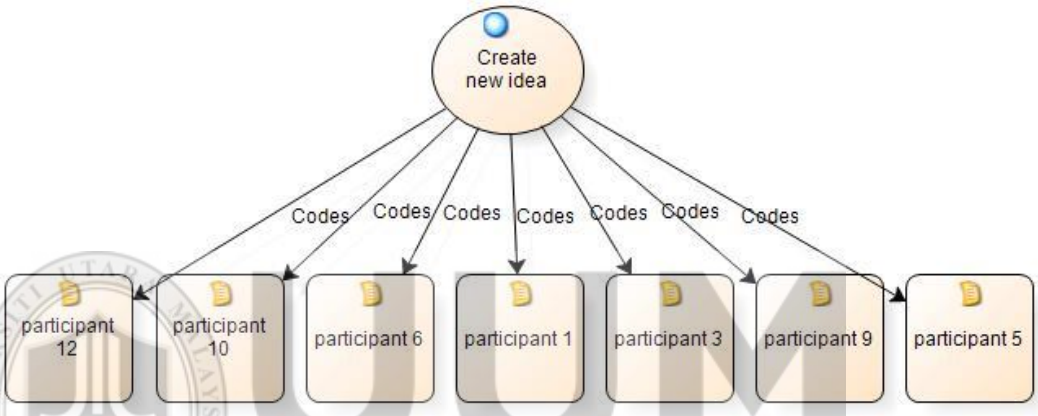

Figure 4.29 Participants for Create New Idea

4.2.2.4.2 Theme 2: Acquiring in Depth Understanding

The second theme involves in-depth understanding through the use of social media tools. From the perspective of four out of twelve participants (Figure 4.30), the students can benefit from the social media options for group comments. After posting documents/files, the group members can begin discussing the assignment topic and project and such discussion can facilitate in-depth understanding. According to Participant 11,

"Sometimes when I go through the context of the assignment, some points are ambiguous to me, but through the comments and explanations provided, I can read and understand deeply with one discussion after another. Such discussion is available at all times as it is saved by social media group"

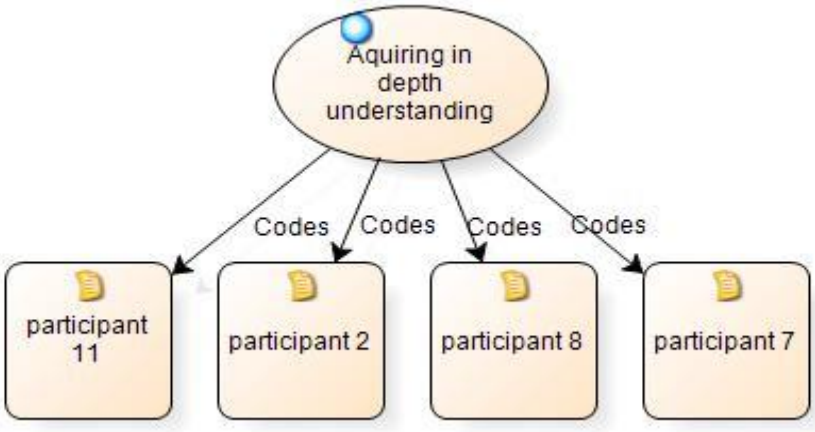

Figure 4.30 Participants for Acquiring in Depth Understanding

4.2.3 Findings for Research question Three: What are the barriers towards knowledge sharing using social media tools among local and international postgraduate students?

4.2.3.1 Socialization part

The interview question that related to socialization part is: What difficulties do you face when using social media tools during the conversation with your group mates?

Generally speaking, when adopting new technologies like social media tools for sharing knowledge, its benefits and drawbacks should be highlighted. In this part, the barriers of using social media when converting knowledge from tacit to tacit among postgraduate students in UUM are presented. The answer to the research question is categorized into three themes as provided by the raw interview data. Figure 4.31 presents the themes.

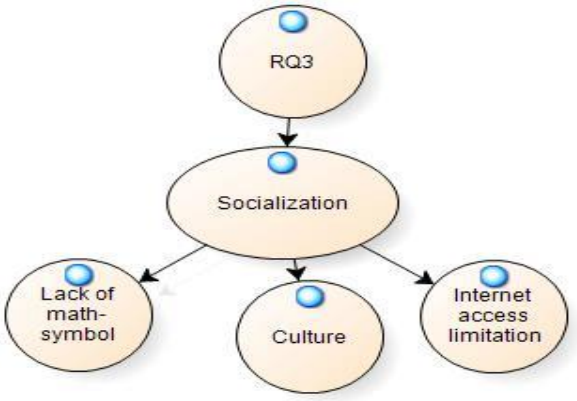

Figure 4.31 Themes for Socialization

4.2.3.1.1 Theme 1: Internet Access limitation

Under this theme, eight out of twelve interviewees (See Figure 4.32) claimed that the major hindrance against social media tools is the difficulty in accessing internet. This issue prevents the members of the group from connecting among each other when they need to – to provide their opinions about the assignment solution. Participant 9 elaborates,

> *"I sometimes have issues of no internet connection and difficulty in accessing the Internet when using social media and this prevents me from discussing the assigned work with my group mates".*

Along a similar contention, the third participant also elaborated on the internet connection issue that prevents the discussion of group members about the assignment. An issue arises when a member loses connection. He stated,

> *"Internet access is a major barrier because during discussion, some group members may not be able to connect to the Internet"*

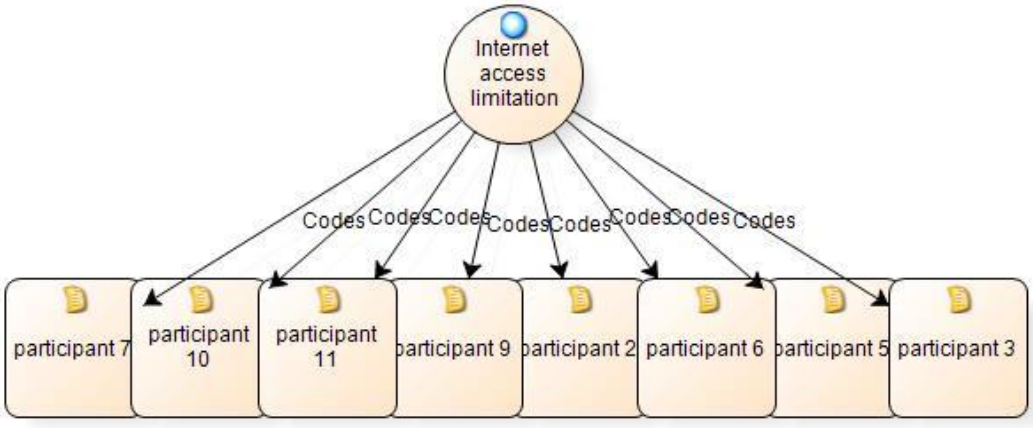

Figure 4.32 Participants for internet access limitation

4.2.3.1.2 Theme 2: Lack of Math- symbol

Equations are significant to ICT and IT students as majority of the subjects and projects require equations for calculation (e.g. advance data base where one chapter is dedicated to cost estimation). In order to solve the assignment, the group member has to use equations and mathematical symbols. This difficulty is faced when chatting and conversing through social media tools as claimed by five out of twelve participants (Figure 4.33). They specifically, cited the difficulty in typing in mathematical symbols when chatting among group members to share their ideas or to provide a new idea for the assignment. Participant 4 relayed,

