

Integrating Online and Face-to-face Approach to Enhance students' Learning in a Campus-based Malaysian Tertiary Institution

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Thesis submitted to the University of Nottingham
for the degree of Doctor of Philosophy

January 2020

To my family, many thanks for the encouragement.

Abstract

This is a qualitative longitudinal case study of a blended learning research conducted through iterations of action research cycles that expands over certain periods of time investigating impacts of a technology on teaching and learning. The study seeks to explore efficient and effective ways of supporting collaborative learning activities in a higher education context in Malaysia tertiary institution where the expectation is that the campus based students work in a blended mode that consists of face-to-face and online interactions. It started with evaluation studies conducted in three consecutive semesters, followed by a reconnaissance phase, research cycle 1 and 2. The limitations in the findings from each cycle were overcome with proposed interventions before starting with the following cycle. The study drew upon multiple data sources comprising the students' online forum discussions, the students' written reports of their face-to-face meeting, interviews with group leaders, and the researcher's observations. The data were analysed with reference to the three sub-triangles of an activity system in which each sub-triangle represents the tool, rules and roles. Pedagogic and methodology issues identified in the first cycle led to methodology and pedagogy intervention plans that informed the second action research cycle. The findings from the second cycle revealed the effectiveness of the pedagogic strategies adopted to help students to plan their move working from a face to face mode to an online one and vice-versa.

Acknowledgements

Firstly, I would like to express my sincere gratitude to my advisors Prof. Dr Gordon Joyes and Dr Linda Ellison for the continuous support of my Ph.D study and related research, for their patience, motivation, and immense knowledge. Their guidance helped me in all the time of research and writing of this thesis. I could not have imagined having a better advisor and mentor for my Ph.D study. My sincere thanks also goes to my substitute advisors Prof. Dr Charles Crook and Dr. Tony Fisher, who had provided me an opportunity to enhance my understanding of how to express my ideas in a scholarly written form for my thesis

Besides my supervisors and advisors, I would like to thank the rest of my thesis committee: Assoc Prof Dr Hisham Dzakaria and Dr Mary Bailey for their insightful comments and encouragement, but also for the hard question which incented me to widen my research from various perspectives.

I am also grateful to Jacqueline Stevenson (Postgraduate Programmes Administrator) and Jodie Smith (Postgraduate Programmes Assistant) from Nottingham University, United Kingdom who had facilitated me during my stay in the UK campus as well as Associate Professor Dr Subramaniam Ganakumaran (Director of Studies, School of Education), Chris Meng Shan Au (Student Registry Office), Regina Eruthayam (Faculty Administrator), Norhidayah Mohd Noor (Postgraduate Research Administrator) from Malaysia campus who had assisted me in providing useful sources of information related to the administrative matters about my study.

I would like to thank the Faculty of Education, Universiti Teknologi Malaysia for granting me permission to collect data on students' discussions through online forums and the Centre for Information and Communication Technology (CICT), Universiti Teknologi Malaysia for allowing me to use the e-learning platform and making data collection easy, professional, and secure for conducting my research. My heartiest gratitude to my sponsor, the Ministry of Higher Education Malaysia for providing scholarships and opportunity to pursue my doctoral degree.

This thesis would never have been completed without the encouragement and devotion of my family and friends. I am indebted to my parents, Ali bin Kadam and Patimah binti Abdul Rahman as well as my wife, Siti Norazhreen Amin, for their understanding, endless patience and encouragement when it was most required.

To both Nottingham University Malaysia and United Kingdom Campus as well as Universiti Teknologi Malaysia, I am also most grateful for all their kind support and understanding over the past few years in completing my thesis.

List of Publications

1. **Mohd Fadzli Ali**, Lokman Mohd Tahir, Nurul Nadwa Zulkifli (2017). Developing learners' employability skill of critical thinking through collaborative online discussion at tertiary institution. Journal of Theoretical and Applied Information Technology, 95(24), pp. 6833-6845 (Scopus indexed).

2. **Mohd Fadzli Ali**, Gordon Joyes, Linda Ellison (2014) Proposing the Third Generation of an Aligned Activity System as a Theoretical Framework in Blended Learning Research. *Jurnal Teknologi*, *75*(3), 61-66 (E-ISSN2180-3722) (Scopus indexed).

3. **Mohd Fadzli Ali**, Gordon Joyes, Linda Ellison (2014). Blended Learning: The Evaluation Studies. *Advanced Science Letters*. Vol. 20, No. 10-12, October 2014, p. 2193-2197(5). (Scopus indexed).

4. **Mohd Fadzli Ali**, Gordon Joyes, Linda Ellison (2014) Building Effective Small-group Team Working Skill through Blended Learning at Malaysia Tertiary Institution. *Procedia - Social and Behavioral Sciences*, Vol 2, p. 997-1009

5. **Mohd Fadzli Ali**; Lokman Mohd Tahir; Mohd Nihra Haruzuan Mohd Said (2017). Facilitating learners' online discussions in completing group assignments, 2016 IEEE Conference on e-Learning, e-Management and e-Services, IC3e 2016, Langkawi, Malaysia, 8009048, pp. 102-106

6. **Mohd Fadzli Ali**, Gordon Joyes, Linda Ellison (2014) Building Effective Small-group Team Working Skill through Blended Learning at Malaysia Tertiary Institution. *Procedia - Social and Behavioral Sciences*, Volume 112, 7 February 2014, Pages 997-1009

7. **Mohd Fadzli Ali**, Gordon Joyes, Linda Ellison (2014). Blended Learning: The Evaluation Studies. The 2nd International Conference on Internet Services Technology and Information Engineering (ISTIE 2014), Bali, Indonesia (31 May – 1 June 2014).

8. **Mohd Fadzli Ali**, Gordon Joyes and Linda Ellison. (2013) Proposing the Third Generation of an Aligned Activity System as a theoretical framework in blended learning research. Paper presented at 2nd International Conference on Interactive Digital Media, Kuching, Sarawak (2-4 December 2013)

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13. **Mohd Fadzli Ali** and Gordon Joyes *Online interaction: quantitative versus qualitative approach.* In: Conference on Teaching And Learning In Higher Education, 2007, Kuala Lumpur.

14. **Mohd Fadzli Ali** and Gordon Joyes. *Online technology and tutor's roles in a blended classroom setting.* In: International Conference on Lifelong Learning, 2007, Kuala Lumpur.

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Chapter 1

The Research Context and Problem

1.1 Introduction

This chapter is structured as follows. First, I discuss how the use of online learning has become a technology-enhanced learning environment and has engaged learners in the blended learning. Then, I highlight the benefits of online learning that has become part of Malaysia education policy and how Malaysian tertiary institutions beginning to adopt the use of e-learning in a blended mode. Next, I describe how e-learning started in University Technology Malaysia (UTM) and share my personal experiences teaching in a blended mode. Finally, I explain how my personal experiences and reflections on teaching in a blended mode were used as a basis for my research undertaking for this thesis.

1.2 From online to blended learning

Online learning is gradually becoming significantly important in tertiary institution changing the face of tertiary education around the world and continuing to undergo dramatic transformation. It changes the way higher education is taught and the way students learn. The early use of computers was to assist teachers in managing classroom activities. Gradually, as more personal computers became affordable to purchase and the Internet usage gained enormous interest, campus-based and distance learning institutions began to explore the idea of online learning. As technology progressed with a new wave of broadband multimedia (Peters, 2000), online learning improved the quality of distance education by providing more and better interaction with the teachers and between students (Stacey and Wiesenberg, 2007). The flexibility of online learning helps the students to learn anywhere and anytime because the learning process occurs regardless of boundary of time and place. The separation between students and teachers is closely bridged. As online learning removes the time and distance barriers, bachelor and graduate degree programs can be offered online.

Online learning has been widely used worldwide. According to Adkins (2010), the sale of the self-paced e-learning products and services in 2010 cost $32.1 billion and reached $49.9 billion by 2015. This report expects the increasing purchase of the e-learning products across seven regions: North America, Latin America, Western Europe, Asia, Middle East and Africa (Adkins, 2011) (figure 1.1).



Figure 1.1: The forecast and analysis of the worldwide market for self-paced e-learning products and services between 2010 and 2015 (Adkins, 2011).

By 2015, Asia was the second highest expenditures after North America. India has the highest growth rate followed by China and Malaysia.

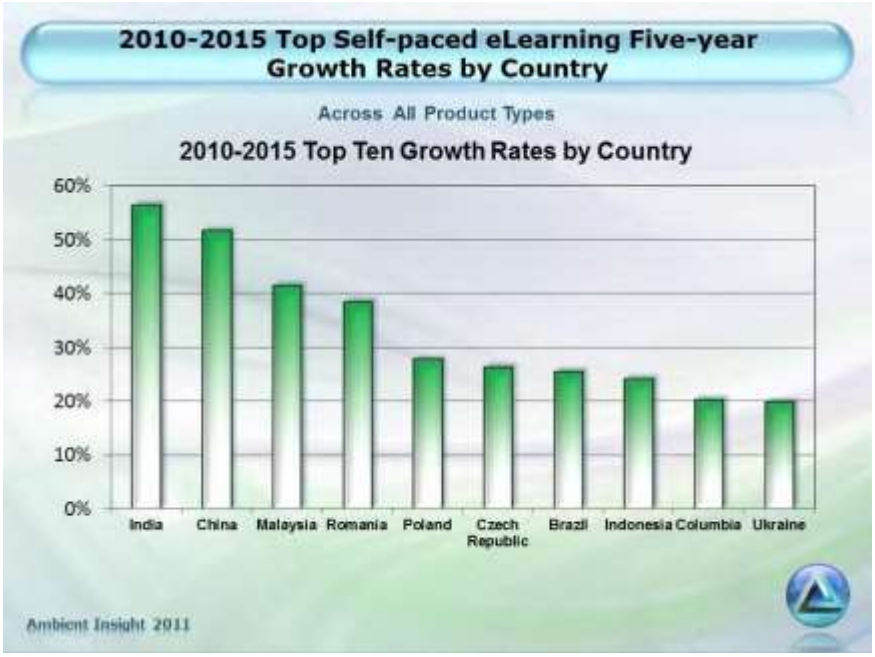


Figure 1.2 – 2010-2015 Worldwide Self-paced eLearning Five-year Growth Rates by Ten Countries (across all products) (Adkins, 2011).

According to Peña-Ayala (2014), for the past fifty years, there have been two major shifts where the use of online learning is becoming more frequent in teaching and learning at tertiary institutions.

First, learning is becoming a two-way process where the teacher is no longer the sole knowledge provider (Peña-Ayala, 2014). In traditional paradigm, the teacher was regarded as a content expert whose task was to deliver and transfer knowledge to students and these students were considered as passive learners. However, as the time passed along with online technology, teaching and learning are gradually developing different perspectives.

Two well-known cognitive theorists, Piaget and Vygotsky, advocate the ideas of learners' cognitive development. Piaget suggests that learners do not simply receive information but construct the information to develop their own knowledge through experience (Wadsworth, 2004). Thus, a teacher is not a source of knowledge, but a facilitator. The focus of teaching has been shifted from teacher-centred environment to student-centred learning. The students or learners have become a main focus of all the teaching learning activities.

Vygotsky further suggests that the role of the teacher is more of assisting students to "construct" meaning than "provide" meaning. However, the process does not only involve constructing meaning, it must involve leaners' interaction (Vygotsky, 1978). The teacher needs to allow students to share in decision making so that their learning experience can take shape in a student-centred environment. As the students in a single classroom come from various backgrounds with mixed abilities, interaction is vital where one can help other students to learn.

However, placing students at the centre of their own learning and expect them to interact effectively does not spontaneously happen. The interaction must be purposeful and meaningful for learners (Krashen & Terrell, 1983), and thus, it requires effective collaboration.

Many educators have integrated online technology into their instruction. Research shows that use of an online discussion forum has a positive impact on students' collaboration as it encourages them to be more active participants in their own learning. There are various advantages about collaborative online environment. For example, online forum provide a way for students to extend their classroom discussions (Shana, 2009), builds class community where learning can take place online (Palloff and Pratt, 1999), and helps to develop problem solving and critical thinking skills (Kolloff, 2011). Students learning online have the opportunity to express their thoughts through collaborative interactions with both their peers and the teacher through synchronous and asynchronous communication. The learning process takes place when students interact with each other expressing ideas, exchanging opinions, teaching each other and witnessing how other students learning (Stahl, Roschmann & Suthers, 2006). The online forum provides asynchronous interactions as the students can read the discussions, think what to respond and write the feedbacks at any given time (Goodyear, 1999). According to Hillen (2014), when the online forum is used synchronously, it has the same functionalities with face-to-face interaction.

The second shift is related to the mode of delivery (Peña-Ayala, 2014). The teacher does not only create the learning environment in classroom but learning materials can be delivered through online. Online technologies are gradually providing teachers with understanding of how students learn and providing them the ability to customise course materials.

According to Peña-Ayala (2014), as the two shifts are closely interrelated, we are experiencing a major change in education. The conventional setting of the traditional classroom or lecture hall will continue to remain as an important face-to-face learning mode. In fact, it is integrated with online tools and enhanced its use through sound teaching and learning pedagogies. Teachers have to be trained on how to organise and deliver the learning materials online and face to face so that the students can decide their own learning (Palloff and Pratt, 2013). The students can also access the course materials through other online resources. According to Collis and Moonen (2001**),** online learning is to complement rather than replace traditional classroom teaching as the purpose is to form a blended or hybrid approach.

This has become the start for blended learning. Since then, blended learning approach has become increasingly common in tertiary education around the world.

1.2.1 Definition of Blended learning

According to Poon (2013), there is no single agreed-upon definition of blended learning. However, the common explanation is that blended learning basically combines both face-to-face and online delivery methods with the intention of each complementing the other (Poon, 2013). Blended learning improves the quality of teaching and learning as it supports the face-to-face teaching approach. Gil and Garcia (2011) describe blended learning as an approach that has many advantages including allowing more affective interactions between the learners and their instructors through the use of discussion forums and journal, and learning how to depend less on teachers. Guzer et. al. (2014) perceived blended learning as a practical and flexible approach that motivates students' learning. Blended learning could also be considered as perfect combination of online and face to

face when it complements the best features from both environments and establishes interdependency between them (Glazer 2012).

As both the traditional classroom and online learning have their own strengths, it would be better to complement the two methods into blended learning (Abdul Wahab, et. al., 2016). By combining online with traditional classroom learning, students' learning becomes flexible and convenient as they retain their face to face interactions (Dziuban et al., 2011). Due to its flexibility, learning can be tailored to the students' specific needs. The students are able to track their progress by learning through a variety of activities that apply to many different learning styles and increase information retention through slow or quick self-pacing. The students can control and personalise their learning (Condie and Livingston, 2007) in environment that encourages their self-regulation and metacognition.

Various teaching and learning approaches have appeared from blended learning including flipped classroom (Bergman & Sams, 2012) and interactive simulation that controlled remote equipment (Holzinger, et al, 2009). The term Flipped classroom is generally used to describe almost any classroom learning that provides pre-recorded lectures followed by in-class exercises. This is a pedagogical model where lecture and homework elements of a course are reversed. The students view the short video lectures at home before the class session, while during class the students are primarily involved with exercises, projects, or discussions (Bergman and Sams, 2012). Interactive simulations could enhance learning performance in specific fields such as medical profession and to adapt an environment of advancing technology. This also includes a shift from individual learning to collaborative learning and from passive to active learning. These trends are beginning to be incorporated into the curriculum in Malaysia. The detailed explanation on the definition and concept of blended learning is further discussed in chapter 2.

1.2.2 Online learning platform

In adopting the online mode of blended learning, educational institutions must provide teachers and students with institutionally supported-learning platforms (Jones and Muldoon, 2007). The platform has been referred to as course management system (CMS), learning management system (LMS), course learning management system (CLMS) and virtual learning environment (VLE). According to Cavus and Kanbul (2010), although these acronyms are used interchangeably, they are related to each other and used for the purpose of teaching and learning instruction.

Both LMS and CMS are used either to provide digital learning materials for the classroom that students and teacher meet regularly in person or to host an online course that does not require regular face to face meetings. However, there is some confusion over the differences and similarities between the two. According to Watson and Watson (2007), LMS is used to supervise the learning process of the organisation as a whole including delivers and manages instructional content, assesses individual and organisational learning goals and keeps track of the progress of those goals while CMS is used primarily for online or blended learning. It supports the placement of course materials online, relate students with courses, keep track of student performance, storing students' assignment submissions and engage the students and their teacher in discussions (Watson and Watson, 2007).

Another term is CLMS. Lane and Hull (2006) explain that an LMS focusses on organisational and individual competencies while an CLMS manages the learning content. The end user of LMS is the learner while the LCMS user is the learning content creator. An LCMS system allows several content experts to create the learning contents in various formats.

VLE is popularly known among teachers at tertiary institutions. It is a software system developed to assist tutors or teachers in the management of educational courses for their students. It is utilised widely by universities and colleges to help teachers to develop a course website using a given template that does not require high technical skills. It

provides communication, assessments and document sharing. It also provides flexible arrays of course activities such as forums for online discussions, virtual lectures and activities, blogs, journals, quizzes, and feedback. The teacher can upload learning materials in various formats such as word, PowerPoint or pdf and the students are able to download them. The learning materials uploaded can be a course lesson plan, quizzes and tests. The students can also upload their assignments for teachers to mark. Through VLE, the teacher can check the students' test electronically and the results can be shared immediately with the students. The teacher can set up forum for the students to send messages and discuss online so that they can work as a team in completing their assignments. The students were able to work in groups as the system provided forum discussions to support the collaborative tasks. The asynchronous discussion, which was mostly used, allowed the flexibility for the learners to control when to post and reply messages. VLE is mostly used as an extension of classroom lesson, face-to-face group meeting and group discussions. Thus, the advantages of elearning include integrating online mode with classroom learning, solving the problem of large-enrolment courses, and providing learners' flexibility to decide when, where and how to engage in their learning.

VLE can be used to support both blended and distance learning (Halawi, et. al., 2009). Students using a VLE can complete their tasks in class or at their own pace, time and location, they can also engage in discussions though synchronous and asynchronous forum. Thus, through VLEs, students' collaboration could be improved (Duan, et. al., 2010). As this thesis is being submitted with the UK, the term VLE is used throughout the thesis.

Most campus-based and virtual universities in Malaysia have already developed blended learning and embarked on two types of delivery system managing both *virtual*-education programmes as well as traditional classroom learning.

1.3 The two types of educational institutions

According to the data from the Ministry of Education (2015), there are 20 public universities, 9 foreign branch campus, 43 private universities and 31 private university colleges. The public universities are government-owned and partially funded by the government and under the Ministry of Education (MOE).

There are two recognisably types of educational institutions. The first is the campus-based university where students learn in a real, physical environment and can collaborate with other students' face–to-face. The second type is a virtual university that does not have building or campus for students to go to because students receive learning at a distance. However, both types of universities are encouraged to have their curriculum in mixed mode of face-to-face and online.

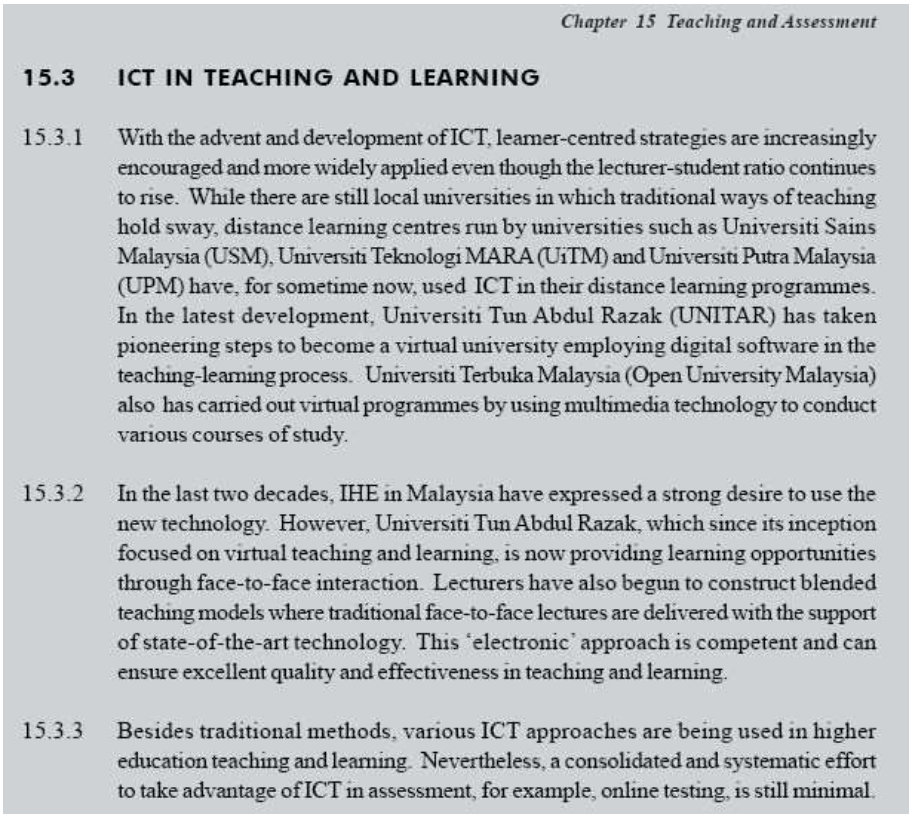
Virtual universities are established throughout developed and developing nations in order to cater for the increasing demand on higher education. The virtual university has evolved from using correspondence to broadcast technology. However, there is a slight difference between e-learning and distance learning at university level. The basic definition that distinguishes distance education is the physical separation of the student from the instructor and the class room. According to Guri-Rosenblit (2005), distance education and e-learning do overlap in some areas but they are not necessary the same. Distance education programmes enable students to learn at dispersed places whereas e-learning can be used by both distant and on-campus students (Guri- Rosenblit, 2005). Although implementing a VLE is expensive, it has becomes an accepted part of learning in campus-based universities. Since 2006, many government-owned universities in Malaysia have started complementing classroom learning with online learning (Bunyarit, 2006). Grapragasem, et, al., (2014) state that many education institutions increasingly are turning to learning platforms to deliver courses through online and blended learning.

The distance learning programs offered by virtual universities in Malaysia tend to be predominantly web-based where students can interact through discussion forums, communicate through video conferencing, and download online learning materials and

use wireless mobile learning devices. Universiti Tun Abdul Razak (Unitar) and Open University Malaysia (OUM) are the two Malaysian distance learning institutions that depend heavily in their e-learning technologies. Unitar for example, conducts fully online learning. With the Internet facilities, students who find the course that is right for them can simply apply online. These universities offer mainly self-directed modules making use of interactive technology through online learning. They can study at their own convenient time and progress entirely at their own pace. As for OUM, some modules are available online and some are taught at their learning centres throughout the country. Another private university established in Malaysia is Asia e-University (AeU). It is a dual-mode (residential full time and online distance learning) international university and funded by the Malaysian Government, under the guidance of Ministry of Foreign Affairs and Ministry of Education.

1.4 E-learning Initiatives in Malaysia

While pedagogy and curriculum design are matters for institutions, governments are responsible for defining the policy, legal and funding contexts which impact on the motivation and ability of the institutions to integrate new modes across higher education provision. The benefits of the e-learning technology have drawn the attention of the Ministry of Higher Education Malaysia to incorporate online learning in the national educational policy. In 2006, the Ministry has published an official report on the recommendations concerning the development and direction of higher education in Malaysia (Ministry of Higher Education, 2006). The report became part of the Malaysia national education policy. In relation to blended learning, article 15 of the report outlines two important aspects (figure 1.3).



Chapter 15 Teaching and Assessment

15.3 ICT IN TEACHING AND LEARNING

15.3.1 With the advent and development of ICT, learner-centred strategies are increasingly encouraged and more widely applied even though the lecturer-student ratio continues to rise. While there are still local universities in which traditional ways of teaching hold sway, distance learning centres run by universities such as Universiti Sains Malaysia (USM), Universiti Teknologi MARA (UiTM) and Universiti Putra Malaysia (UPM) have, for sometime now, used ICT in their distance learning programmes. In the latest development, Universiti Tun Abdul Razak (UNITAR) has taken pioneering steps to become a virtual university employing digital software in the teaching-learning process. Universiti Terbuka Malaysia (Open University Malaysia) also has carried out virtual programmes by using multimedia technology to conduct various courses of study.

15.3.2 In the last two decades, IHE in Malaysia have expressed a strong desire to use the new technology. However, Universiti Tun Abdul Razak, which since its inception focused on virtual teaching and learning, is now providing learning opportunities through face-to-face interaction. Lecturers have also begun to construct blended teaching models where traditional face-to-face lectures are delivered with the support of state-of-the-art technology. This 'electronic' approach is competent and can ensure excellent quality and effectiveness in teaching and learning.

15.3.3 Besides traditional methods, various ICT approaches are being used in higher education teaching and learning. Nevertheless, a consolidated and systematic effort to take advantage of ICT in assessment, for example, online testing, is still minimal.

Figure 1.3: Excerpts from the Malaysia national education policy on the use of elearning at tertiary institutions

First, in the context of blended learning, it should transform instruction on campus-based learning. The Ministry has directed all tertiary institutions including public and private universities to integrate the use of online learning with classroom m learning, emphasise the role of the teacher as facilitator, and promote learning as an on-going process throughout life. Second, as e-learning continues to gain momentum; the goal was not only to extend students to study at tertiary institutions as to meet the demands of the workforce but to provide opportunity for the larger numbers of students with entry qualifications. This has resulted in the formation of the the National e-learning Policy or Dasar e-Pembelejaran (DePAN) that provides the framework for quality elearning deployment at Malaysian tertiary institutions. The e-learning policy became ambitious in 2010 when the government's higher educational development programme called the Economic Transformation Plan (ETP) extended the use of elearning to distance education. In 2011, the Ministry launched the Malaysia Education Online (MEdO), an online learning platform delivering education programmes from Malaysian universities, colleges,

polytechnics and training institutes. MEdO aims at encouraging more participation from public and private universities to offer programmes through online. A large-scale study conducted by Hanafi, et. al. (2011) showed that almost (90%) all higher learning institutions in Malaysia had e-Learning policies and have their own implementation plans and the level of awareness of the e-learning policy among the academic staff is high. Some tertiary institutions have made the use of e-Learning compulsory among their teachers and students.

With elearning becoming increasingly prominent in tertiary education, the government has aspired to be ranked higher internationally in improving the development and practice of higher education system. In 2013, the Ministry developed the Malaysia Education Blueprint 2015–2025 (Higher Education) or the MEB (HE). MEB outlines 10 shifts that will spur continued excellence in the higher education system (figure 1.4).



Figure 1.4: Malaysia Education Blueprint 2015-2025 (higher education)

In general, these 10 shifts particularly address overall issues including technology-related teaching and learning in higher education. The first four shifts concentrate on outcomes for key stakeholders in the higher education system while the other six shifts focus on vital matters concerning higher education ecosystem such as funding, governance, innovation, global prominence, globalised on-line learning and transformed higher education delivery.

Shift 9 is related to the matter of globalised online learning. In a hope to democratise access to education, the Ministry is continuously working with tertiary institutions to co-ordinate and spearhead content development. One of the key initiatives is to develop Massive Open Online Courses (MOOCs) in various niche areas of expertise, while participating in international MOOC consortiums. MOOC was originally referred to a course entitled Connectivism and Connectivity Knowledge in 2008 which was developed by Stephen Downes and Geprge Siemens. Their intention was to exploit the possibility for interactions between a wide varieties of participants made possible by online tools so as to provide a richer learning environment than traditional tools would allow.

Generally, MOOCs are a model for delivering learning content online to anyone who wishes to participate without prerequisites, entrance exams, applicant interviews or tuition fees. MOOCs benefit learning institutions in reducing the course of delivering education programme and sharing course content with the wider public. It also encourages engagement between staff and students of the institution to reach broader audience. As learning occurs in a more informal setting, learners have the option to finish a course whenever they feel like it, whenever they have the time. In 2015, the Ministry announced the launch of 60 Massive Open Online Courses (MOOCs) offered by 20 public universities in the country. By the end of 2015, more than 15 percent online courses were offered through MOOCs and the government aims at achieving 30 percent by 2020.

Malaysian educators acknowledge that online learning has a huge potential to be a useful tool for learning. Universities are gradually bringing e-learning into the mainstream of their educational programmes, and it is often an integral part of a classroom-based course. Thus, blended learning is increasingly becoming popular in Malaysia tertiary institutions and it is expected to become a common delivery mode of teaching and learning.

1.5 Issues on implementing blended learning

E-learning has been influential in teaching and learning for decades and has long been a key area of concern in education. Tertiary students in Malaysia have generally grown tremendously over the short time since it has been in existence. Despite the encouraging impact of online and blended learning, some Malaysian educators and researchers have mixed feelings on the views of the benefits of the applicability of blended learning. Although there are only a few studies, the findings could not simply be ignored.

Mohd Razali and Yahya (2010) reveal that the on-line mode within blended environment did provide adequate opportunities for social interaction as in face-to-face interaction and it took a great effort from the instructor to motivate the learners to complete their self-studying process. As a result, other social skills such as interpersonal and communication are even difficult to be developed (Mohd Razali & Yahya, 2010).

According to Azizan (2010), although online learning could help address the limitations posed by the traditional classroom learning, it also has its own constraints. Azizan (2010) further elaborates that the constraints could lead to lower teaching and learning efficiency and students would feel the task to complete their course is not easily achievable. Therefore, Azizan (2010) emphasises greater discipline from the students to set their goals in their learning. As traditional classroom learning and e-learning have their own strengths, Azizan (2010) strongly suggests the combination of both modes so that this would allow the teachers to tailor the students' learning to fit their needs. Unfortunately, there are some blended learning researchers who seem to emphasise on

the practices without a clear understanding of educational theories or models. Thus, there should be some forms of education reform that promote the adoption of blended learning such as how blended learning should be precisely defined, how it should be delivered and what suitable e-learning model should be proposed (Azizan, 2010).

In a study on blended leaning, Norazah et. al. (2011) found that the student respondents agreed with the fact that online courses were more appealing and the instructors felt that they had benefitted the students. However, these are not the only criteria to determine a successful learning experience. Norazah et. al. (2011) refer to Owston et. al. (2013) who doubt whether the instructional approach of blended learning could be functioning well for low-achiever students. Instead, Owston et. al. (2013) suggest that the learners should only be offered either to enrol in a fully face-to-face or blended course. Norazah et. al. (2011) also refer to Sabri et. al. (2010) who describe that all courses could not simply be designed as a blended learning.

Singh, et al (2005) emphasise that e-learning has been regarded as a means of delivering higher education and thus, if universities do not embrace e-learning technology, the institutions would be left behind. Academicians should be guided by an experienced teacher or lecturer who retains a positive attitude towards using e-learning in his teaching (Singh, et al., 2005). However, a study by Haron et. al. (2011) report that academicians were apprehensive about teaching in blended learning. Although lecturers were aware of the importance of e-learning and the skill should be acquired by them, the adoption of blended learning among academicians varied at tertiary institutions (Haron et. al., 2011). A positive attitude towards blended learning depends entirely on how confident the lecturers are. As teachers and lecturers are central to education, they should be given proper training so that they could provide effective guides for students learning in blended environment.

As for MOOCs, it has been a topic of interest within the field of elearning. The institutions started to introduce the element of blended learning in MOOCs as a new model of teaching and learning in pedagogical settings and become a standard part of university credentialing. Much of the studies came from the tertiary institutions offering MOOCs. For example, a study conducted by Lay Huah (2016) on Wawasan Open University (WOU) that used Moodle as a platform to deliver MOOCs. The findings revealed that MOOCs had provided learning infrastructure that supported both instructors and learners to interact collaboratively. It also gave students a collaborative platform to brainstorm ideas and opinions. With the emphasis on instructor's facilitation, this had made the learners responsible for their own learning and sustained MOOC participation and engagement (Lay Huah, 2016). However, some educationists have different perspectives about MOOCs.