> *"I faced such difficulty when chatting when I required some mathematical symbol but social media lacks the option. I had to go to Microsoft Word and type in the symbols and then send the file or figure of the symbol as a picture"*

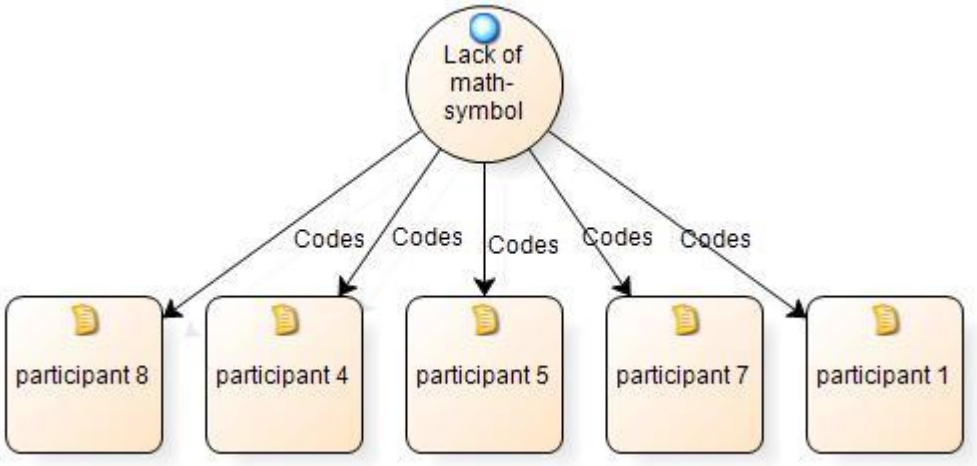

Figure 4.33 Participants for Lack of Math-Symbol

4.2.3.1.3 Theme 3: Culture

Culture has both positive and negative impact in new technology usage (Al-Gahtani, Hubona & Wang, 2007) and social media is no exception. More and more students are recently increasingly making use of social media as tools to contact their families, their friends and their classmates. There are several issues with this connection through social media and culture is one of them. A few students prefer to steer clear of social media when communicating. This theme is based on the perspectives of the participants, where three out of twelve participants (Figure 4.34) elaborated that some of their group members' traditions and culture prevent them from using social media to converse and chat with a member of a different gender. This issue prevents smooth and frank communication among group members when discussing their group work as some of the members may be absent. Participant 11 explains,

> *"Some of the group members do not even have accounts in social media, particularly female Arab students because their culture or tradition prevents them from having accounts in Facebook and other social media networks. This makes it challenging to contact them"*

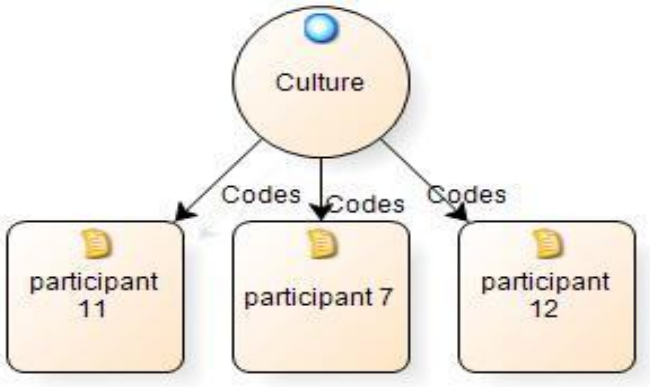

Figure 4.34 Participants for Culture

4.2.3.2 Externalization part:

The interview question that related to externalization part is: What are the barriers in transferring ideas to text by using the social media tools?

In this section, social media is used to convert tacit knowledge to explicit knowledge when documenting work. The researcher categorized this part into two themes according to the interview sessions raw data as presented in Figure 4.35.

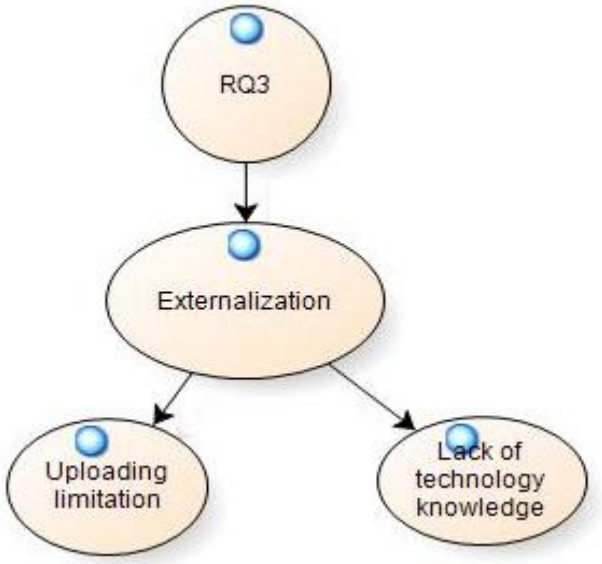

Figure 4.35 Themes for Externalization

4.2.3.2 Theme 1: Uploading limitation

In this theme, the students' ideas and thoughts are converted into documents in the form of texts, files and diagrams. Such documents are posted online through the use of social media but in order to post them, the group members need to upload them. The issue lies in the fact that some group members find it difficult to upload documents using social media owing to the documents or file size. Under this theme eight out of twelve participants (Figure 4.36) elaborated that uploading files is one of the limitations of social media tools that they have experienced. This issue is attributed to the file size limitation by social media and as such, the students are prevented from uploading files of certain sizes (both image and video), where in Facebook the image size limit is 100KB and for LinkedIn, the maximum image size if 4MB. According to Participant 10,

> *"When I need to send large-sized files through social media to the group, I am unable to do so because the file is big and social media has limits. For example, I wanted to send HD file to Facebook group but I could not owing to the size of the file"*

A related issue is the size of the video to be uploaded by the group members, where Facebook has a limited 1024MB video size for 20 minutes. The students face challenges when uploading videos that exceed this size. Some other related issues are internet connection problems, and slow bandwidth, in which case when the students are desirous of sending some files/diagrams to the social media group, but the internet is slow, the internet connection is lost. This makes it difficult to receive or send files to other group members. In the view of Participant 12,

"I faced the problem of size limitation when uploading files that exceed the limit of 1024MB (video), confined to 20 minutes of viewing in the Facebook group. I faced the problem when I wanted to send the video of programming process to other group members. Owing to internet problems, I sometimes cannot upload files using campus internet connection"

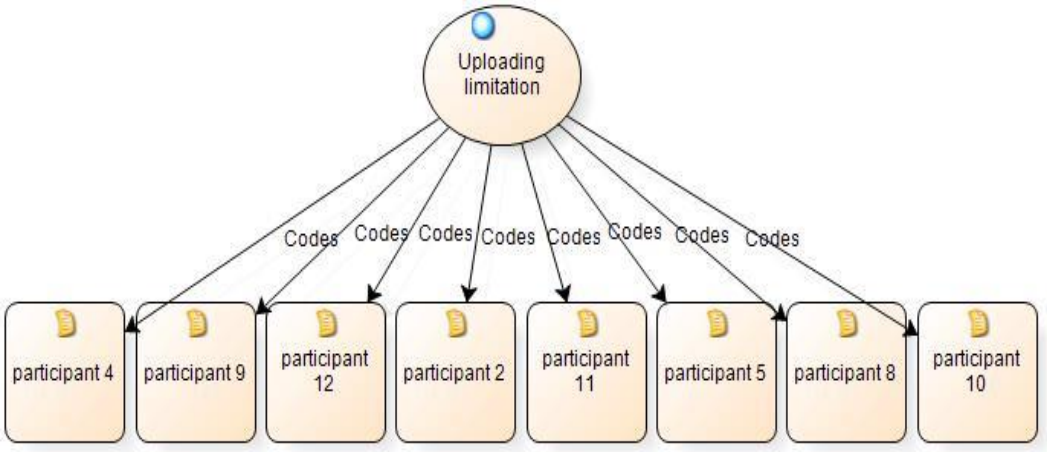

Figure 4.36 Participants for Uploading Limitation

4.2.3.2.2 Theme 2: Lack of technology knowledge

Majority of postgraduate students are currently using social media tools as they use it on a daily basis to contact their friends, families and they use it for educational purposes. For instance, they make use of Facebook and Twitter to send files to other group mates and classmates. Nevertheless, not all students are adept and experienced with using such technology as they only use social media for chatting. Three out of twelve participants (Figure 4.37) stated that some of their group members are not experienced in using social media, particularly in uploading files for the assignment and project. Such issues sometimes led them to drop some files and some faced risks in file deletion when sending to other group members. According to the Participant 7,

"Some of my group members lack the experience of using social media so some files may be accidentally deleted as they may believe them to be irrelevant to the work and this leads to lost work for the whole group"

Moreover, inexperienced group members in social media are not adept at uploading their work to the group site and this entails the other group members to upload for them or send snapshots of the uploaded files. In this regard, Participant 11 stated that,

"Some of my group members did not know how to utilize social media group and I had to teach them and this took time which we didn't have as the assignment had to be submitted but at the same time, we couldn't rush through it as they might make a mistake that could cause us the whole work"

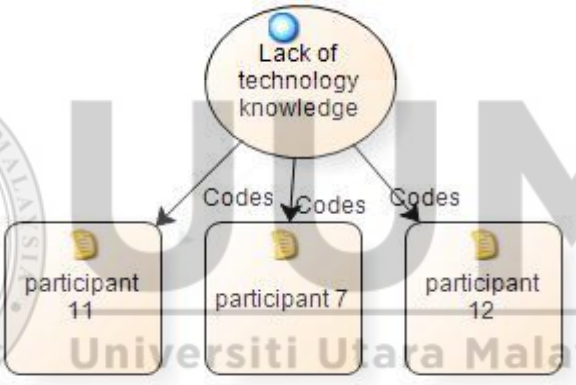

Figure 4.37 Participants for Lack of Technology Knowledge

4.2.3.3 Combination part:

The interview question that related to combination part is: In your opinion, what are the obstacles that you may face in gathering data for your assignment or project report through using social media tools?

It was mentioned in the earlier sections that the present study has its basis on three major research questions with each question seeking to determine a range of issues. In the present section, the barriers of using social media when converting explicit

knowledge to new explicit knowledge are addressed. The answers are based on three themes as presented in Figure 4.38.

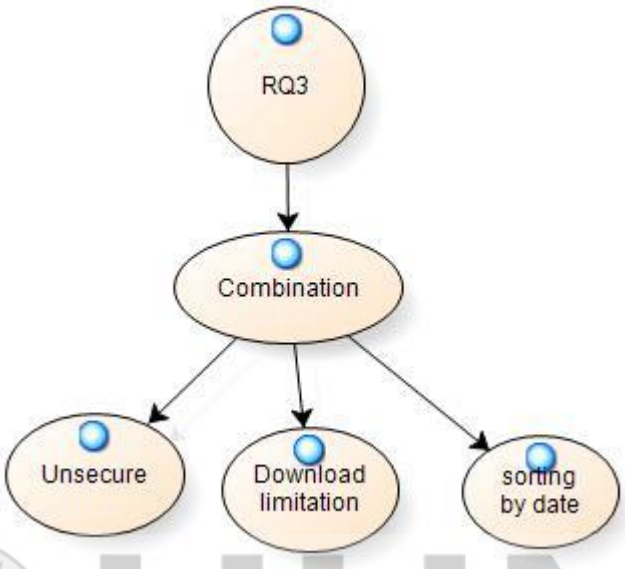

Figure 4.38 Themes for Combination

4.2.3.3.1 Theme 1: Unsecure

As with any technology, social media tools have some risks attributed to them when data sharing (i.e. file sharing, sending and receiving). File sharing among the group members may face security risks (hackers), particularly when files are collected from the group members to be combined into one final file. Such risks have to be addressed, particularly in the field of IT and ICT as they are familiar with them and how they can sabotage the final work (new explicit knowledge). Some group members for this reason refuse to use social media owing to the threat of hackers. Five out of twelve participants (Figure 4.39) emphasized this issue. According to Participant 1,

> *"Social media tools can be accessed without authorization (hackers) and this can lead to stolen data that would eventually prevent the group members to share their work through social media. This is particularly true when the final work is a crucial assignment/project".*

In other words, social media tools like Facebook are known to be unsecured as assignment works and projects may be stolen by unauthorized individuals from outside the group and this could eventually lead to loss of work. Participant 9 stressed,

> *"Sometimes, I hesitate to use social media tool, Facebook owing to it flimsy security, as anyone can access the social media group and steal the group's work. I actually experienced this when using Facebook group with my group members".*

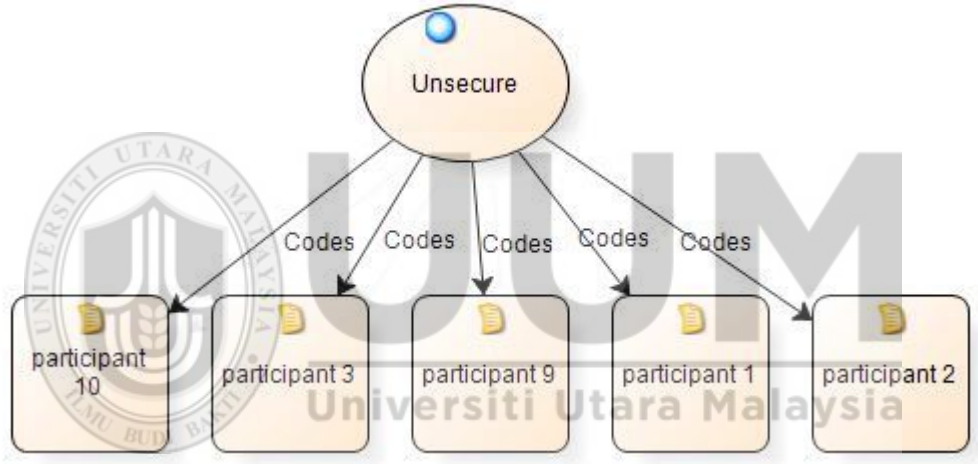

Figure 4.39 Participants for Unsecure

4.2.3.3.2 Theme 2: Download limitation

Owing to the proximity of meaning of all the four parts of the process, at first view, the themes may be mistaken as similar when in actuality, all themes hinge on knowledge sharing process proposed in Nonaka and Takeuchi's model. The general problem of sharing knowledge through social media lies in the internet speed as files/diagrams have to be downloaded or uploaded constantly. This holds true particularly when data is big and the image has a high quality. Under this part, the