According to Hazel (2014), although there are thousands of students learning through MOOCs worldwide, the learning outcomes still leave much to be desired. This is because MOOCs do not provide direct individual support from the instructor. The evaluation on the effectiveness of MOOCs was also limited (Colvin, et. al., 2014). Hill (2016) claims that MOOCs could not be considered as the future of education; instead, it could be a threat to tertiary institutions. Ubell (2017) further adds that the founders of MOOCs were not realised of the pedagogical revolution on how students learn through online courses. Furthermore, they failed to appreciate the existing body of knowledge about learning online through active learning such as peer-to-peer learning, virtual teamwork, and interactive exercises. The learning instruction of active learning encourages discussions and interaction, in opposite contrast to passive listening in lectures. They also failed to integrate active learning approaches with any other innovations in teaching and learning.

Therefore, did the use of elearning was overestimated? Did the practice of recorded lectures in MOOCs pose too many technical and pedagogical challenges? There was no simple answer. Educationists needed to lay down an explicit planning on the use of e-learning technology in tertiary institutions and to make a collaborative decision-making

process. This would allow everyone in the education field to see that it is in the best interests of all parties involved. Although ICT investments are expensive, the Ministry of Education Malaysia is firmly committed and believes the strengths of elearning should be sustained.

1.6 Adopting blended learning in UTM

Whilst there was still a fair amount of scepticism surrounding the use of elearning and the implementation of MOOCs, UTM has already invested in the information technology infrastructure. UTM believes elearning technology has significant value because it does support and extend learning outside the classroom in a blended environment.

The e-learning project in UTM started as early as 1997 with the development of the UTM Cyber Campus project by the Ministry of Education (Al-rahmi, et al., 2015). At this stage, students could access information related to course syllabus including course assessment, course objectives, course synopsis, weekly schedule and references. In the following year, each general topic discussed in class could be further explained in detail by the teacher through elearning. These included detailed assignment requirement and activity to achieve objectives targeted. By 2001, the teachers did not only share weekly topics, they also created online forum for the students to conduct online discussions. Besides accessing the course contents through elearning, the students could also involve in online discussions with their peers and teacher. From there onwards, the use of elearning was gaining momentum. Starting 2004, all course materials prepared by the teachers and academic staffs were be uploaded online through a platform called Web CT. After a period of time, UTM switched to Moodle as its new elearning platform. Moodle is hosted on the central institutional web server. It hosts a large number of courses. Each course could be managed by one or more teachers. Moodle provides a primarily asynchronous on-line experience that is content-rich by postings course subject materials in weekly sections. The development and design work of Moodle include security requirements such as students' records, assignment submission, content materials uploading, and online tests. In order to ensure that the use of the VLE was successful, the teachers were made compulsory to integrate elearning in their classroom. UTM ICT centre provided continuous training to

these teachers where they spent substantial amount of time to use VLE portal to provide materials to support their classroom learning and fine-tune their teaching strategies.

In 2013, UTM collaborated with MIT's (Massachusetts Institute of Technology, USA) educational project called BLOSSOMS. BLOSSOMS is an acronym for Blended Learning Open Source Science or Mathematics Studies that aims at high school classes and higher learning institutions in Science, Technology, Engineering and Mathematics (STEM). It is part of MOOCs and is led by Richard Larson, a Professor of Engineering Systems. Besides creating interactive video lessons, Blossoms hopes to attract more students to study science and mathematics. Since BLOSSOMS in UTM is relatively new, it is too early to expect its significant outcomes.

Government-owned educational institution like UTM has made substantial financial investment in elearning. As the elearning technology was being gradually introduced into the classroom, educators needed to find a way to best integrate online and face to face learning. My professional teaching journey in UTM spoke about my experience with elearning and how the challenges adopting the technology brought my teaching to the next level.

1.7 My personal online learning experiences

As educators, we were sometimes unfamiliar with the technology and uncertain about its usage but we tried our best to find the best ways of using it to enhance teaching and learning. My teaching career began at the Faculty of Education in 1998. In the faculty, I was responsible for teaching computer subjects such as Authoring Language, Telecommunications and Networking, Multimedia Courseware Instructional Design and Multimedia Courseware Development. The education students were required to enrol in these computer subjects regardless of their major fields of study. The students were from various majors including Physics, Mathematics, Chemistry, Teaching English as a Second Language (TESL), Sport Sciences and Islamic Studies. I taught the computer module in blended mode for five semesters. The first two semesters (semester 1 and 2 of 2004/05 academic session) were entirely based on trial and error as I tried to identify the right

combination of online and classroom activities that could enhance teaching and learning effectiveness.

The lecture method was the most widely used teaching approach in UTM and was adaptable to a large group of class setting. Since every teacher had an absolute autonomy to exercise their own teaching methods, there are numerous individualised teaching strategies were adopted. For example, I had observed the use of case studies, brainstorming and question-and-answer method. The teachers, who adopted the case study strategy, usually presented the students with written materials regarding a case. The students were asked to discuss a series of situations regarding various aspects of the case. The technique of brainstorming allowed the teacher to generate ideas from the students so as to analyse problems from different perspectives. As for the question-and-answer method, the teacher drew the students into an active discussion. My practice developed by considering which of this wide range of teaching methods would work best for my students.

Since I believed that it was always best to actively involve students in the teaching and learning process when sharing information, I decided to adopt the question-and-answer technique. By learning how to use questions effectively in the classroom, I thought I could support learning. Thus, I engaged students in a question-and–answer dialogue. First, I tried to ask students questions on their previous knowledge on the subject. During the teaching lesson, I picked a student at random and posed questions on what he knew about the course content which I had just delivered. Second, I welcomed questions from the students and opened for discussions with the rest of the class.

Despite my efforts to strengthen my lesson technique, I knew that the basic challenge with teaching at higher institution was how to reach each and every student in such a big class. My approach to this was picking a few students at random. This did not involve the other students in the class and they were largely ignored. This was the first limitation of the lecture mode. The second limitation could obviously be seen in the students' participations. My concern was how to manage the communication with huge number of

students in class. The proportion of the teaching staffs to the number of education students in the faculty was approximately at one to 80 (1: 80). Although, a single lecture hall could occupy almost 100 to 120 students, the number of students entering UTM increased every year. The bigger the number, the lesser time the teacher could interact with students. When UTM started introducing online learning in 2002, I believed that this technology could help planning effective content delivery while maintaining communication with each and every student.

In the conventional education system, the teacher was the sole provider of knowledge and the students were the passive recipients. The new blended teaching approach in UTM often required the teachers to work and guide the students in planning and managing their own learning. This approach encouraged the students to take more active role in their learning process. For the teachers, it was a more challenging role to facilitate students as the expectations were getting more complex.

What I could derive from my teaching experiences in a blended mode are three important skills. First, the students had to use communication skills effectively, both online and face-to-face. Second, the students needed team working skills to work effectively in groups. Third, problem solving skills were needed in dealing with their assignments.

In UTM, teachers were encouraged to ask their students to complete assignments in groups. As group assignments were usually very challenging, teamwork skills were vital. Within teamwork, all memb ers must work together until the task was completed and their project was graded. It was assumed that the group member knew the contribution of each of the members, so the performance of each student within the team could be assessed through peer assessment.

1.8 The fundamental research question

As a teacher directly involved in classroom and online learning in UTM, this was quite a challenge for me as I had to find the best teaching practice. Based on the professional scepticism from previous researchers which are discussed earlier together with my personal experiences conducting online and face to face learning in blended environment, a fundamental research question is formed - how to blend classroom and online learning effectively? This research will be further explored after the discussion of the theoretical framework.

1.9 My research undertaking in university

In planning for my research undertaking, it was important to have an idea of my initial research design. Littlejohn and Pegler (2007) provide guidance on designing online and classroom learning activities. This would help me to think through how to blend online with classroom activities effectively. A specific reference from McPherson and Nunes (2004) suggests that research on online learning is best understood and developed through an action research framework. In my research context, I had to provide a clear explanation on my research plan on how to translate my personal experiences and reflections teaching in blended mode into an action research framework. There were two significant aspects that I had to be clear: first, the research framework and second, the blended environment.

The research framework in this thesis consists of theoretical and conceptual framework. The theoretical framework describes a broader relationship between the research constructs or variables (Asher, 1984). The conceptual framework is much more specific in defining this relationship. It specifies the constructs or variables that needed to be explored in the study. These elements or variables justify the kind of research instruments to be used to analyse the relationship. Thus, after designing the theoretical framework, the conceptual framework was formulated. Thus, a conceptual framework is the researcher's plan on how research problems needed to be specifically explored and addressed. This conceptual framework is founded on the theoretical framework and it is often developed as a diagram (Robson, 2002). The conceptual framework is further discussed in chapter 3.

Based on each sub-triangle of the theoretical framework, the research questions developed are as follow.

1. How does the blend of communication tools used affect the blended learning context?
2. How does the nature of regulations affect the blended learning context?
3. How does the roles of students and teacher enhance blended learning context.

1.10 Significance of the Study

The challenge that university teachers were facing was how to integrate the classroom and online learning effectively and to focus specifically on the undergraduate programmes. The issue in this area explores three significant issues. First, how online learning provided a new avenue to complement the methods of teaching and learning in classroom in mutually supportive ways; second, how online technology affected the role of teacher in online and face-to-face activities as well as the role of students in their learning environment; and finally, how online learning could help students to develop a sense of learning ownership.

1.10.1 To Ministry of Education

With more support from the Ministry of Higher Education Malaysia, this will encourage the use of online and classroom learning at tertiary institutions in Malaysia. The exploration of this research initiative provided opportunities that lead the researcher to focus on an area in the online learning research that had not been known or explored yet.

1.10.2 To UTM

In UTM context, the use of online learning is to support classroom learning in a blended environment and to develop three important skills - communication, team working and problem solving skills - when students work collaboratively as team on group assignments.

1.10.3 To Teachers

With the implementation of blended learning at tertiary institutions, there is an urgent need to reflect upon the role of the teacher. Since both online and classroom learning modes require different approaches, the teacher has to be trained to work effectively online and in the classroom.

1.10.4 To Students

It is expected that online collaborative learning should be able to support the students learning together as well as facilitating group processes and the group dynamic.

1.10.5 To Future Researcher

This study can be further explored from various perspectives of blended learning by future researchers.

1.11 Limitation of the Study

This study was conducted at Malaysian public tertiary learning. The limitation was mainly the use of internet for online discussion forums. The respondents at residential areas where access to the Internet was poor, had to go to the faculty or library.

1.12 Scope

The respondents of the study are mainly undergraduate students from various majors including sport sciences, teaching English as a second language (TESL), and technical and vocational among others

1.13 Definition Operational

The brief descriptions about the term in this study are below:

1.13.1 Online Discussion

Lake (1999) argued that online discussion encouraged introverts and students of non-Western cultures who are more reflective and who tend not to respond so quickly in face-to-face discussion to express their views, as discussing online give them more time to consider other people views and write their own response.

1.13.2 Online Forum

Forum is a medium for students and instructor to share opinions and idea on certain issues or topic (Schuler, 2000). In addition, forum is a place for students to get the information for their learning (Salmon, 2000).

1.13.3 Collaborative Learning

Collaborative learning refers to an instruction method for students at various performance levels that work together in small groups towards a common goal (Gokhale, 1995). The online learning environment in higher education has huge potential in nurturing collaborative learning among distance learners who are separated in time and space (Fung, 2004).

1.13.4 Blended learning

According to Poon (2013), there is no single agreed-upon definition of blended learning. However, the common explanation is that blended learning basically combines both face-to-face and online delivery methods with the intention of each complementing the other (Poon, 2013).

1.13.5 Peer Assessment

Peer assessment requires every student working in a small group to assess the work of their peers against set assessment criteria. It primarily looks at group cooperation.

1.14 Conclusion

The growth of blended learning was driven primarily by many tertiary institutions worldwide and technically by the availability of the Internet broadband technology. As far as the student learning was concern, the tertiary institutions had to take a necessary direction to accommodate the impact of online technology. Based on the suggestions on the use of elearning in classroom introduced in 2006 and an initiative of Malaysia education blueprint introduced in 2015 from the Ministry of Higher Education, educators had to re-think and re-evaluate their teaching and learning strategies.

Chapter 2

Literature Review

2.1 Introduction

This chapter begins with extensive discussions on students' preferences learning through online or classroom setting. This had led to the conduct of various comparative studies using quantitative approach and most of the findings suggest that online is better, if not equal, than classroom learning in three key areas (learning outcomes, perceptions and interactions). But, when a growing number of students are accessing online learning within classroom setting, comparison between online and classroom learning become insignificant and this indicated that those studies have some flaws. Instead of making comparison, researchers should determine how the benefits of online and face to face learning could bridge the gap between the two in order to form a sound blended learning. In learning more about which options of research design that best fit the study of blended learning in this thesis, mixed-method and qualitative approach are also explored. However, a qualitative approach is finally chosen as a basis to conduct the study of blended learning along with the rationale use of activity theory.

2.2 Online versus traditional classroom learning

There are various studies from the literature that draw a fine line between elearning and classroom learning. This is in view of the staggering growth of elearning that has started to replace many traditional teaching methods over the years.

According to a study by Emelo (2014), students in a classroom setting tend to forget 70% of the course content upon completion within a week and 87% within a month. This had made classroom learning as an ineffective form of teaching. In fact, elearning can be better than face-to-face learning with high quality of interaction and timely feedback (Chen and Yang, 2006). Furthermore, the group that support elearning are normally the technology-savvy generation of students (Dziuban et al., 2005) who could naturally adapt and embrace elearning. Elearning offer flexibility to students as they can log on into their online courses rather than attending classes at specified time (Grabinskia, et al., 2015). Elearning normally provides a weekly format that guides

the students when to log in, when to read course materials and when to submit their project. The strategy of student-centred approach could enhance students' learning process better then teacher-centred instruction. A student-centred learning is considered as an active learning where students take control of their learning and interact among members in constructing knowledge together rather than being passive recipients (Ocker and Yaverbaum, 2001).

However, some researchers are against of the ideas that online classes are equal or more effective than traditional classroom teaching. The group who do not favour elearning prefer the formal class routine. According to Maki (2002), there are students who still prefer to enrol in campus-based courses despite the growing online courses. They claim that they also have some flexibility in their once-per-week meeting scheduling where some schools conduct night classes. With the structured schedule of attending classes in a week meeting the instructors, the students can be constantly monitored. Thorpe (1998) reveals that collaborative work between groups of students was a near failure due to the fact that each student was still following their own schedule. In fact, the students in a small group that met face to face to work on their projects performed significantly better, achieve more progress, and had a clear direction throughout their timeline compared to those who were interacting solely through their computers (Thorpe, 1998). Beard (2004) states that students can be more successful when they have sufficient personal contacts with the instructor and their peers, and the learning process involves interactions with them. This is because in online class, the students found it was much more challenging as they had to teach themselves of the course content and got tested on it. For some students, the amount of time they have to spend working on the learning materials is significantly more that classroom learning. It seems that the freedom to determine the time and venue for group discussions which part of the core advantage of virtual learning, can be questioned (Thorpe, 1998). The fact is that online classes may not be as effective for some students but they could be more effective for others. The effectiveness of online and traditional courses is depending on one's personal stance on which mode do they learn the most from.

Although classroom learning still dominates academic teaching, the universities still keep investing heavily in elearning technology to enhance the quality of teaching (Concannon, et al., 2005). Thus, as technology is indisputably becoming a part of modern classroom, we cannot simply ignore the fact that these technologies are leading the educational experience to change.

2.3 Adopting online learning in education

Using a new technology is quite a complex task. It is because when new technologies are adopted in education, learning how to use the technology may require specific skills. This technology-enabled educational innovation provides educators and teachers with ideas on how to further enhance the teaching and learning process. This has led many education researchers to compare the effectiveness of the new technology with the traditional method through various studies.

The technology which started with the use of the televised broadcast for distance education students has been extensively discussed in the literature (Keegan, 1986; Holmberg, 1989; Harasim, et. al., 1995). According to David (2000), many researchers have conducted studies to find out whether the technology used in distance education could achieve similar academic excellence to the face-to-face learning.

Likewise, the introduction of the technology of elearning in the field of education has also instigated the same enquiries. While the proponents of traditional classroom learning have set the face-to-face mode as the benchmark for students' learning, the proponents of online technology hold the belief that online learning can potentially develop the same knowledge, understanding and skills as face-to-face. This has led both groups to conduct various studies to support their claims. As online learning has been thought to be better than traditional classroom if not the same, many educational researchers tend to compare between the two. This has led to various research comparing online and classroom learning.