leader of the group collects data from all the members as they send it to the social media group site. The leader then downloads the files for combining all the individual work into one single file for submission. In this regard, four out of twelve participants (Figure 4.41) complained of the difficulty they face in downloading files during collection of data – difficulties that are attributed to the size of the file, and data and HD diagrams. This is compounded by the slow internet. In the feedback provided by Participant 4 he related,

> *"The difficulty lies in the process wherein the leader combined the individual works into one single file and uploads the file in the social media group after which each member is obliged to download it. Often times, the leader of the group has to resort to other technologies to send the file"*

Along the same line of contention, participant 7 stated that big-sized files are difficult to download and sometimes this is because of the files high resolution. According to him,

> *"I faced issues in downloading big files owing to the number of images therein and owing to the slow internet. I also faced issues in downloading HD images".*

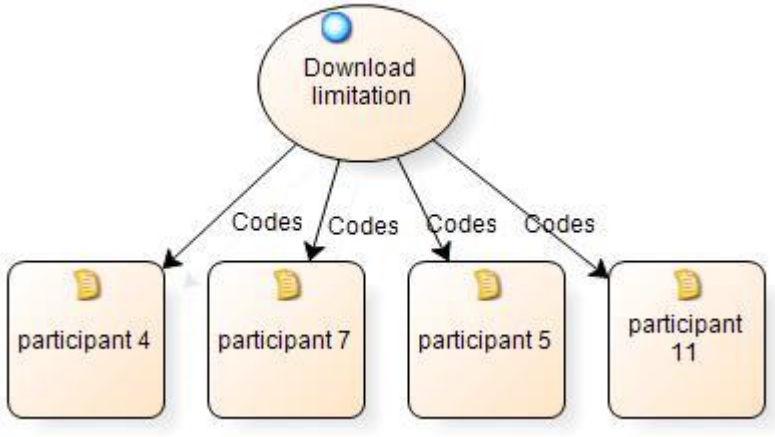

Figure 4.41 Participants for Download Limitation

4.2.3.3.3 Theme 3: Sorting by Dates

For accurate results, the present study addressed all the issues that are faced by postgraduate students in IT and ICT, and the points of view of such students. The researcher focused on every problem preventing the student to leverage social media in completing their assignments and projects. Under this theme, three out of twelve participants (Figure 4.37) cited the social media's interface lack of sorting files and images by data as the group members document them through Whatsapp or Facebook. This issue is faced by students when they are desirous of retrieving some files sent by other group members in previous weeks. For instance, when a group member send multiple files and diagrams from the beginning of the semester and continues to do so to the social media group, the leader faces a problem in collecting which data and image and in documenting the right files. To do so correctly, the leader has to go through all the files manually and determine which file he needs as there is not sorting by data option. Participant 1 elaborated,

> *"I faced such a barrier when I received countless of large files and images from other group members and when I wanted a specific file that I received three days prior, I had difficulty in retrieving it. Often times, I request the group member to send it again as it is difficult to find it in the group of files that are not sorted by date".*

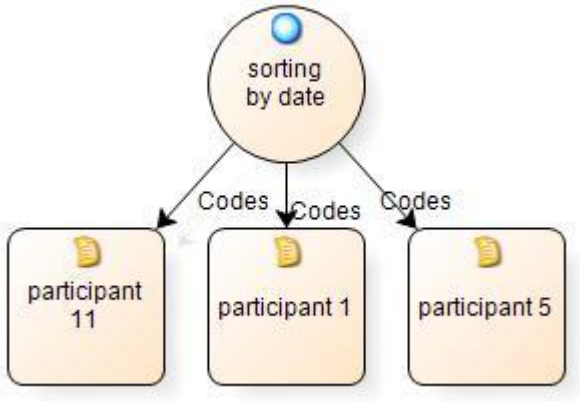

Figure 4. 42 Participants for Sorting by Date

4.2.3.4 Internalization Part:

The interview question that related to internalization part is: What are the barriers that may prevent you from completing the group work process using the social media tools? Tell me about your difficulty when the group members make decisions using the social media?

The last part of Nonaka and Takeuchi's model is internalization and this part highlights the barriers against using social media when converting explicit knowledge to tacit knowledge among the students. There are three themes under this part based on the participants' feedback. Figure 4.43 presents the themes.

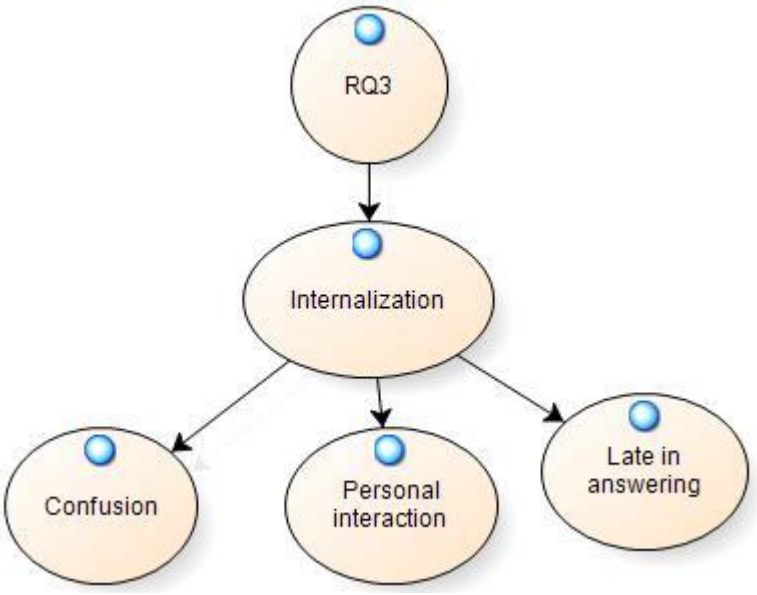

Figure 4.43 Themes for internalization

4.2.3.4.1 Theme 1: Confusion

The tools of social media enable the students to leave comments of the group members. This holds true in Facebook group when students collaborate on an assignment or project completion. The group members' comments are actually discussions and explanations of the work and queries for further elaboration. In this context, group members face problems when some of the members write comments that are irrelevant to the topic of the assignment and this confuses and distracts the others. This theme was cited several times by five out of twelve participants as depicted in Figure 4.44. Participant 12 explained,

> *"When discussing the assignment topic prior to the posting of the final document some group members deviate out of the topic and I get distracted from my ideas"*