2.4 Comparative studies using empirical approach

Stern (2004) explains that the results of the large number of comparative studies that have appeared in the literature varied depending on the courses offered, the characteristics of the students enrolled (for example, gender, age, learning style, and level of academic competence), and the learning instruction-used. These comparative studies used mostly empirical evidence. There are two important categories of comparative studies. First, studies that investigate only face-to-face and only online mode and second, studies that compare blended learning to other modes of learning. This section covers both categories.

2.4.1 Comparing only face-to-face and only online mode

In attempting to determine the effectiveness of online learning, much of the research that compares face-to-face and online mode has mainly addressed the use of the VLE for three different purposes. First, the most common research is to compare students' achievement in the online and traditional classroom. According to Dell et. al. (2010), some online methods may achieve better learning outcomes. Second, besides learning outcomes, there are studies that look at the students' satisfaction and students' perception of online learning. Third, there are research findings that have emphasised the communications and interactions as an important feature in the online learning research.

Suanpang, et. al. (2004) reviewed the research literature published from 1995 to 2003 which compared online and traditional classroom learning by concentrating on the learning outcomes, for example, the studies from McCray (2000), King and Hildreth (2001), van Schaiket. al. (2003). While studies conducted beyond 2003 were Chen and Zimitat (2004), Ladyshewsky (2004), Rosenfeld (2005) and Stacey and Wiesenberg (2007). In general, these comparative studies focused primarily on the students' performances in terms of their exam scores. The methods for these studies involved two groups of students where the experimental group used online learning while the other group was taught face-to-face in the classroom. The impact of online learning as an intervention was compared across the two groups. Most of the findings of the comparative studies conclude that there are no significant differences between the experimental and control groups based on the performance of students' learning such as test scores using either technology-based or traditional classroom-based of learning. In a study by Lu and Lemonde (2012) who conducted a quantitative comparative study of a quasi-experimental approach between online and classroom delivery, looked on student test performance. The findings reveal that the test performance was equal for the students learning fully through online and learning in traditional classroom provided that the students were from higher performing group. For the students from lower performing group, learning through online delivery approach produced significantly poorer test results compared to classroom face-to-face learning.

However, Kennedy (2000) points that the students' learning outcomes could either be in form of two separate domains - learning products or learning processes. Learning products refer to what students have learned while learning processes refer to how students have learned (Kennedy, 2000). Both domains are complementing each other and not mutually exclusive.

Besides learning outcomes, the students' satisfaction and students' perception of online learning are other important factors. For example, Roach and Lemasters (2006) conducted a descriptive study to determine the level of the students' satisfaction working in the online learning in comparison with classroom learning. The findings indicated that students were satisfied with the online mode of the course. The study from Smart and Cappel (2006) focused on the students' perceptions of online learning in using self-paced modules. After completing the module, it was reported that the largest dissatisfaction factor among the students was the time required to complete the online modules. To overcome students' dissatisfactions however, the teacher must carefully plan the online activity in their next classes. Another example is a study from Grabinskia et al. (2015) who conducted a comparative study on accounting students and found that there is no significant difference in their perception between online and traditional classroom.

The third criterion of conducting comparison studies is the emphasis on communications and interactions as an important feature in online learning research. Maintaining students' interactions within the online environment is often complicated. It requires deep understanding of the online interactions studied over time. The online interaction among students also requires collaboration and specific roles for each individual. The study from Diekelmann and Mendias (2005) looked at the online relationships between the students and the teacher. While the students were required to discuss online, the teacher became a "supportive presence" by facilitating the students' discussions. In the study of Whitman et. al. (2005), the teacher monitored the students' progress working as a team in an online environment. Then, the students in the teams were compared by their final project grades, observable patterns in group processes and member attitudes.

Besides comparing directly between only face-to-face and only online, there are other categories of comparison studies present in the literature that is comparing blended learning with other modes.

2.4.2 Comparing blended learning with other modes

Bliuc, et. al (2007) categorises four types of comparison studies for blended learning. They are comparisons between blended learning and exclusively online contexts; between blended learning and exclusively face-to-face contexts; between blended learning and distance education modes; and among blended, only face-to-face and only online. A review of the literature that compares blended learning with these learning modes (online, face-to-face and distance) yields mixed results.

Examples of studies that compared blended with only online mode are Schweizer, et. al. (2003), Lim, et. al. (2006) and Dowling, et. al. (2003). Schweizer, et. al. (2003) conducted a complex empirical study to compare the students' group discussion in three fully online learning and a blended learning psychology course. While Lim, et. al. (2006) investigated the differences in instructional and learner factors between two groups of students who were involved in online only and blended delivery formats. Dowling, et. al. (2003) investigated whether there were connections between students' learning outcomes and the teaching modules that were delivered in traditional face-to-face setting or in blended mode. The findings from all these studies showed that the blended delivery mode was highly associated with students' final marks, and thus had improved their learning outcomes. According to Mario (2000), in order to succeed in fully online courses, the students must be independent and work on their own pace.

In comparing blended learning with face-to-face contexts, there is research that explores the debate as to whether learning through blended delivery mode is comparable to classroom learning in a campus-based setting. For example, the study by Utts, et. al. (2003) compared two groups in an introductory statistics course in which one group was a blended learning class and the other a traditional face-to-face class. The findings

revealed that the student performance in the blended format was equal to the traditional format. However, the students evaluated the blended format course less positively and they felt that the workload in this mode was higher.

The study from Harker and Koutsantoni (2005) which represents the comparison between blended learning and distance education modes, investigated the blended learning effectiveness based on three key indicators: student satisfaction, retention and performance. The course program was conducted either in a blended learning context or in a distance education mode. The three indicators were compared between two groups of students. The findings show that the two groups achieved the same level in the performance and satisfaction levels but the level of student retention was significantly higher in the blended learning mode.

The final category looks at the studies across all three different learning contexts; online, face-to-face and blended mode. These comparative studies become more complex when three different learning contexts of face-to-face, online and blended are contrasted. In this comparison, there is a fairly large body of work that examines the aspects of students' learning outcomes and learning community. Both O'Toole and Absalom (2003) and Reasons, et. al. (2005) looked at the students' learning outcomes while Rovai and Jordan (2004) studied how students develop a sense of learning community. O'Toole and Absalom (2003) investigated the relationship between the students' achievement in their learning outcomes and the provision of learning materials online. Because the study involved three different modes, the findings were varied. The results indicated that students who attended class face-to-face and read learning materials online achieved higher test scores compared to students who only came for a lecture or who only learned through the web. Reason, et. al. (2005) set out to examine the assertions by previous literature that suggested the blended learning setting had a profound impact on distance education courses compared to other approaches. As for Rovai and Jordan (2004), they did not study students' learning outcomes but conducted a study on the sense of community in the three different formats of learning.

2.5 The Drawbacks of Comparative Studies

These comparative studies have received wide criticism in the educational literature (Wills & McNaught, 1996; Draper, 1997). According to Kennedy (2000), a major criticism is that apart from having treatment variables, researcher cannot assume two learning environments are similar as each learning environment comprises various interrelated variables which contribute to student learning. It means when one variable is altered or modified in the learning environment, other variables would have also changed in the environment.

2.6 Limitations of comparative studies

The comparative studies (comparing directly between only face-to-face and only online) has received wide criticism in the educational literature (Wills & McNaught, 1996; Draper, 1997). According to Kennedy (2000), a major criticism is that apart from having treatment variables, researcher cannot assume two learning environments are similar as each learning environment comprises various interrelated variables which contribute to student learning. It means when one variable is altered or modified in the learning environment, other variables would have also changed in the environment.

The comparative studies that gather empirical evidence usually support the positive results of the use of online learning in complementing classroom setting. Although the studies provide some convincing evidence for educators that online learning can be designed so that it provides the same learning outcomes as classroom learning, they share some common criticisms. The studies ignore the authors' times developing the instructional model and the authors' role in encouraging class discussions online. As the online and classroom conditions in these studies differed in terms of time spent by the students within the comparative modes, the authors did not clearly show how the time-management strategies were used. Most importantly, how the instructors keep the students motivated in participating online activities and preventing loss of interest.

These criticisms also affect the general validity of empirical studies and is criticised by some of the literature.

2.7 The criticism on empirical studies

The criticisms on the comparative studies which compare face-to-face and online learning using empirical evidence have been widely discussed (Ehrmann, 1996; Ramage, 2001; Conger, 2005). The discussions on the findings are mostly based around an analysis of the "No Significant Difference" phenomena (Russell, 1999). This provides a detailed research bibliography of 355 studies, summaries and papers that use an empirical approach to determine a difference between online and face-to-face modes. The findings of which suggest that in most cases, online modes are at least as effective as face-to-face ones.

Ehrmann (1996) cites Clark (1994) who states that any research that looks at technology integration should emphasise the specific teaching and learning methods used so that a judgement can be made about the results. Another educationist also cited by Ehrmann is Kozma (1994) who warns teachers to carefully choose the appropriate technology for the learning context as this will affect the specific teaching and learning methods. Thus, based on Clark (1994) and Kozma (1994), Ehrmann (1996) summarises two important challenges or decisions in relation to the use of technology in teaching and learning; first, the need to choose the best teaching and learning strategies and second, the need to choose the technology that best supports the strategies. Ramage (2001) cites Clark (1994) who indicates that it is not the media selection that affects the learning outcomes but the pedagogy involved. In his literature review analysis, Ramage (2001) has raised doubt on the research findings that show technology improved the students' grades, faculty perceptions and students' perceptions.

Conger (2005) raised two important criticisms of comparative studies citing studies by Phipps and Merisotis (1999), Joy and Garcia (2000) and Lockee, et. al. (2001). First, there are too many variables to control in education settings. From the perspective of scientific method, these comparative studies are flawed if all the variables other than the experimental ones are not identified and controlled. The second criticism is the lack of

theoretical underpinning in these studies. In her attempt to answer this criticism, Conger (2005) refers to Ramage (2001) who proposes education researchers need to ask the right questions before conducting any comparative studies such as "when we ask if one media delivery method is better than another, what are we really asking?" (Conger, 2005, p. 2) and "if the theory (supports) that students learn better face to face, what is it about face to face learning that we believe leads to better outcomes?" (Conger, 2005, p. 3).

According to Casanovas (2010), within empirical studies in this area, quantitative approaches are most commonly used. However, quantitative research in the study of online learning is not very useful as it can only explore certain types of questions. It cannot provide answers to how and why questions. There are several important issues to consider within the study of online learning. Quantitative research leaves many questions about the factors that lead to effective learning unanswered. It does not seem to recognise that pedagogic solutions need to be developed for the particular context. The question is more to do with what makes for effective learning activities in a particular context, what does the research actually inform us about the actual students' experiences working online and face-to-face, what factors affect their experiences, and what features that have significant impact on the teaching and learning process as well as the students' performances. Finally, how ethical it is to actually withhold an online element of a course from one group or subject an experimental online component on a group when the students are on the same course. However, when research findings are solely based on empirical evidence, there is still inadequate understanding of the phenomenon of online learning.

So, when the research findings derived from both comparative studies (face-to-face and online mode, and blended learning with other modes) do not provide sufficient explanation on students learning process, the question was what would be the best research approach that needed to be employed. Since the number of students accessing online learning within classroom setting kept on growing (Dahlstrom, et al., 2011), researchers should focus on the benefits of both online and classroom modes in order to form a sound blended learning. Instead of comparing merely online and face to face, researchers should look at the advantages of how blended learning could engage students in their learning.

Thus, in designing a curriculum, educator such as Ni (2013) suggested the instructors to take the advantage of the benefits of online learning to offer courses in blended environment to overcome the time, place and resources limitations as this could close the gap between online and face to face approach.

In learning more about which options of research design that best fit the study of blended learning in this thesis, mixed-method and qualitative approach are also explored. Education researchers such as Abusabha and Woelfel (2003) and Onwuegbuzie and Collins (2007) suggest employing a qualitative approach along with quantitative method as the best approach or compromise.

2.8 Blended learning: compromising on a mixed-method approach

While the methodological debates on quantitative versus qualitative approach remain as opposing philosophies, it is interesting to firstly look at both sides of the perspectives. Abusabha and Woelfel (2003) make contrasting statements about both approaches. On the one hand, the researchers who use the qualitative approach argue that human experience cannot be explained in numbers or through the manipulation of variables. On the other hand, the quantitative proponents criticise qualitative research for being biased or subjective (Abusabha and Woelfel, 2003; Piergiorgio, 2003).

According to Hoepfl (1997), the qualitative approach studies the phenomenon in the context-specific setting while the quantitative approach conducts experimental studies to test hypotheses to arrive at generalisations. This is true at a methodological level but at a practical level when the tools for data collection are chosen such as at the methods level a range of qualitative and quantitative tools are commonly used within either methodology.

Although Abusabha and Woelfel (2003) note the differences between the two different philosophies of quantitative and qualitative research, they feel that the emphasis should strongly be on mixing both methods within the chosen methodology. A specific instance is provided in which a researchers could elaborate human behaviour through descriptive data collection from the qualitative method.

There are quite a number of proponents of a mixed-method approach. Johnson (2004) makes an effort to place both the quantitative and qualitative paradigm on an equal level by developing a framework that encompasses mixed method research. Bryman (2004) asserts that the methods derived from both paradigms can be integrated to balance the strengths and weaknesses of each approach.

A specific example is a three year mixed-method study that was conducted by Henri and Lee (2007) on student characteristics, needs and learning styles. The findings are used to guide instructors at the University of Hong Kong Faculty of Education to improve teaching and learning in a core module (Information Literacy). The findings also revealed that part-time students preferred a combination of online and face-to-face teaching, with more face-to-face class time in that mix.

Employing both quantitative and qualitative methods in conducting research would allow the strengths of one approach to make up for the weaknesses of the other. However, there are many pros and cons in the literature about mix-method approach. One of the drawbacks is when qualitative data are quantitised, the data will lose its flexibility and depth because qualitative data are multidimensional while quantitative data are one-dimensional (Bazeley, 2004). Researchers of mixed-method approach normally use qualitative data to explore and support quantitative findings. Because of this, the analysis of qualitative findings could not be expanded.

The study of blended learning requires a phenomenography approach where it is used to explore and understand the experience of learning and the experience of teaching (Bowden, 2000). This would help the researchers to further describe about the students' behaviours in experiencing, understanding and responding to the strategy of blended learning in the daily classroom settings (Hande, 2014). Hande (2014) further explains that phenomenography is rooted within qualitative research which provides in-depth understanding of the feelings, values and perceptions of a subject. A qualitative study design was adopted as a means of analysing student perceptions and generating ideas to

be used to improve the educational program (Hande, 2014). This fits the conduct of the blended learning research in this thesis.

2.9 Blended learning: employing qualitative approach

It is neither the intention of the researcher to oppose the dichotomy between quantitative and qualitative approach nor to deny other researchers' schools of thoughts. Based on reasons given about phenomenography (Hande, 2014), a qualitative approach is chosen and serves as a basis to conduct the study of blended learning. However, no single blended learning is one-size-fits-all. According to Graham (2012), the definition of blended learning can be traditional classroom learning with face to face interaction and some online components such as learning materials and quizzes available online. It could also be defined as mostly online classes with limited face to face interaction (Graham, 2012). It is also important to explore the definition from the literature along with the activity theory.

2.10 The concept of online learning

The term online learning is extremely broad and accordingly, it has been used differently by various authors. Among the terms used in the literature are web-based virtual learning (Piccoli, et. al., 2001), interactive learning (Unruh, 2000), Internet-based learning (French, et. al, 1999), technology-mediated distance education (Ozdemir & Abrevaya, 2007) and flexible learning (Collis & Moonen, 2001). Fitzgibbon and Jones (2004, p. 26) note that online learning usually refers to 'a web-based, higher education accredited programme, delivered over the Internet, using a Managed Learning Environment, mediated by tutor-led synchronous and asynchronous discussion groups' and this is the definition adopted for the purpose of this research.

Indeed, the advancement of the Internet has drastically changed the way the process of teaching and learning is conducted at many tertiary institutions. According to Palloff and Pratt (2001), the pressure from the government urging universities to invest in ICT and the increasing public acceptance of the Internet – hence increased expectation of students and of employers who required students to be digitally literate. As a result of these and

commercial pressures and in part due to its flexibility in supporting learning at any place and at any time (Suanpang, et. al., 2004), the Internet had become part and parcel of the education agenda (Horton, 2001)

2.11 The formation of blended learning

Online learning complemented classroom activities to form blended learning. The term blended learning has various definitions within the literature. According to Hijazi, et. al. (2006), blended learning integrates both face-to-face and distance learning and make the most use of both delivery modes. For some authors, the other term that similarly reflects the combination of classroom and online learning is hybrid learning. (Young, 2002; Bärenfänger 2005). Krause (2007) describes blended learning as teaching and learning that integrates effectively different modes of delivery, models of teaching and styles of learning. When combining technology and face-to-face classroom, a strategic and systematic approach must be adopted by teacher (Krause, 2007). With the recent technology of high-speed broadband, blended learning could be seen as the integration of online learning with face-to-face classroom learning. Collis and Moonen (2001) define blended learning as a hybrid of face-to-face and online learning where the online component is naturally part of classroom learning. For Falconer and Littlejohn (2007), the online component of blended learning is a "natural extension" of classroom learning. The concept of blended learning is discussed extensively in section 2.5 of this chapter.

When the policy to use online learning was implemented, the challenge facing the teachers was how to integrate classroom teaching with the on-line learning (Marra, et. al., 2004; Wang & Woo, 2007). According to McConnell & Zhao (2006), in some countries where campus-based universities had the highest status, the lecture approach was still the favoured method of teaching despite having networked learning available to them. Whitlock (2001) warns that it would not be successful for educators to instantly convert classroom teaching to an online course. According to Davies et. al. (2005), traditional classroom learning cannot be substituted with online mode and that the use of e-learning in teaching and learning should be integrated with the face-to-face mode to optimise learning.

2.12 The concept of blended learning

Graham (2006) identifies 3 common types of blended learning. First, the type of blended learning that combines the delivery media; second, is the type that combined instructional methods; and third, is the type that integrated both online and face-to-face instruction. For the type that combines instructional modalities (or delivery media), Graham (2006) cites Singh & Reed (2001) who define blended learning as a learning program that combines more than one delivery mode with the intention to optimise the learning outcome and cost of program delivery. Examples of delivery modes could include the use digital camera, electronic whiteboard and multimedia educational courseware. The second type of blended learning is described by Driscoll (2002) cited by Graham (2006) as a means of "combining various pedagogical approaches to produce an optimal learning outcome with or without instructional technology" (p. 54). Graham's third type of blended learning bridges refers to a combination of online and face-to-face learning. He reflects on the efforts to find the effectiveness blend for combining online and face-to-face instruction. This type is the focus of the research in this thesis.

There are many authors who agree with Graham's third type in defining blended learning (for example Collis and Moonen, 2001; Rogers, 2001; Nicholas, 2003; Singh, 2003; Littlejohn and Pegler, 2007; Condie and Livingston, 2007).

Collis and Moonen (2001) explain that blended learning incorporates a flexible approach where online resources such as online syllabi, hand-outs, PowerPoint slides, and course-related Web links are made full use of to enhance the learning potential of the online environment and face-to-face contact. The online component in blended learning is seen as a natural extension of classroom learning. Nicholas (2003) states that the term blended learning and mixed-mode are interchangeably used to reflect the combination of face-to-face classroom learning and distance approaches. Singh (2003) also suggests that tertiary institution should adopt blended learning by combining multiple delivery media to complement both face-to-face classroom, e-learning and self-paced learning. On the aspect of teaching and learning, Littlejohn & Pegler (2007) refer to the word "blend" in

relation to the proportion of e-learning content within the course. “It can be a strong blend (almost exclusively e-learning) or a weak blend (virtually none)” (p.29). In fact, there are two types of blends – media blend and activity blend (Littlejohn and Pegler, 2007). In a context of this study, the activity blend has been the main focus in the research area of online learning. However, the blending of classroom activities and online activities must be carefully managed. Osguthorpe and Graham (2003) outline the process of blended learning as “trying to maximise the benefits of both face-to-face and online method” (p. 227) and “in ways that leads to a well-balanced combination" (p. 229). Condie and Livingston (2007) have raised an important issue concerning the balance of classroom and online activities in blended learning. Thus, there is a need for educators to accommodate both the traditional classroom and online sessions (Rogers, 2001).

From the literature (Ellis and Calvo, 2004; Lim and Chai 2004; Walther, 1996; King 2001; Hoyle, 2003; Gagné, et. al., 2005; Margaris, et. al., 2008), it appears that there are four fundamental questions that could be posed to educators about blended learning. First, how to optimise learning through the ‘right’ balance between online and face to face learning activities? Second, how to structure the course module? Third, how many levels to include in the blended process? Fourth, how many types of learning (models) for a blended process?

2.12.1 How to optimise the ‘right’ balance?

Ellis and Calvo (2004) emphasise the important strategy of learning through discussion. In the context of blended learning, online discussion should be closely integrated with the classroom activities (Lim and Chai, 2004). King and Hildreth (2001) also stress the advantage of online discussions among distance education students who do not have the opportunity to meet face-to-face. However, some teachers may find it difficult to blend online and classroom activities. The question is what kind of learning activities should take place in the classroom and online. Certain complex learning activities might benefit more from face-to-face or they might be better suited to be more online. For Walther (1996), online discussion is more focused compared to face-to-face discussion.

2.12.2 How to structure the course module?

Another essential component to consider for conducting blended learning is whether the course should be tightly or loosely structured. There are many ways to structure course materials within the online environment. For the teachers, they must know how to carefully blend online tasks and activities with classroom ones based on their knowledge of the students' experiences and skills. Some teachers might organise the course materials and activities in a tight sequence prior to the students learning. Alternatively, the students could decide on their own sequence in which to explore the materials if this is allowed for. However, structuring the sequence rigidly might deny the students' interests to learn in the best way for them. Hoyle (2003) emphasises the role of the teacher in tracking the students' progress by identifying those who had succeeded to move to the next stage of learning after completing the assignments given or those who had not completed their work by communicating with them through online or in classroom. This could be done efficiently if a structured approach is used. The main advantage of a structured course in blended learning where the instructions are systematically planned is that this offers support to the students in their learning so that they can follow the materials effectively (Gagné, et. al., 2005).

2.12.3 How many levels to include in a blended process?

Based on the literature, there are four different levels of the blended process. These comprise the activity, the course, the program, and the institutional level. This blended process is determined by either the students or the teachers. The students would decide upon the blending at the program and institutional level while the teachers would determine this at the course and activity level. In describing the four levels of the blended process, Margaris, et. al. (2008) citing Bonk and Graham (2006). Blending at the activity level requires the learning activity to consist of both classroom learning and online learning. At the course level, the blending process could have both classroom and online activities overlapping or being performed one after the other. As for the program level, the students have the option to select courses to be mixed in both classroom and online mode. Otherwise, the two courses would be combined and prescribed by the program. Finally, the institutional level would explore the many different ways to decide the blended process

based on the needs of the organisation.

2.12.4 Which types of learning (models) to include in a blended process?

Margaris, et. al. (2008) cite Valiathan (2002), and Margaris and Kotsialos (2005) who refer to three different fundamental models of applying the blended process associated with skill (and knowledge) -driven, the attitude-driven and competency-driven learning. The skill-driven model combines self-directed learning through the assistance of the teacher to produce specific knowledge and skills. In the attitude-driven model, the objective is to develop specific behaviours and attitudes by mixing various events (Margaris, et. al., 2008). Finally, the competency-driven model suggests the blended process to be supported by online learning tools and knowledge management resources in order to develop workplace competencies.

In relation to the 4 fundamental questions related to blended learning, the responses are as follow. In terms of learning activities, the researchers must plan efficiently the learning activities that complement both online and classroom learning and there should be a clear purpose that students understand the relevance of both modes. The course should be structured so that every section is comprehensible and understandable and easy to be followed by the students. At the course level, teachers in UTM are given flexibility to determine what type of learning activities that suit their lesson most. The skill-driven model is the most suitable model as it combines students' self-directed learning through the support of the teacher to develop specific learning skills namely communication, team work and problem solving.

However, more discussions are needed especially about pedagogic skills (Ng, 2010) from the literature.

2.13 Making activity theory fits into blended learning research

The theoretical framework discussed earlier in chapter 1 is derived from activity theory pioneered by Lev Vygotsky and other psychologists. It is based on Jenlink's (2001) 3 sub-triangles – tool, rules and roles. The use of the 3 sub-triangles in the teaching and learning process in blended learning fit with the cognitive and constructive approach by Vygotsky and Piaget. Hillen (2014) advocates the idea of Vygotsky's zone of proximal development (1978) and Piaget's cognitive development theory (1973, 2003) in learning through computer-supported collaborative learning or CSCL.

2.13.1 Vygostky's Zone of Proximal Development

Vygotsky is a social cognitive theorist and psychologist who defines the zone of proximal development as a gap between what a student has already learned (the actual level of development) and with the support of educational strategies and tools, how much he or she can achieve (potential development). Vygotsky looks at interaction with peers as an important and effective way of developing skills and strategies. With suitable learning exercises, a less competent student can learn from more skillful peers within the zone of proximal development (ZPD). The concept of ZPD has been expanded and changed into a new concept called scaffolding. The term scaffolding has never been used by Vygotsky in his writing but it was introduced by Wood et al. (1976). In education, scaffolding is regarded as a variety of instructional strategies to assist students to progress systematically building on their experiences and knowledge as they are learning new skills and, ultimately, greater independence in their learning process. According to Wood, et al (1976), the idea of scaffolding is parallel with the work of Vygotsky. With the help of scaffolding, the student learns to master the task. However, the scaffolding is only temporary and adjustable. Once the task is mastered, the scaffolding can be removed. The student is able to complete the task again on his own and thereby encouraging and advancing their individual learning.

In blended learning environment, teachers become part of the whole process of online and classroom delivery. Condie and Livingston (2007) point out that the teachers must understand how to fulfil their role as being the facilitator within online learning. Teachers are not only required to master the technology of VLE, but must be able to facilitate students' online discussions. The online discussion can become productive with the presence of a teacher to monitor and facilitate the interactions (Veerman, et. al., 2000). It is important to note that the teacher is responsible for structuring interactions and developing instructions in a face to face and online setting. Within the classroom, the teacher is not always considered as a more knowledge person. Instead, students can also be placed in collaborative groups with their peers who have demonstrated mastery of tasks and concepts. Likewise, in collaborative online groups, Hillen (2014) suggests the focus is not only on the teacher, but also on the students' peers and the technology, which supports communication and interaction. It was reported widely by studies that online technology encouraged interaction between teacher and the students (Stacey &Wiesenberg, 2007), provided support for collaboration (Frederickson et. al., 2005; Vonderwell, 2002; Dysthe, 2002) and provided opportunities for reflections (Wang & Woo, 2007).

Rosenshine & Meister (1994) also suggest that students' progress in learning is determined through problem solving under expert guidance, or in collaboration with more skilful peers.

Thus, developing effective group discussions requires good communication, team working and problem solving skill. The students need to acquire these three skills to engage in effective discussion. A discussion can helps a group make a particular decision or come to a conclusion.

Communication skills: Effective communication is the most important skill as it is central to all work practices (Kubler and Forbes, 2005). Communication through online forum deeper learning and enable collaborative learning (Murphy, 2004). Online technology provides three types of communication. They are text-based, audio-based or video-based communication (Ryan, et. al., 2000). The most common option used by many online learning users is communication through text-based communication (Preece, 2000). Through text-based communication, students have the opportunities to communicate both asynchronously and synchronously with teachers and their peers. According to Wang and Woo (2007), the common advantage of online discussions is its convenient use regardless of time and place. An asynchronous online text-based communication remains the most widely used by students as it provides more flexibility and becomes a convenient use regardless of time and place (Wang and Woo, 2007).

According to Chin and Anderson (2005), e-learning has the potential to be highly interactive and help students not only to improve their IT skills but as well communication skills. Through the online discussion forum, Prain and Lyons (2000) indicate that students could exchange various views from simple discussion to complex ideas. These exchanges provide an effective interaction in exploring the topic and course content (Honey, 2001) and with the assistance of the teacher, the students are gradually constructing meaning and understanding knowledge (Rowntree, 1997).

Online discussion forums or boards that resulted in threaded discussions are one of the most important tools in online teaching and learning. Discussion forums allow communication through asynchronous discussion to take place over a period of time. The opportunity to communicate asynchronously is one of the primary benefits of online learning. In spite of various benefits of online discussions cited in the literatures, Brooks and Joeng (2006) refer to certain findings that highlighted the lack of coherence and depth in online discussions with students often not responding to other students' ideas. In order to develop active discussion, Revill and Terrell (2005) suggest that the use of the forum must be appropriately planned and moderated. Teacher can't expect that the students know

how to use the online strategically without any guidance. Otherwise, this would result in less or little collaboration.

According to McNamara and Brown (2007), teacher should consider three important factors before allowing students to use online forum - the organisation of the forum, the motivation of students to participate and the ability of students to participate effectively.

McNamara and Brown (2007) cite ideas from Brooks and Jeong (2005) who suggest the group online threaded discussions should be organised into discussions topic where arguments are clustered within each topic. If discussions were not threaded, discussions may become repetitive and thus, discouraging students participation (Vonderwell, Liang, & Alderman, 2007).

In general, asynchronous discussion enables students' flexibility to control when to reply to the messages, whom to send the feedback or comments, and where to post their messages in a discussion forum. The students could interact collaboratively with each other through debating, reviewing and reflecting upon existing knowledge and thus understanding the course content in-depth (Vonderwell, 2002). According to Wozniak and Silveira (2004), unlike face-to-face discussion, asynchronous communication allows the learner to feel less intimidated. In fact, the learner has the opportunity to contribute his in-depth ideas of the topic discussed.

According to McConnell (2005), students will generally achieve better in a collaborative situation rather than learning individually or competitively with others. Through collaborative learning, it is important for the learners to own the knowledge, so that they can become committed to building knowledge, rather than merely receiving or reprocessing it. Jonassen (1999) states that this knowledge-building becomes a social activity through which the students are encouraged to share knowledge. According to Slavin (1995), the backbone of collaborative learning is the willingness of the peers to participate collaboratively in a constructive sense. Jonassen (1999) stresses the importance of technology in knowledge-building communities by providing a medium for storing,

organising, and reformulating the idea that are contributed by each community member. Furthermore, Ong and Hawryszkiewycz (2003) add that collaborative learning has the potential to develop better interactions among students to share views of the available knowledge. Collaborative learning, which is supported by online technology, is able to support on-line communities of learners (Adams and Freeman, 2000; Lapadat, 2002; Tu and Corry, 2002). This has potential to change the learning process to take place at the time and location best suited to the learners. This approach to learning has the potential to make the experience learner-centred.

According to Rovai (2002), communication skill is vital in achieving positive outcomes in group learning. Building rapport among group members is also indispensable as it connects each other (Rovai, 2002). Lowes (2000) emphasises the importance of dialogues among members such as engaging in discussion and brainstorming either asynchronously or synchronously when completing assignments. There is a suggestion that group assignments should be designed for "positive interdependence" where each group member contribute his or her ideas (Lowes, 2000, p. 12)

There are research that focused on developing better communication skills through the use of an online forum and face-to-face meeting (Lapadat, 2007; Brown, et. al., 2006; Jones and Cooke, 2006; Motteram, 2006; Guldberg and Pilkington, 2007; Aalst, 2006).

Brown, et. al. (2006) used a case study to conduct a small-scale research study analysing students' postings in online forum of their depth thinking. Jones and Cooke (2006) used two case studies which involved an in-depth qualitative analysis of the students' online discussion to enhance their understanding of how students learn online. Motteram (2006) also used a case study approach to look at one particular module in an attempt to capture students' experiences of using a number of online tools. A qualitative data analysis was conducted to explore the nature of the students' interactions on a day-to-day basis and ensure that the tasks they had to complete were feasible within the time duration given. Evidence shows that the students had successfully exchanged ideas and processes and they were able to reflect meaningfully on of what they had discussed. Through a blended

learning course, Guldberg and Pilkington (2007) investigated why some online forum discussions were actively used by the students with a higher number of postings and good quality of discussion while others were less successful. Their findings showed that the nature of questions being posed to the students had an impact on the outcomes of the students' online discussion. Aalst (2006) developed a framework with the aims of looking for knowledge building which based on three notions of collaboration, learning how to learn and idea improvement. This framework was used to help teachers to develop pedagogy in supporting collaborative inquiry in online learning. The findings show that knowledge building could be achieved with the students' high collaboration in the online forum and their learning to learn. A deeper level of collaboration led to a shift in thinking about knowledge and thus, stimulated the students' knowing

Teamwork: Another important skill that could be derived from the use of e-learning is team working. The VLE provides a collaboration tool that offers a discussion board for teamwork. Although good communication skills can promote better team work, the question is how the team should work collaboratively in sharing workloads. O'Leary (2005) suggests each student should be assigned with different roles such as summariser, coach, guide, encourager, cheerleader and recorder. In a face-to-face context, the students hold the same roles. Some roles have the advantage of engaging students with 'deeper learning' than others.