This was also mentioned by participant 11 when he claimed that some of the Facebook comments are erroneous, some are ambiguous and some are not relevant to the topic

and this confuses the members and leads to misunderstandings of the assignment or project report. According to her,

> *"When I use Facebook to discuss the final work, some group members leave some unclear comments that force me to determine the source for authentic material while other members deviate from the topic, which confuses me further"*

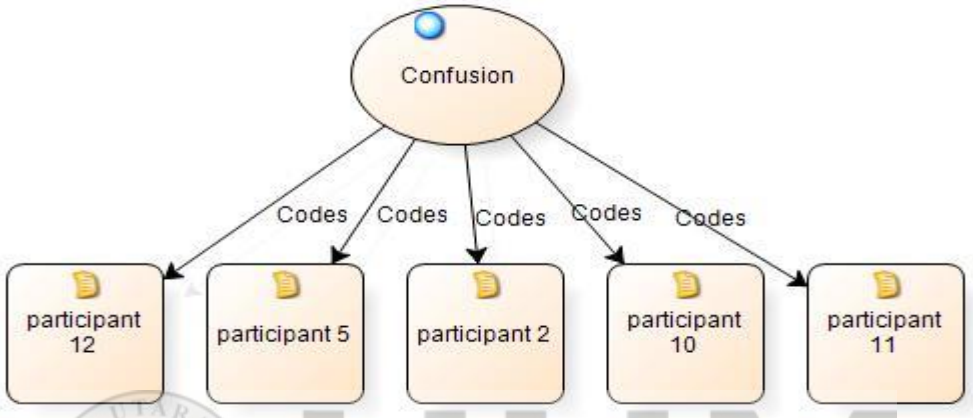

Figure 4.44 Participants for Confusion

4.2.3.4.2 Theme 2: Personal Interaction

Prior studies have been dedicated to the benefits of social media in assisting students in their education, specifically in knowledge sharing, through files and images. However, when the students have completed their assignment and now comes the time for understanding the context of the assignment as a whole, there is need for physical interaction among members as when a group member needs to run the interface design and he needs the help of others to know their preferences. In other words, a face-to-face meeting is required. Some students also misunderstand or fail to understand the comments that are not related to his/her part of the work without further elaboration and discussion through face-to-face meetings. In this regard, three out of twelve participants (See Figure 4.45) stressed on the need for personal interaction for

understanding of the group work and social media lacks such tools. Participant 8 related,

> *"Prior to submission of the project, the members of my group need to run the interface or prototype and this is difficult to do through social media as we require the programmer to explain the interface face-to-face"*

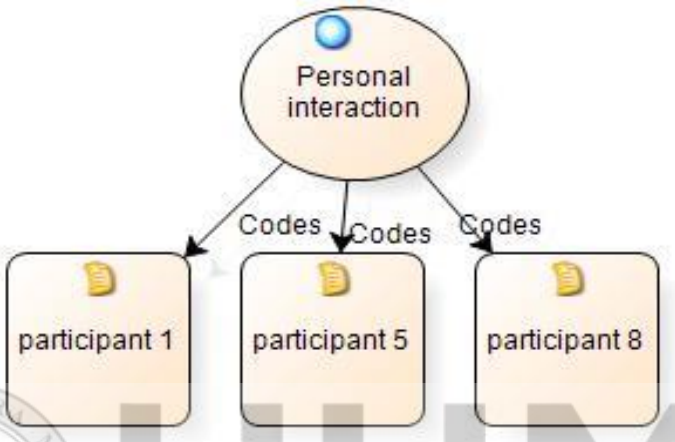

Figure 4.45 Participants for Personal Interaction

Theme 3: Late in Answering

Time is of the essence when completing take-home assignments and group assignments, particularly when the assignment is completed and the decision has to be made for its submission. The issue that arises in this case is that some group members are not available online prior to the work submission and this causes late submission of work. To this end, two out of twelve participants (Figure 4.45) mentioned this as a barrier. Specifically, Participant 9 claimed that,

> *"The major barrier stems from non-replying group members as sometimes all the group members' feedback is required. Also, the same absent non-replying member do not even bother commenting as he/she is offline"*

Other two participants stated that social media is a good tool for sharing assignment and project work and that they did not find any issue with the comment part in the social media group.

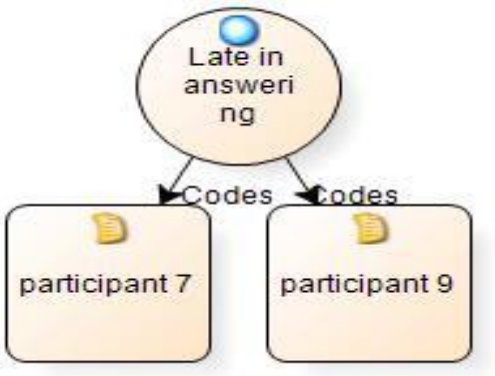

Figure 4.45 Participants of Late in Answering

4.4 Summary of the themes

It is without a doubt that social media tools are invaluable for educational purposes. After data collection from the participants, the researcher analyzed data and managed it through NVivo software and highlighted several issues related to social media tools use by postgraduate students.

Table 4.2
The summary of the results

Research questions	Nonaka & Takeuchi parts	Themes
RQ1	Socialization	Manage the work Exchange experience Exchange perspectives
	Externalization	Document the files Design the diagram Design the software
	Combination	Organizing Modification Sorting
	Internalization	Review Reflection
RQ2	Socialization	Overcome time issues Overcome geographical distances Provide confident
	Externalization	Saving file Protect from Viruses Enhance English language
	Combination	Easy to use Saving paper cost
	Internalization	Create new idea Acquiring in depth understanding
RQ3	Socialization	Internet access limitation Lack of math symbol Culture
	Externalization	Uploading limitation Lack of technology knowledge
	Combination	Unsecure Download limitation Sorting by date
	Internalization	Confusion Personal interaction Late in answering

Briefly stated, the table focuses on Nonaka and Takeuchi's (1995) model upon which the phenomenon of social medial tools use for knowledge sharing is based upon and is examined among UUM students. The research questions act as guides to achieve the study objectives. Each research question comprises of four parts namely socialization, externalization, combination and internalization, and each part comprises of themes on the basis of the interviewees' perspectives.

4.5 Summary

This chapter presents the findings of this study depending on research questions that analysis using intepretive analysis and Nvivo software. The first section included the demographic section for the participants explained the profile of each one from gender, age and nationality. The second section included the findings of research questions, the findings of research question one involved the knowledge sharing activities among postgraduate students that included manage the work, exchange experience and perspective as wella as organizing, modification and review the work for assignment and project report. The findings of research question one include the benefits form using social media in knowledge sharing that involved the overcome time, deomographic and cost issues as well as providing enhance english language and easy to use. The findings of research question three included internet access limitation, uploading and downloading limitation and lack of personal interaction.

CHAPTER FIVE
DISCUSSION AND CONCLUSION

5.1 Introduction

This chapter summarizes the results of this study building on the outcome from the earlier chapter. It also provides the practical and theoretical contribution followed by the study limitations and finally the conclusion and future work.

5.2 Discussion for the knowledge sharing activities among postgraduate students using social media tools

Through the interview session, the participants were categorized into two kinds of social media tools. The first group was categorized as the social networking group – a group using Facebook and Twitter. Most of the participants stated that Facebook is a more flexible and manageable tool for the educational purpose, where almost all the participants have an account in the Facebook platform, and experience for over 4 years. On the other hand, very few participants have an account in Twitter and these few accounts are rarely used.

The second group is called the social messenger apps, where roughly all the participants were familiar with this kind of social media. This group includes WhatsApp and Viber members. The researcher recognized through the interview session, the participants used social messengers to communication with other students to remind them of class timings and exam schedules. The participants approximately all confirmed using WhatsApp as a tool to communicate and discuss among themselves. This tool is deemed to be a faster way to communicate, but they find it

difficult to send the documents or the full project through the Apps because of the limited size for file transference that does not support some document types. For this, they use social networking (such as Facebook). To sum up, Whatsapp as a social messenger App, and Facebook as a social networking site are more frequently used among the students for many purposes, with education as one of them.

5.2.1 Socialization

Much knowledge, perhaps 80%, lies in people's brains. The aim of the knowledge students is to find ways to collect this tacit knowledge. Socialization consists of sharing knowledge in face-to-face, natural, and typically social interactions. It involves arriving at a mutual understanding through the sharing of mental models, and brainstorming to come up with new ideas (Dalkir, 2013). In this study, the students show the transference of idea through social media. The findings of this study reveal that postgraduate students share knowledge to convert tacit knowledge into new tacit knowledge, particularly to convert ideas between group members through social media tools. In other words, the students leverage social media tools to transfer their ideas among them.

The findings also show that the interaction between group members through social media is an important part of supporting students' planning to carry out their assignment and project report; for instance, the students can divide the work between them, determine the time of work completion according to the deadline and the time for submission of work. This is similar to the research done by Hrastinski and Aghaee

(2011), who mentioned social media use for asking and answering questions as well as coordinating group work and retrieving information.

In addition, the findings of this study show that social media plays an important role in converting tacit to new tacit knowledge because the students can exchange ideas and students' perspectives; for example, the students can exchange opinions through discussion regarding the assignment and project report, using online chatting of social media tools. By these tools, the students can exchange their experience - for instance, some students explain to the other group members the best solution to the questions of the assignment or the codes that are needed for programming the interface for project report.

Thus, these findings reveal that the idea can be transferred and shared through the use of social media tools, and that social media tools are considered as a way to facilitate interaction among the group members outside the campus. In contrast, Marwick (2001) claimed that sharing ideas (tacit to tacit) cannot be achieved through any other means except through physical meetings.

5.2.2 Externalization

The process of externalization (tacit-to-explicit) gives a visible form to tacit knowledge and converts it to explicit knowledge. The findings of this study show that the main activities that the group members indulge in are; documenting the files, designing the diagram and designing the software related to assignment and project report. The students' used social media as a tool to send their project documents like Word and PDF; for example, the group members convert their thoughts for the

assignment solution into documents like MS word. Added to this, they design the diagrams for assignment and project report after and sometimes represent it through drawings on paper (mind map) and then convert it into a proper diagram by taking snapshot of the paper or using software for drawing (e.g. EDRAW). Furthermore, the students program the interface or prototype for a project report by converting their thoughts into documents; for example, they copy the codes for programming language and put it in MS word.

The group members can use social media to post such files for other members' perusal by uploading them. The findings confirm that social media is a convenient way to transform the files from one member to each of the group members in an easy way. These findings are consistent with those reported by Saad and Haron (2013) who found that the staff in public academic institution share several types of encoded knowledge in both written and electronic forms. The encoded knowledge includes any knowledge conveyed by signs and symbols including books, manuals in written format and electronically transmitted.

5.2.3 Combination

Combination refers to the conversion of explicit knowledge into a new explicit knowledge like assessing papers and reports (Akhavan et al., 2013). In this part, the students collect data and submit it to their group leader. The leader downloads all the files and diagrams sent by the group members thru the social media group and combine it together in one file or a poster. The responsibility of the leader is to collect data and organize the work for assignment and project report; for example, by collecting data,

the leader is able to coordinate or organize the files and diagrams in one file to be provided a structured and standardized format. The process of organizing themes is supported by Song et al., (2011) who mentioned that technologies facilitate the process of gathering, organizing, editing, categorizing, and incorporating newly converted explicit knowledge into existing organizational knowledge by creating and disseminating documents, routines, and work rules to be applied across the organization.

Moreover, the study findings reveal that modification and sorting of work is an activity among postgraduate students, for example, when they send some explicit knowledge such as article or diagram and software interface related to their assignment or project report and collect it together to get new knowledge in the form of a final work for assignment or project report. The leader of the group import the knowledge required from the group member and modify the necessary knowledge (i.e. the final work of the assignment and project report) to be more coherent and fit the needs of students' task to achieve a well drafted assignment and project report.

Based on the discussion above, social media tools can be used as a tool to send and receive the assignment and project report in order for the leader of the group to put the finishing touches through modifications. The findings of this study is compatible with those reported by Siriwardana (2012) who stated that online sharing media like Google docs allow a user to share documents among his/her group members and provide them the modifying right to lead the group and to maintain group work consistency.

5.2.4 Internalization

Internalization refers to the conversion of explicit knowledge into a new tacit knowledge such as learning from written collective discussions (Akhavan et al., 2013). The results of this study show the main activities that the students do before submitting their final work and these include review or checking their work after combining the works of all the group members. In the internalization part (explicit to tacit), the review phase is an important step prior to the final submission because in this phase, group members are provided with the final work (explicit knowledge such as file) to read and understand it (tacit knowledge). This enables the member to go through the final work and to carry out added modifications; for example, the group member is enabled to check the text by reading the context and to discuss with other group members to garner comments and suggestions.

Therefore, the social media tools aid the students to get the feedback for the last review for easy modification of the draft in a timely agreed on manner. In this regard, Chao, (2007) and Alqahtani et al., (2010) mentioned that social media can help the user to evaluate the work by checking, testing and reviewing.

5.3 Discussion of the benefit of social media during knowledge sharing among postgraduate students using social media tools

5.3.1 Socialization

Even though face-to-face is the most reliable and effective process in knowledge sharing, the study findings show that social media tools are a popular choice among the students. The effectiveness of social media is exploited in virtual learning

environments because it gives the students the opportunity to communicate easily. In other words, rather than waiting for a long period of time to meet the group member face to face, social media features can facilitate interactive and immediate responses between group members. Thus, this makes sharing of knowledge quicker and more effective because some of the students do not have the time to meet their group members, as they are busy with other activities related to the university, home and work that prevent them to share their work in assignments and project reports in a timely manner. These issues are supported by Riege (2005) who stated the lack of time is a barrier in sharing knowledge.

Thus, the findings of this study confirmed that social media tools can solve issues in sharing knowledge by offering enough space to allow the students to take time to generate and share knowledge. Korpman (2004) mentioned that online tools such as wikis or blogs can be used to create an online community of learners. More specifically, he said that, the students may post to ask and respond weekly questions between each other, and this gives the students the opportunity to communicate online especially for those who spend little time on campus due to work or family commitments. Thus, his arguments support this study.