According to McInnis and Devlin (2002), the significant advantage of well-designed team work is that it increases student learning. McConnell, et. al. (2004) agrees that the assessment of each group member will clearly reflect ''a sense of community and promotes and rewards collaboration' (p. 288).

Lowes (2014) categorises students' interactions working in small group within online courses as parallel, associative and cooperative (p.4). There are various benefits of online team work such as helping students enhancing their communication, collaboration and social skills (Fåhræus, et. al., 1999) and supporting their online collaboration (Goold & Coldwell, 2006). Students tend to participate more in small group rather than in larger

group (Beaudoin, 2003). Technology namely VLE can be useful for teamwork activities as it could bring students together and as an added value in increasing their learning experience catalyst in adding value (O'Cree cited in Anderson, 2005).

However, if not developed and conducted properly, online teamwork could be problematic such as unequal member's contribution and unclear learning objectives (McInnis & Devlin, 2002). To overcome this problem, Johnson et. al. (1991) highlight two important aspects for a successful teamwork. The first aspect is positive interdependence where every member in the group working together and contributing equally to achieve common goals and thus, every member's efforts is considered important. The second aspect is promotive interaction where every member exchanging and sharing information, responding to ideas/opinions appropriately and trusting each other.

Jones and Jones (2008) emphasises two important aspects about teamwork – first, the students' perceptions of online teamwork determine whether the group is functioning and second, the role of instructor to influence the students' thinking on teamwork through the use of instructional strategies. For Schusler et al. (2003), teamwork occurs within social learning where leaners engage with one another sharing different perspectives and developing a common framework.

Problem solving: According to Gagne (1980), the main purpose of education is to teach people to become effective problem solvers. By having students to communicate and work collaboratively in groups, they will be able to improve their problem solving skills. In the context of this thesis, group problem solving was related to completing the assignments and maintaining the group to work as a team. It was important for the teacher to design the assignments that required the students to work from structured to open form of exercises. Wegerif (1998) and Ponti and Ryberg (2004) point out that through the online forum, students can be in control of their own learning environment in solving their assignments.

The important literature on group working online in solving problem is elaborated by Stahl (2006). Stahl (2006) describes extensively about negotiation which is a process by which a group of people who are working together arrive at a group decision. According to Stahl (2006), group negotiation is an important aspect within collaborative learning using VLE especially in building new shared knowledge. However, negotiation is not only about making decision. In the online and face-to-face collaborative learning, it is concerned more on developing new knowledge through mutual interactions.

Stahl (2006) further explains that knowledge negotiation with two important purposes. First, it "controls the publication and transfer of ideas, documents, drawings and other artefacts or sets of items from a small project group perspective into the perspective of a larger community of learners in a course". Second, it involves "evolving a group knowledge artefact to a mutually acceptable status for publication, rather than reaching consensus on a pre-existing choice of personal opinions".

Stahl, et. al. (2014) also point to the various roles of individuals in small-group collaborations supported by VLE. The role of group of joint attention in a dyad. In order for learners to work together as a group, they must be oriented to the same thing. As for leadership as interactional, leaders are not simply born but it sees as "emergent from group interaction and distributed among group members". The social interaction in the Vygotsky's zone of proximal development is regarded as the basis for cognitive growth or development.

2.13.2 Piaget's Social Cognitive Development

Piaget who is also a social cognitive theorist, emphasises that true learning occurs when an understanding of thing and idea are matched together and creates mental model. This mental model allows a learner to assimilate new information correctly and develop his conclusions and predictions. Piaget's works had caused the new field of cognitive theory to come into existence and his theory has been referred to by many educators worldwide applied to teaching practices and curriculum design. Piaget also believes learners exchange information or knowledge through social interaction. Although Piaget (1973)

refers to social interaction among children as a basis for the development of knowledge, it could also illustrate a similar situation in an online classroom. Social interaction can be conducted through various means such as online forum, emails and chats.

2.13.3 The three sub-triangles (Jenlink, 2001)

The three sub-triangles of the activity theory are used to explain the students' engagement in their learning process when they take charge of their own learning through online and face to face interactions with the teacher's guidance. The learning goals of the blended learning research are achieved when leaners manage to construct knowledge through group interactions. The tool sub-triangle is related to the use of students' group discussion through online and face to face while the rules sub-triangle is related to the obligation of the students to work in group with good communication and problem solving skill. The roles sub-triangle is related to a question of what make a good and efficient team who collaborate and divide tasks efficiently among group members.

2.13.4 The on-line learning community

The development and formation of a community of learners can potentially contribute significantly in the learning process (Littlejohn & Pegler, 2007). This learning community has been referred to different by terms such as communities of practice', 'communities of interest' and 'virtual learning communities' (Lave and Wenger, 1998; Wenger, 1998; Lewis and Allan, 2004).

Many education researchers have given considerable attention to the potential of online communication to promote deeper learning for students and to allow collaboration between them. Wegerif (1998) emphasises the importance of the social dimensions of learning among distance education students to form online communities. For Brown (2001), the process of building an online community involves three important steps which start with making friends, ensuring acceptance within the community, and fostering the feeling of camaraderie. O'Leary (2005) suggests that Ice breaking activities should be introduced at the beginning of a course as the significant step to build an online community.

The course modules that have been designed to develop a sense of community and collaborative activities increase the students' social presence and this social presence is closely related to the interaction among students (Garrison and Cleveland-Innes, 2005; Tu and McIsaac, 2002)

2.14 Blended learning research – employing qualitative approach

According to Savenye and Robinson (2004), educational technology researchers who prefer qualitative approach tend to use and refine methods thinking that these methods have various degree of instructiveness with respondents. A study by Li-Ling (2012) that assessed the use of blended learning intervention in an undergraduate nursing course using a qualitative research design with in-depth interviews. The findings reveal that most respondents appreciated the opportunity to be involved actively in the learning process and making a profound and critical decision-making. A study by Jokinen Mikkonen (2013) explored teachers' experiences of teaching undergraduate nursing students in a blended learning environment using qualitative case study approach. The findings show that implementing blended learning with a combination of face-to-face learning and learning with technology are challenging as it takes a thorough planning and implementation. A study by Ching Lam (2015) also explored students' experience in a blended learning course from the viewpoint of the Community of Inquiry (CoI) using a qualitative case study. The findings emphasise the importance role of learning autonomy and its relation to the community. Angeluci and Cacavall (2016) conducted a study on codes that highlight the tensions between human and nonhuman actors present in innovative practices of blended learning using qualitative study.

2.15 Qualitative blended learning research - using action research approach

According to McPherson and Nunes (2002), online learning is a fairly new phenomenon in education and is often new to both teacher and students. Action research is an ideal approach to enable "reflective practice and the exploration of tutoring strategies and styles" (p87) and thus, this approach can be used extensively in the study of online learning.

The nature of action research is based on the involvement of the researcher in the research setting. The researcher participates directly in the research process and that processes would benefit all participants directly. According to Stringer (1999), action research is "more than the traditional interpretive research in the sense that the researcher is directly involved in the research setting and the experience itself" (pg. 7).

Action research is able to address a diversity of research questions pertaining to the pedagogical, technical and organisational issues associated with the use of online learning. It caters for both the researchers and the practitioners. An action research approach was chosen for conducting the study of blended learning in this thesis and this is described in detail in chapter 4. In addition to the research approach, activity theory was adopted as a tool to frame the analysis and this is also described in chapter 4 together with a justification of its adoption.

2.16 Qualitative blended learning research – adopting activity theory

From the literature, there are various studies that adopt the use of activity theory in different research perspectives. However, only research that are related to the study of blended learning are referred to in this section. The research are categorised into the following. First, there research that used activity theory as an analytical framework to analyse the adoption of online learning in a campus-based learning institutions. The second category used activity theory as a tool to analyse the contradiction between online and face-to-face mode.

The examples of the first category are the studies from Mlitwa (2007) and Rambe (2010). In understanding the application of online learning in higher education, Mlitwa (2007) looked at the adoption of open source software (OSS) in the higher learning institutions while Rambe (2010) looked at the use of social networking, specifically the Facebook in teaching and learning process. Both used the analytical framework of activity theory to derive contradictions from their studies. Mlitwa (2010) revealed his findings that showed some discrepancies between the technology adopted by the institutions and how they were being used by the academics. In the study from Rambe (2010, p. 101), several contradictions from the use of Facebook were raised including 'tensions between lecturers' teaching strategies and student conceptions of learning' and 'dilemma between recruitment of student academic participation on Facebook and prevention of its resentment by uncooperative students'.

The second category is about the online and blended learning research that used activity theory to derive contradictions between online and face-to-face and at the end of the analysis, some interventions are proposed. Examples of this category are from Karasavvidis (2008) and Murphy and Manzanares (2008). Karasavvidis (2008) conducted a study of blended learning that looked at how traditional and online learning were combined. The findings showed that the students only made minimal use of the online resources as they were merely a replication from the traditional practices. However, this was due to the fact that the technologies were not fully utilised. Thus, the researcher felt that there was a need to use theoretical framework that would systematically study the innovation of online technology and chose activity theory in the research. In the study of Murphy and Manzanares (2008), a third-generation Activity Theory perspective was used to gain insight the contradictions between classroom and online learning. Based on Engeström's (2001), these contradictions were used as a source of change to further develop ideas of innovations on how the blended mode could successfully be improved.

There are some critics on the use of activity theory that can be highlighted. Mwanza and Engeström (2005) argued that the use of technology-based approaches in managing content materials in web-based learning do not fully take into consideration the social-cultural and pedagogical aspects of the users. To remedy this, they have produced a metadata standard to structure the content effectively based on activity theory (Mwanza and Engeström, 2005).

Jonassen and Murphy (1999) also used activity theory as a framework to analyse the needs, tasks, and outcomes for designing constructivist learning environments (CLEs). Activity theory which focussed on the interaction of human activity, was able to model the component of an activity system in the CLEs. Brine and Franken (2006) used the analysis of activity theory in evaluating a web-based academic writing course. Activity theory served as a formative evaluation technique to improve students' academic writing through an e-learning system.

2.17 Measuring students' online interaction

From the literature, there are various methods available to analyse online discussion. Corich, et. al. (2005) reviews the literature in analysing an online discussion and highlights Spatariu, et. al. (2004) who used four approaches to the online discussion analysis - the levels of disagreement, argument structure analysis, interaction-based, and content analysis.

Sing and Khine (2006) regarded online interaction as a form of discourse while McConnell (2001) describes online learning as a tool to encourage high students' participation in the forum discussion. As the students' discussion through online learning should lead to the construction of knowledge, the final output of online interaction must reflect the students' understanding of the course content. The transcripts derived from the VLE can be used to trigger discussions during research interviews (McConnell, 2001) and they can also serve as raw data for content analysis.

According to Hara, et. al. (2000), content analysis has been the popular approach used by many researchers analysing online discussions (Henri, 1991; Gunawardena, et. al., 1998, Garrison, et. al., 2000). Corich, et. al. (2005) describe the category of content analysis developed by Henri (1992) and Garrison, et. al. (2001) had been mostly referred by researchers.

2.17.1 Content analysis and coding strategies

Brook & Oliver (2003) stated that the majority of the literature that examines online learning that occurs within an asynchronous discussion has predominantly centred on qualitative content analysis. The preferred content analysis approach varies according to the purpose and the interests of the researchers. Content analysis is a technique that enables the researcher to study human behaviour in an indirect way through an analysis of their communication (Fraenkel and Wallen, 2006) and it is a suitable method used to analyse the transcripts of the online forum discussion generated by the VLE. All discussion on the online forum must be transcribed and coded. Ingram and Hathron (2004) propose several methods for coding the transcripts of online discussions that include arranging the messages chronologically by date and time, dividing each message into statements (ideas), and coding the statements based on the specific characteristics of students' interaction/collaboration. The purpose of the detailed coding is to identify all of the ideas discussed and to determine the pattern of the interaction. However, Ingram and Hathron (2004) warn researchers to analyse the transcripts of the discussions carefully to identify any superficial aspects of interactions. To date, many researchers have attempted to develop coding strategies to account for the different aspects of online interactions (Sing and Khine, 2006).

2.17.2 Models of content analysis

There is an increasing body of literature that is based upon an examination of the contents of the online forum discussion that are based on different models of content analysis – for an overview of these see (De Wever et. al., 2005). Sing and Khine (2006) quote a few well-known models of content analysis such as the five dimension model (Henri, 1982) and the interaction analysis model (Gunawarden, et. al., 1997).

One of the earliest models of content analysis was developed by Henri (1992). The model consists of five dimensions and their categories as shown in table 2.1. The model is intended to help educators understanding comprehensively the learning process that takes place online. The model became the basis for other researchers' models.

Table 2.1: Henri's (1992) model of content analysis

Dimension	Categories
Social statement or part of statement not related to subject matter	Participation levels of participation; types of participation
Implicit interaction: indirect response, Indirect commentary	Interactivity explicit interaction: direct response, direct commentary
Cognitive skills elementary clarification; in-depth clarification; inference; judgment;	Independent statement
Metacognitive knowledge	Application of strategies
Personal; task; strategies; evaluation; planning; regulation; self-awareness	Skills

Another model proposed by Newman, et. al. (1995) focuses on group learning, deep learning and critical thinking (table 2.2). The indicators of critical thinking were developed based on the students' message postings categorised into positive and negative contributions. In a comparative study, Marra, et. al. (2004) developed approximately 40 codes in various categories such as relevance, justification, novelty, and ambiguities.

Table 2.2: Newman, Webb and Cochrane's (1995) model of content analysis

Category	Indicator
Relevance	Relevant states or diversions
Importance	Important points and issues or unimportant points and trivial issues
Novelty, new info, ideas, solutions	New problem related information or repeating what has been said
Bringing outside knowledge or experience to bear on problem	Drawing on personal experience or sticking to prejudice or assumptions
Ambiguities; clarified or confused	Clear statements or confused statements
Linking ideas, interpretation	Linking facts, ideas and notions or repeating information without making inferences or offering an interpretation
Justification	Providing proof or examples or irrelevant or obscuring questions or examples
Critical assessment	Critical assessment or evaluation of own or others' contribution or uncritical acceptance or unreasoned rejection
Practical utility (grounding)	Relate possible solutions to familiar situation or discuss in a vacuum
Width of understanding (complete picture)	Widen discussion or narrow discussion

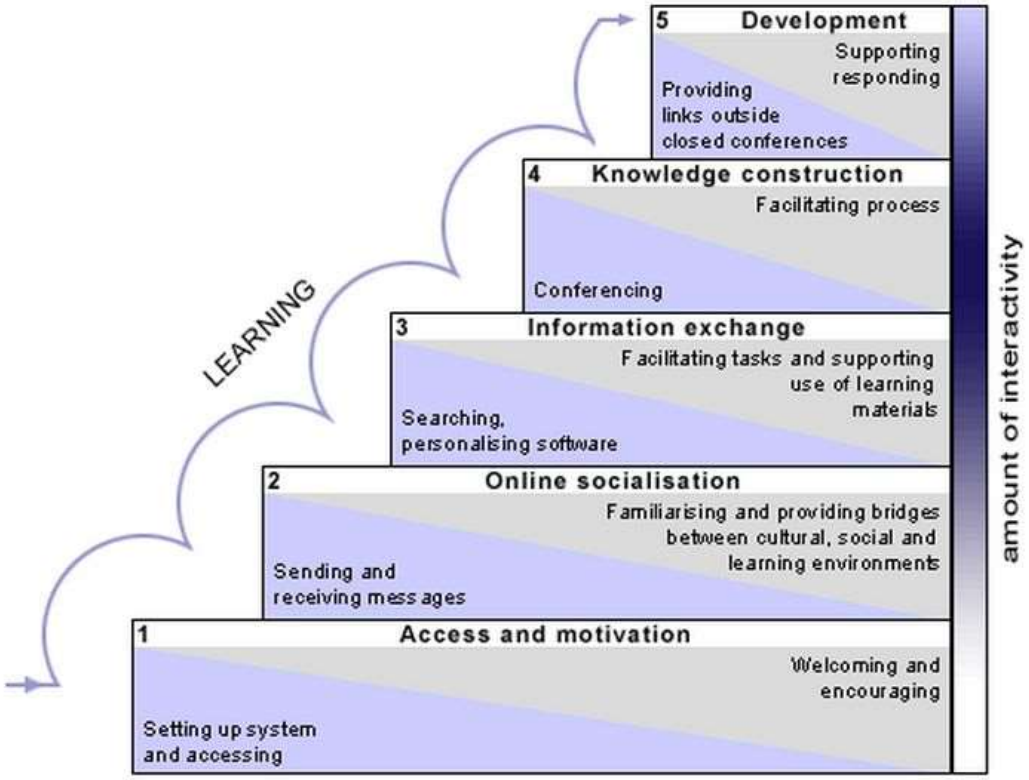
In order to identify how knowledge can be constructed through an online forum, Gunawardena, et. al. (1997) developed an interaction analysis model (table 2.3). The model specifically elaborates the process of co-construction of knowledge through five progressive phases. They are sharing, comparing of information; discovery of dissonance; negotiation of meaning/ co-construction of knowledge; testing and modification of proposed synthesis; agreement/ application of newly constructed meaning. This model had been applied by other researchers, for example Kanuka and Anderson (1998) used the model to analyse an online forum in multi- method evaluation study and transcript analysis of an online forum. Hou and Sung (2008) studied how the model could help them explain the process of knowledge construction that takes place in online discussions before deciding which coding system should be used.