In terms of geographical distance, Steinheider and Al-Hawamdeh (2004) mentioned that geographical distance is one of the barriers to knowledge sharing. The findings of this study reveal that social media tools can solve the problem of geographical distances that prevent the students from sharing their knowledge because most of the students living outside the campus face such a problem. This study found the social media tools is best used to overcome these issues, where the group members make use

of social media tools to discuss and converse online without meeting face to face. For example, the group member used social media such as Whatsapp to share their ideas and discuss the assignment and project report with other members.

Additionally, shyness is considered as a barrier among students because it prevents them from sharing knowledge (Sabbir et al., 2014) especially if the group consists of different genders, where different genders are considered as a factor that can impact the group-work process (Analoui et al., 2014). Therefore, using social media is a convenient way to solve this barrier. The findings of this study confirm that using social media for knowledge sharing among students gives them the opportunity to communicate with their classmate confidently. The virtual environment, such as social media, helps some of the students to gain more confidence especially with students are shy to talk or communicate with his/her classmates – they feel more comfortable to express their opinions through these tools rather than in face to face meetings.

The findings of this study reveal that using social media tools to convert the group members' thoughts help in saving transportation cost when conversing through chatting in social media tools. This allows the group member to meet each other online instead of meeting each other face to face, with the latter being cost consuming. For example, the group members use Whatsapp or Facebook to discuss and convert their ideas about their assignment and project report through chatting. Therefore, this finding is considered as one of the benefits of social media tools and as a technology to help the students, particularly those who are unemployed students.

5.3.2 Externalization

In this section, the students' knowledge is converted from tacit to explicit, and this knowledge is stored and protected online using social media. Using social media as tools to store data provides the member a chance to save the file and retrieve it any time. To this end, the findings of this study show that social media is crucial in knowledge storage such as files and figures related to the assignment and project report. This finding is compatible with that of Banzato (2012) that confirmed that the use of Google Docs from the teacher is invaluable in saving materials in text format to share with students.

The findings also reveal that social media is a tool that protects from viruses because in the externalization part, the group members convert their thoughts into documents such as MS word and diagram files. The group member uploads this document by using social media tools; for example, uploading the files for assignment and project report to Facebook group. Thus, a group member will not require the use of external RAM to send the files and diagram to other group members and as such, the files are protected from viruses.

Generally speaking, the English language is very important for the academic purpose and sometimes the students need some assistance to develop their academic language skills, especially when English is their second language. Consequently, writing documents offer opportunities for students to use English language as an instrument to transform their thoughts into text document. Riege (2005) listed the barriers of sharing knowledge, with one of them being poor written communication. Therefore, based on the findings, the social media tools used in sharing knowledge can enhance

the writing process among the postgraduate students when they work as a team. Thus, social media is important to enhance English language when students want to write their thoughts down in text document and send it to their group members. Sending thoughts through word document would give the opportunity to correct some word or learn some new word, especially when interacting with students from diverse cultural and linguistic backgrounds. This finding is supported by Korpman (2004) that highlighted the potential benefit of peer interaction for learning across diverse cultural and linguistic groups in the form of improving English language skills of international students.

5.3.3 Combination

In this section, the students collected data from all group members in the form of text and diagrams and put it together in one file using social media. Hew (2007) stated that ease to use technology motivates people to share knowledge due to the fact that the technology provided allowed people to easily receive posting. In the same concept, the findings of this study show that, the postgraduate students benefited from the features that the social media provided in collecting data by downloading the assignment parts or the project from all group members in an easy manner, where the students (or the leader of the group) just copy the paragraph or sentence from the source and paste it to the file or post on the social media tools.

Additionally, the findings for the combination part uncover that when using social media, the group member saves on paper costs because in this part the leader of the group collect the soft copy of the files from other group members online. In other

words, the group member sends the work for assignment and project report without printing a hard copy of the file that will be in which case, cost-consuming. This finding highlights another benefit that can be gained from the social media tools.

5.3.4 Internalization

Internalization involves the transformation of the explicit knowledge to tacit knowledge, where knowledge acquired by learning is internalized and integrated to the tacit personal knowledge of the individual to become a valuable asset. It is the process of transforming explicit knowledge in practice into tacit knowledge. After combining all the work by using social media tools, the students begin to check the work by going through it and noting down what they understand. In particular, this study found that through the social media tools, the students' main activity is to discuss the comments through social media to deeply understand the subject or topic. Based on the discussion above, the researcher found that the finding is consistent with that reported by Wankel (2012) who stated that through the discussion by using social media among the classmates, the students might restructure their thoughts on the information and improve their understanding about a particular subject.

Another benefit of social media tools that is highlighted in the findings is the creation of new ideas. In this part, the transformation of explicit knowledge (for example, the files for final work) to tacit knowledge (for example, the thoughts that can understood from the group member) involved the use of social media tools as the assignment and project report are posted online along with the discussion and comments. Through this

explanation the group member can benefit from the creation of a new idea after reading the discussion and comments.

5.4 Discussion of social media barriers during knowledge sharing among postgraduate students using social media tools

5.4.1 Socialization

In this study, the barriers are considered as the difficulties faced the group members in sharing their work for their assignment or project report by using social media tools. The results of this study show that the students faced some difficulties during chatting and conversing with their group members and these difficulties include Internet access limitation, lack of mathematical symbol and culture. The difficulty in internet access limitation is considered as a general issue and this study also confirmed that students use social media chatting to discuss their assignments and project reports. This finding is consistent with that of Keller & Hrastinski (2006) who confirmed that technical problems are also a limitation, as learners may not feel that the peers are available or that the medium is inaccessible when they needed it.

Still another difficulty during chatting and discussing through social media is the lack of the mathematical symbol. The findings of this study uncover that social media have some issues that prevent the students to share their ideas through mathematical symbols that required to solve the assignment. The lack of mathematical symbol issue is faced by the group member during chatting with other group members because social media does not provide the use of such an option. This finding is supported by

Aghaee (2010) who stated that the learner is limited by the writing format in social media and this includes the lack of special format and symbols.

In addition to the above, the students faced another difficulty in using social media and that difficult is culture. The restricted cultures among some of the postgraduate students sometimes prevent them from sharing knowledge using social media tools. The findings of this study reveal that some of the group members do not use social media tools because their traditions prevent them from doing so, particularly social media chatting by female members. Consequently, this caused a problem for the group because they cannot contact with them and discuss with them online. This result is supported by Pookulangara (2012) who pointed the culture will influence the usage of social media and it influences the lifestyle, and in turn lifestyle influences the way individuals communicate and interact with new media technologies.

5.4.2 Externalization

In this section, the students begin to transfer the thoughts into files or image and then send it to the group leader using social media tools. The findings of this study show that the uploading limitation is one of the barriers of this process. Group members faced this problem when they send the file and image of assignment and project report to the group leader through social media. Uploading limitation may be attributed to the limitation in size, where when the members upload files that are more than the size allowed, the uploading process fails. In this case, the maximum size for image in Facebook is 100 KB and limit of file size is 25MB, therefore the students will face the problem when they need to upload a file bigger than this. This result is supported by

Aghaee (2010) who mentioned the size limitation in the attached documents for sending, when the file is large and the users can not send it through social media.

Although technology has proliferated in the current times, there are some students who are still unaware of how to use the social media tools and this is considered as another problem. The findings of this study show that lack of the technology knowledge is a problem in using social media tools because the group member cannot finish the work without collaboration from all the other members.

5.4.3 Combination

In combination part, the explicit knowledge is converted to new explicit knowledge by the individual. In this section, the students convert explicit knowledge (for example the document such as text and file) into new explicit knowledge (for example the final files) for assignment and project report. The findings of this study reveal some difficulties that the group members face in combining the whole file for the completed draft as they are unsure how to send and receive files to/from the group members. The related risks include data theft, copying data or corruption of data. As a result, information security is one of the issues faced by the students while using any technology, such as social media tools. This finding is consistent with study done by Gruzd et al. (2012) that mentioned privacy as one of the issues of using social media tools because file becomes accessible to other students and individuals.

Another issue that students face when collecting files and images attributed to the files and image downloading through social media tools. This is especially true in the case of download limitations, particularly with big files and slow internet connections.

5.4.4 Internalization

Last but not the least, internalization part is the final part of Nonaka and Takeuchi's theory and it is the last part addressed in the research questions. The complete four parts of Nonaka and Takeuchi's theory provides the comprehensive understanding of all the issues related to the social media and sharing knowledge. In this part, the group members arrived to the final step of sharing knowledge.

The findings of this study show that after the group members start to read the final work for assignment or project report, they discuss about the contents of the file by providing comments in social media. In some cases, through the discussion stage a group member have different ideas about the topic and that confuses other group members. Based on above discussion, the group members can be influenced by the comments provided and received, due to the differences in ideas and experience.

Moreover, another barrier that the group members face is lack of personal interaction because in this part of learning, the students need to understand the topic for assignment and project report. Thus, some topics need face to face interaction to understand it as it is difficult to understand through social media. This finding is supported by Barkley (2012) that stated the disadvantage of using social media and the lack of a true face-to-face relationship between the students and the teacher.

5.5 Contributions of the Study

5.5.1 Theoretical Contribution

In theory, this study contributes to the knowledge of the application of Nonaka and Takeuchi's theory and the utilization of appropriate social media tools as IT tools in knowledge sharing and their application in higher education institutions. This is especially important as there is a scarcity of the studies in this field.

In regards to this, Nonaka and Takeuchi's theory discussed the differences in cultures between Japanese companies and Western companies in how they create knowledge and innovations. In the same concepts, this study applied Nonak and Takeuchi's model on different cultures (local and international students) and found that multi-culture has positive effect in that students from different cultures and with different languages are all come together and collaborate and interact through English. Consequently, this process enhances the students writing for academic purpose and it enhances the members' English language through writing interaction with students that have good English skills.

In the same way, this study utilized this theory in higher educational institution, which proved to be effect. Nonaka and Takeuchi's theory was able to explain the knowledge sharing process well in the field of sharing knowledge in four parts (Socialization, externalization, combination and internalization). These parts highlighted all the activities that can be used by the group members to transform tacit to explicit knowledge (assignment and project report) depending on four parts of this theory; for

example, converting knowledge from tacit to tacit in socialization, tacit to explicit in externalization, explicit to explicit in combination and explicit to tacit in internalization.

Specifically, the knowledge sharing process among group members start by holding conversations about the assignment or project report (tacit to tacit), secondly, by converting the group members thoughts into tangible things by documentation (tacit to explicit). Thirdly, by combining the documents and files to produce new work such as final files for assignment and project report (explicit to explicit) and finally, posting the final work for assignment and project report to discuss about it and understand it, and learn from each other (explicit to tacit).

5.5.2 Practical Contribution

In the practical aspect, this study highlights the many activities of using social media tools as well as the benefits and the barriers among the IT and ICT postgraduate students in UUM Universiti. Therefore, when applied to other groups that need to be exploited, the barriers can be steered clear of, and the benefits leveraged. This study focused on the students' perspectives in understanding the chief issues related to using social media in sharing knowledge, and it explains the way online environment helped the educational process whether or not the student is in campus.

Knowledge sharing refers to the act of making knowledge available to others within the team so that knowledge held by an individual team member is converted into a form that can be understood, absorbed, and used by other members (Menguc, Auh, & Uslu, 2012). To facilitate knowledge sharing, the individual can use social media as

tools. Social media tools are now being used by universities as alternative spaces wherein students can adapt to the university lifestyle through interacting online with peers. In this sense, this study confirm that social media can be used to strengthen and improve the students in higher education institution as well as enable the students to create an informal learning environment by having students collaborate and learn from each other. Thus, social media tools, as an artifact to enhance communication and collaboration amongst all those students, can be used effectively as a learning tool within a small group of students.

In addition, depending on the result of this study, the researcher found that using social media tools is convenient way to overcome some difficulties that the students face such as geographical distance, time and cost and it provides students with easy to use technology, which could easily be adapted from a personal setting use to on in an educational setting, like group work for assignment and project report.

Furthermore, this study provides practical knowledge that the individual should take into consideration when choosing social media to facilitate knowledge sharing. The postgraduate students in this study confirm that creation of new idea through discussion and comments among group member is a benefit of social media. This study allows the researcher to study the problem areas and examine how benefits influence postgraduate students using social media tools.

In general, this study provides a comprehensive overview on the appropriate IT tools such as social media that can significantly improve communication, support

knowledge usage and speed up knowledge sharing among group member in higher education institutions.

5.6 Limitation

In this study, there are some limitations which need to be taken into consideration and can be improved in future research. Firstly, this study focused solely on School of Computing (SOC) for IT and ICT in UUM. Thus, this certainly may not provide a perfectly comprehensive picture of these research objectives. For more comprehensive research, future studies should collect data from other colleges and other universities. The second limitation is that some of the interviews were conducted online and thus it was quite brief and that led the researcher to choose just two participants.

5.7 Conclusion and Future Work

The main objectives of this study is to investigate the benefit and barriers in the knowledge sharing of using social media tools among postgraduate students in the Universiti Utara Malaysia (UUM) and the activities related to this phenomenon. This study adopted Nonaka and Takeuchi's theory, a theory that encompass four parts: socialization, externalization, combination and internalization.

The Qualitative method is used in this research to collect in-depth information from participants; specifically, twelve semi-structure interviews were conducted with postgraduate students.

In sum, this study explored how the students used social media tools to support their work (assignment or final project), and to communicate among their group members

across the boundaries. Furthermore, the results of this study show that social media tools play an important role in enhancing knowledge sharing among postgraduate students in UUM university because social media is considered as a ubiquitous element that support flexible education and collaborative process through conversations among learners.

In terms of future work, this study recommends higher education staff to explore more activities in relation to using social media tools that will be beneficial to aid the students, as well as positively affect their academic experience. The researcher also suggests future researchers to use the mixed method (qualitative and quantitative) to get rich data from the participants. This study, as mentioned above, focused on the IT and ICT students because of the time considerations. Future works could include all the students in the university departments.

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