Table 2.3: Gunawardena, Lowe & Anderson's (1997) model of content analysis

	Phase	Operation
1	Sharing / comparing of information	Statement of observation or opinion; statement of agreement between participants
2	Discovery and exploration of dissonance or inconsistency among participants	Identifying areas of disagreement, asking and answering questions to clarify disagreement
3	Negotiation of meaning/co-construction of knowledge	Negotiating meaning of terms and negotiation of the relative weight to be used for various agreement
4	Testing and modification of proposed synthesis or co-construction	Testing the proposed new knowledge against existing cognitive schema, personal experience or other sources
5	Agreement statement(s)/application of newly constructed meaning	Summarizing agreement and metacognitive statements that show new knowledge construction

Another well-known model that has been developed is the five steps model (Salmon, 2003). Originally, Salmon's model is not a content analysis tool. However, it has been used as a tool to measure the online interactions. Initially developed for online education with the Open University, Salmon's (2003) five-step model (table 2.4) portrays five stages of learning. As the structure of the model promotes a constructivist approach to learning, the learners working in a group online are required to progress through each of the five stages. Salmon's five-step model (table 2.4) has been widely used and cited in research to reflect the progressive stages in online learning. For example, Wozniak and Silveria (2004) explore the content of postings made by undergraduate orthopaedic students in an asynchronous discussion using Salmon's conference analysis categories. Smet, et. al. (2008) studied the role of the cross-age peer tutoring in supporting the students in a higher learning institution using a content analysis scheme based on the e-moderating model of Salmon.

Table 2.4: Salmon's Five-Step Interaction Analysis Model



The various models of content analysis highlighted above are meant for analysing online discussions. However, in a blended learning context, the analysis of face-to-face interaction cannot be neglected. The question raised is how to measure the students' interactions in a blended mode which comprise both online and face-to-face that aims to support problem solving. Therefore, these models are not going to be suitable. Analysing online and face-to-face discussions in a blended environment will require some new tools.

2.18 Measuring students' online and face-to-face interaction

In exploring the content of online forum and face-to-face discussions, specific coding schemes are required. There are few examples of research in the literature that analyse both online and face-to-face discussions. One example is by Im and Chee (2006) who conducted a qualitative study on non-Hispanic White cancer patients and elaborated on the detailed coding process for both modes. During face-to-face discussions, the research staff members met every week to discuss several complaints from the non-Hispanic White

cancer patients on their medical health treatment. The memos and written records of the weekly research meetings were transcribed. First, the transcripts were analysed using line-by-line coding and then, the codes were categorised according to the contents. From this categorisation process, Im and Chee (2006) developed the idea categories which referred to the patients' health complaints. The idea categories were discussed face-to-face with the participants once again before they were chosen as the final categories. As for the online discussions, the transcripts were printed directly from the e-learning system. According to Im and Chee (2006), although the computer server could automatically generate the transcripts of their online discussions, the coding of the contents were not always accurate as they had to be verified in another analysis process.

Due to the complexity of interactions in blended learning, De Leng, et. al. (2010) suggest education researchers should analyse both online and face-to-face communication in order to view the whole scenario of what is happening in the blended environment. In their studies, De Leng, et. al. (2010) developed two separate instruments: one for analysing online interaction and another for analysing face-to-face interaction. Both instruments were in alignment with each other.

In the blended context in this thesis, a single instrument that can analyse both online and face-to-face discussions is proposed (see chapter 5). The content analysis will comprise the transcripts of online discussions and reports arising from face-to-face discussions.

2.18.1 Proposing the theoretical framework

Most studies in social science starts with a theoretical framework (Somekh and Lewin, 2005). I had to find out what had been studied so far in the field of blended learning and came up with my own synthesis of the literature. I have to look for gaps in knowledge and identified what problems needed to be solved and what research questions needed to be addressed. According to Sinclair (2007), the process of designing a theoretical framework is developmental and experiential as this is the beginning of the theoretical journey. Grant and Oslando (2014) emphasise the importance of theoretical framework as the foundation from which all knowledge is constructed for a research study. The theoretical framework

also serves as the guideline to philosophically, epistemologically, methodologically, and analytically structure the study. (Grant and Oslando, 2014) The theoretical framework is gradually developed until it becomes more refined. (Sinclair, 2007). According to Sekaran (2000) the theoretical framework of a study is a model that supports a theory of a research work and makes a meaningful sense of the relationships among several factors that considered vital to solve the problem. Well-designed research has a clear theoretical framework that drives the researchers to decide on a methodology for collecting and analysing data (Niederhauser, et. al., 2004).

2.18.2 The socio-cultural perspective

Conole, et. al. (2004) urge online learning researchers to look at their studies in a broader and holistic scope of the socio-cultural framework. The current emergence of blended learning in many tertiary institutions appears to have coincided with a growing awareness of the existence of Cultural-Historical Activity Theory. According to Kaptelinin, et. al. (1995), in searching for a suitable theoretical framework in study that related to human-computer interaction, many educational researchers began to look into the use of an activity theory. The theory was founded on a sociocultural perspective of human development (Leont'ev, 1978; Vygotsky, 1978, 1986; Wertsch, 1991). Engeström (2001) describes activity theory as a framework that has evolved through three generations of research.

2.18.3 The first generation of an activity theory

The historical background of an activity theory started in Russia. After the Russian revolution in 1917, there was a need to develop a new field of psychology based on the philosophy of Marxist. In the 1920's and 1930's several conceptualisations were proposed. One particular group of Soviet psychologists proposed a concept called 'principle of unity and inseparability of consciousness and activity' (Bannon, 1997). Kaptelinin et al. (1999) describe the principle as understanding Human mind through their interaction with the world and this interaction is 'socially and culturally determined'.

This principle was further developed by Lev Vygotsky who introduced the mediational model. Based on a concept of a relationship between stimulus and responses in psychology, Vygotsky (1978) describes the interaction between human and their environment as not direct. Instead, it is mediated by artefacts (signs and tools) (figure 1.5). However, the analysis of the interaction between human and their environment is limited to the focus of an individual.

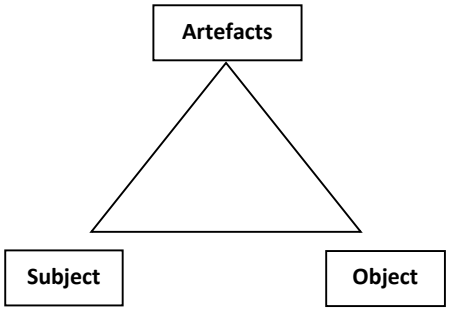


Figure 2.1: The Mediational Model (Vygotsky, 1978)

2.18.4 The second generation of an activity theory

The limitation of an activity theory in the first generation was overcome by the second generation based on Leont'ev's work (1978). Leont'ev (1978) further developed Vygotsky's ideas of social and cultural mediation by adding the concept of human activities. Based on Leont'ev's concept of human activities, Engeström (1987)modified the mediational model and introduced an expanded version called activity theory. This activity theory is widely used as a framework or tool to describe system in an organisation and is also known as an activity system. Engeström (1999) further emphasises that the focus of the study of mediation should involve other components within an activity system.

2.18.4.1 An activity system

An Activity system consists of seven main components – subject, instruments, object, community, rules, division of labour and outcome. The extended Activity System developed by Engstrom (1987) is used to understand the organisation, describe the activities taking place, and focus on the evaluation on specific issues (figure 1.6)

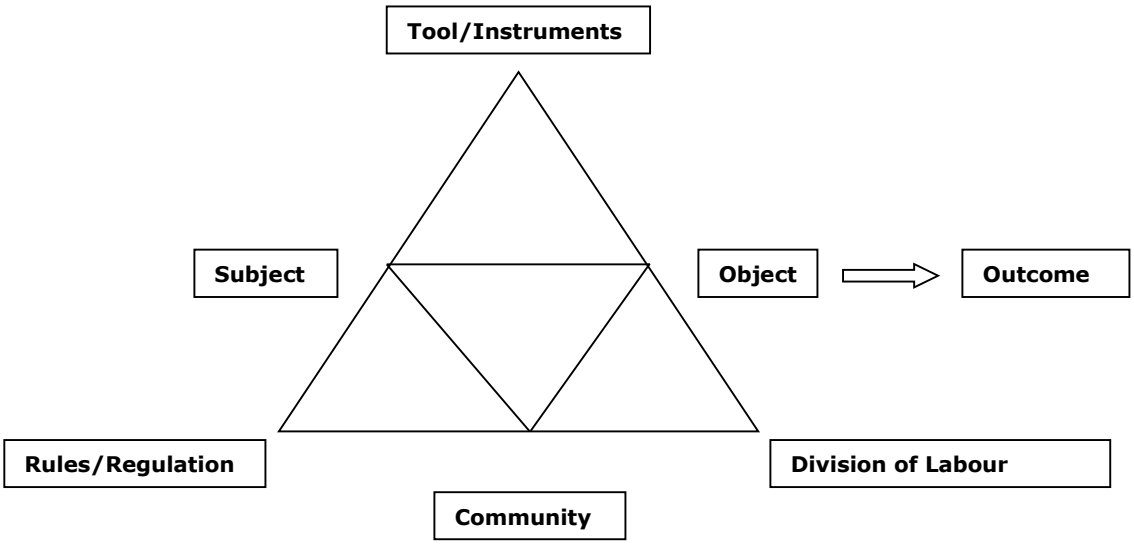


Figure 2.2: An activity system (Engestrom, 1987)

There are three inter-related connections between the element of the subject, the object and the community. The relationship between the subject and object is mediated by tools, while the relationship between subject and community is mediated by rules. The relationship between the object and the community is mediated by the division of labour. The tool is used in the transformation process. The rules are referred to as explicit and implicit social norms, behavioural conventions and accepted social values within a community. The explicit and implicit organisation of labour within community is described by the element of the division of labour. This is related to the transformation process of the object into the outcome. Eventually, the influence of the division of labour will transform the object to become intended outcomes.

2.18.4.2 Activity Theory and Sub-triangles

According to Jenlink (2001), an educational theorist who emphasises the importance of human activity systems, activity theory consists of three triangles (see figure 1.7). The activity theory is based on "a relational dynamic between the subject, object, mediational artefacts (or tools) sociocultural rules, division of labour, and community of structure of a human activity system" (Jenlink, 2001, pp. 348).

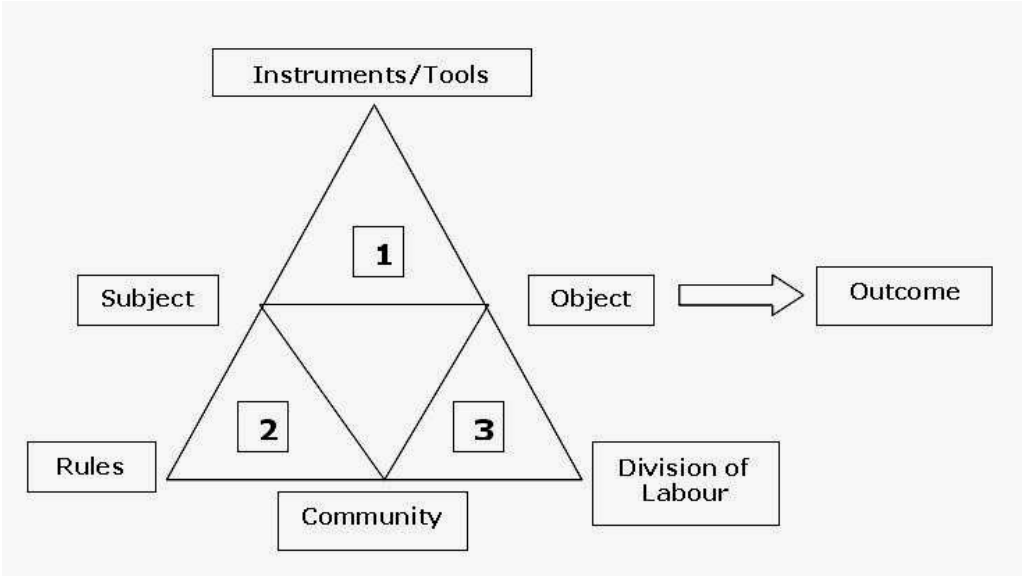


Figure 2.3: An activity system that consists of three sub-triangles within a single triangle as formed by Jenlink (2001).

The first sub-triangle features the relationship between the subject, instruments and the object. The subject is referred to as a person who is associated with the activity created by the organisation. The second sub-triangle shows an interrelated element of the activity system. This element depicts the relationship between the subject(s), the socio-cultural rules of the community (related to the object, goal, and outcome) and the designated community made apparent. The third sub-triangle portrays the relationship between the object(s) or intentioned outcomes(s), the community that the subject is involved, and the division of labour that related to the particular activity.

The three sub-triangles are connected with each other to form a framework for analysing and designing human activity systems such as educational systems. (Jenlink, 2001). Today, the development of activity theory as a framework is to understand activity in a human system which focuses mainly on the interaction among and between people. Jenlink (2001) adds that activity systems are "complex interrelated sets of actions and activities or practices, situated within socio-historical and socio-cultural contexts" (p. 348).

2.18.4.3 The application of activity system in educational research

Many international researchers across various disciplines have adopted the use of activity theory. Activity theory has been widely applied into various educational fields such as understanding language, learning mathematics, and developing systems of Computer-Supported Collaborative Learning (CSCL) features. Activity theory has been extended to understanding learning within work teams (Sandars, 2005). From the perspective of activity system, team working can be viewed from two aspects. First, it is the emphasis on interactions among the students and teachers in the process of teaching and learning. Second, the interacting relationship among stakeholders in tertiary institution is defined as academicians, researchers and administrators.

In terms of teaching and learning, working in teams means interactions among members in the online learning community. Activity theory emphasises the relationship between interactions among the students and the tutor, the processes of the collaboration through activities and the outcomes from the collaboration efforts. In discussing the activities, Mwanza (2002) outlines eight parameters which comprise activity of interest; objective; subjects; tools; rules and regulations; division of labour; community and outcome. These parameters do not just concentrate on the process of teaching and learning but encompass the institutions that promote on-line learning.

2.18.5 The third generation of an activity theory

In relation to Leont'ev's conceptions of an activity theory of the second generation, Engeström (1999) agrees that the tools or artefacts which are used by human as mediation to interact with the environment within an activity system. However, the study of mediation could be extended to other components from another activity system. According to Engeström (1999), two activity systems could be joined together as the unit for analysis and this forms the basis for the third generation of an activity theory.

Based on Engeström's analysis, Uden, et. al. (2008) further explain that the structure of the social world is experiencing the process of social transformation through the conflicts in the social practice. These conflicts are referred to the instability and contradictions which act as the motive force of change and development. This would lead to the reorganisation within and between activity systems and is considered as parts of the evolution. Thus, the aim of the third generation of activity theory is to understand various different dialogues and perspectives in the interacting activity systems.

2.18.6 Applying the third generation of activity theory

The main research focus in this thesis is related to the study in human-computer interactions (HCI). Through the use of VLE which was widely and easily available on the market, many tertiary institutions have combined online learning with classroom learning. In analysing both learning with the perspective of activity system, the main challenge raised is the complexity of the learning activities which involves both the technology and the traditional classroom setting. Therefore, the third generation of activity system as proposed by Engestrom (1999) is able to provide explanations to unravel the complexity. The third generation of activity theory incorporates two or more interacting activity systems. Each activity system will represent each type of learning.

Based on figure 2.4, the third generation of Activity Theory can be used in blended learning research. The first Activity System can be used to analyse classroom activities while the second Activity System can be set to analyse online activities. With the teachers' reflections on blended learning, the contradictions could be derived from both activity systems.

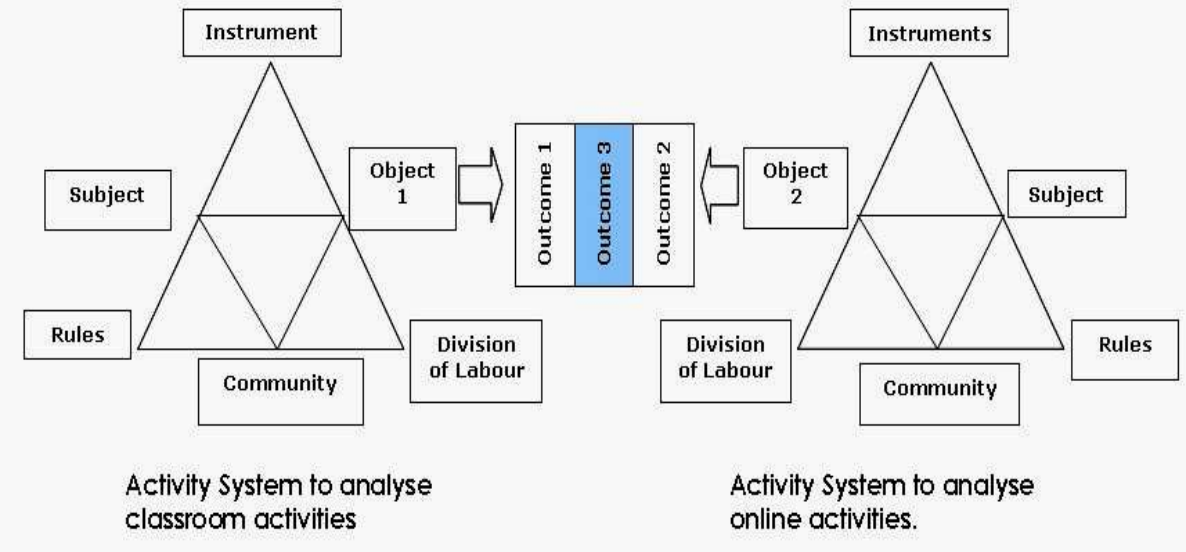


Figure 2.4: The third generation activity system - adapted from Engestrom (1999)

Activity theory was originally developed based on Vygotsky's social constructivist theory of learning. Starting with the premise that activities occur within a context, it is important to 'make meaning of the situation and appropriate interpretation of the results' (Dyke et. al, 2007 p. 92). Thus, constructivist learning environments stressed the development of long-term understanding through meaningful contexts and interactions that reflected how knowledge was developed and used in the real world.

According to Nardi (1996), activity theory was increasingly popular in the study of Human-Computer-Interaction (HCI). It was an appropriate framework to understand and to describe the learning experience of students and teachers in a learning setting that uses technology. Activity theory also provided a broad view of the system in which activity and learning were taking place. Activity theory has been used mainly to understand the design of computer information system and design of Computer-Supported-Collaborative Learning (CSCL), but it has been applied to understanding learning within team work (Morrison, 2003).

According to Sandars (2005), activity theory has been referred to by many researchers across disciplines as a framework to explain and interpret various online learning research. It is originated from Vygotsky's concepts of mediated action and explained in key terms of internalisation, mediation, subject, object, tool, transformation (process), rules, community, division of labour, and outcome (Engestrom, 1987).

Next, it is important to consider the use of the activity theory in formulating the theoretical framework.

2.18.7 The constructive alignment

As part of developing the theoretical framework, a concept called ‘constructive alignment’ is included. The term constructive alignment is derived from Biggs (1999) who defines it as a good teaching system that ‘aligns teaching method and assessment to the learning activities stated in the objectives, so that all aspects of this system are in accord in supporting appropriate student learning’ (p.11). In the context of this blended learning research, I provide an explanation on how the constructive alignment is adapted.

The main objective of a blended learning course is to enable students working in a blended mode. They should successfully construct knowledge through interactions in classroom and online activities and this is the intended learning outcomes. Thus, the constructive aspect refers to students learning which is to construct meaning through online and classroom activities.

In order to know whether the students have achieved the learning outcomes, it is important to measure their learning through appropriate assessment such as peer evaluation (team working) and evaluation on their online and face-to-face activities (working in a blended mode). There are two types of alignments. The first alignment as suggested by Biggs (1999) refers to the teaching method used which is to support the blended learning activities and to achieve the indented learning outcomes. From the third generation of activity theory, one activity system represents the classroom learning while the other represents online learning. As classroom activities should complement online activities, the second alignment is used to align the two interacting activity systems. Thus, constructive alignment becomes an integral *part* of the theoretical framework.

2.18.8 The integration of the third generation of activity theory and the constructive alignment

Referring to the third generation of activity theory, the first three sub-triangles represent the classroom learning while the second three sub-triangles represent online learning. The concept of constructive alignment is used to align both classroom activities and online activities so that the three sub-triangles which represent the classroom learning are made interacting with another three sub-triangles that illustrate the online learning. In other words, the concept of constructive alignment is used to construct the online activities and classroom activities to complement each other and consistent with the objective of the course. Both activities are also intended to achieve the same learning outcomes. Since the concept of activity alignment has never been conducted before, I suggested the terms of my theoretical framework as the Third Generation of Aligned Activity System (figure 1.9).

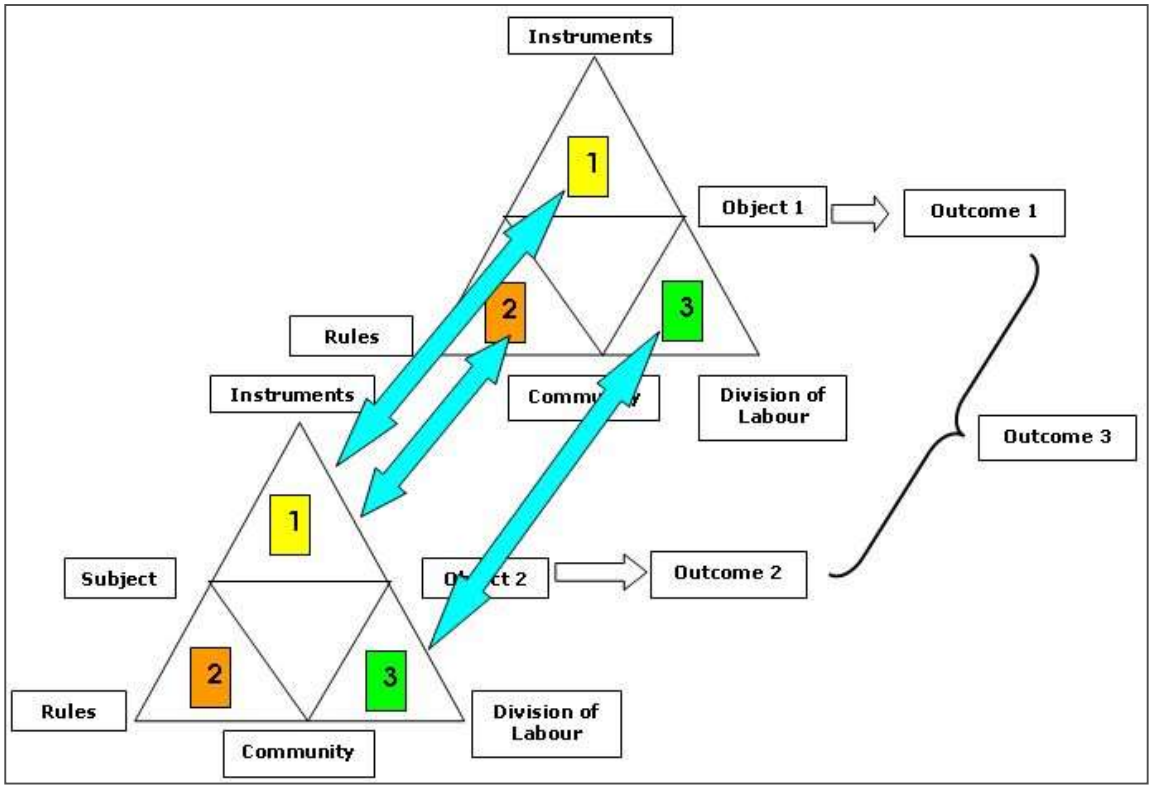


Figure 2.5: The formation of the third generation of an aligned activity system.

2.19 Conclusion

The literature review looks at the fundamental conflicts between quantitative and qualitative approach in the online learning research. The previous studies from both approaches are also highlighted. Although quantitative approach emphasises on the scientific method, it has received some criticism. Based on the suggestion by McPherson and Nunes (2004), a case study of an action research is proposed for this thesis. The literature reviews also looks at the suitable combination of the delivery methods for the best blend of the classroom and online learning in tertiary institutions. For the teachers, they must be proficient in online learning system so that they could take advantage of the best aspects from both learning settings. Both the institutions and the teachers must manage and utilise this online technology skilfully to ensure a university's long-term competitive advantage (Picciano, 2006).

Chapter 3

Methodology: The Action Research Approach

3.1 Introduction

This chapter explains the methodologies of action research and case study situated within qualitative research paradigm. It also explains the fundamental features of action research discussed and explored from the concepts of epistemology and ontology. The various methods to collect data from the qualitative perspective are discussed. Based on action research methodology, a conceptual framework is developed.

3.2 Choosing case study

When the focus and the conclusions are drawn intensely at a particular group in a specific setting, it matches the case study approach. According to Marshall and Rossman (1999), case study research focuses on a single case and provides a much richer content and description of the phenomena being studied.

According to Thomas (2011), case study research has been a popular approach among many qualitative researchers. However, a case study is becoming more difficult to understand because some researchers regard it as a method while others define it as methodology. Stake (1995) does not recognise case study as a method but instead as "an object of choice with regard to the particularity to be studies" (Hamilton and Corbett-Whittier, 2013, p. 8).

Denzin and Lincoln (2011) acknowledge that experienced qualitative researchers have classified case study research as a stand-alone qualitative approach. From a perspective of methodology, case study is described as a researcher who wants to learn more about a specific issue or to explore a particular problem or occurrence. Thomas (2011) divides case study into two popular approaches in qualitative research. The first one were approaches from Stake (1995) and Merriam (2009) situated in social constructivist paradigm whereas the second approach is by Yin (2012) and Eisenhardt (1989) from a post-positivist approach.

Hamilton and Corbett-Whittier (2013) refer to the definition of case study by Merriam (1988) who focused on the end product. According to Merriam (1988), a qualitative case study is "an intense, holistic description and analysis of a single instance, phenomena or social unit" (p 27). After 10 years, she revised her definition of case study by focussing on the case rather that the outcome (Hamilton and Corbett-Whittier, 2013). She agrees with Smith (1978) and Stake (1995) who defines the "case" in the case study as a bounded unit.

Merriam (1998) further describes case study consists of three types – particularistic, descriptive and heuristic. Particularistic studies a specific event or phenomenon. Descriptive case study focuses on thick description of whatever being researched. Thick description is referred to as "the complete, literal, description of the entity being investigated (Merriam, 1998, p.29). Descriptive case study is usually a longitudinal process with various variables affect each other. Heuristic case study focuses on increasing understanding of the case. Descriptive case study is the suitable choice for this research.

The most common critique of the case study approach is that the research context is so specialised and specific, and as a result, generalisability of findings could not be achieved. In contrast, my perspective would be that the outcomes of what happen in my learning institution can lead to recommendations for future practice.

3.3 Choosing action research

Generally, a researcher-cum-teacher has the desire to better understand how an educational setting he is currently involved could improve his practices. In blended learning context, I felt the need to develop a greater understanding of students' thoughts and actions working in blended mode. I also felt the need to develop a deeper understanding of how blended learning environment could improve students' learning. I wanted to explore how my instruction could be enhanced through blended learning but I was not sure where to start. I wanted to examine whether my theoretical beliefs could

relate to my instructional practices. Thus, action research is the most appropriate methodology as it is designed to change the current educational situation for the better. It also helps to introduce a new type of learning practice that is more useful than the previous one.

Both action research and case study approach have their strengths and limitations. However, there is a possibility to combine both methodologies. According to McManners (2016), a variant of the methodology could be developed that combined the practice-based enquiry of action research with case study analysis. The researcher must be guided by his research focus, research questions and by the research methodology publications he consults (McManners, 2016).

3.4 The brief history of action research

Historically, action research is considered as cyclical in nature (Mertler & Charles, 2008). The processes of cyclic, participative and reflective have various definitions of an action research (Dick, 1993). Although action research has a clear beginning, the endpoint is not necessarily clear. If and where appropriate, teacher-researchers may skip research one or more steps, rearrange their order, or repeat some steps more than once (Johnson, 2008). According to Johnson (2008), the steps are only meant to serve as guidelines in conducting action research projects. Calhoun (1993) notes that action research is and will remain a powerful tool for improving the practice of an organisation. Action research could be employed in a wide range of methodologies. When a teacher conducts an action research, the results should be meaningful and important to that teacher (Parsons & Brown, 2002). Thus, the focus of the methodology of this thesis is on the action research.

Many writers acknowledge Kurt Lewin as the earliest researcher who originated the term of action research through his socio-technical experiments started at the Tavistock Institute. Lewin's other research was related to social democracy and organisational change in the 1940s and 1950s. Action research did not originally start in the field of education. The term was used within electrical engineering and Lewin applied it to the behavioural sciences. According to Somekh and Lewin (2005), action research had been

developed in the USA, UK and Australia at their own pace. Action research in the USA prospered in the 1950s but eventually declined due to the criticism from the researchers. In the UK, action research declined in the 1960s due to the emergence of the research and development (R&D) model (Elliot, 1997). However, the action research re-appeared and was first adopted in education following the Stenhouse's Humanities Project (Stenhouse, 1975) and Elliot's Ford Teaching Project during the 1970s (Elliot, 2001). It gained significant foothold in education which closely linked with the idea of teacher as researcher advocated by Stenhouse (1975). In Australia, Kemmis and McTaggart (1986) promoted its use.

3.5 Criticisms on action research

The acceptance of action research, also known as participatory research, was never easy at the early stage. Frideres (1992), for example, expressed some scathing criticisms about action research. First, it promotes ideological bias. Action research is bias when it is conducted by interested parties especially those with political interests. It is also bias in gathering and analysis the data as well. Second, action research does not have systematic evaluation. McNiff (1988) criticised the research process in action research as being unorganised. Third, as action research focuses on a single case, its findings cannot be generalised (Frideres, 1992). However, the worst criticism about the action research was when positivism researchers questioned the validity of the research process (Finlay, 2006). In response to this, Finlay (2006) not only rejected the validity concept, she also contested the ideas of reliability and generalisability in quantitative approach. Finlay referred to Lincoln and Guba (1985) who replaced the term internal validity with credibility, external validity with transferability, reliability with dependability, and objectively with conformability. In the following sections, action research from the perspective of research paradigm was further discussed

3.6 Determining action research in research paradigm

Action research is a research paradigm which provides opportunities for the researchers to develop knowledge and understanding as part of their practice. However, there is a continuing debate on the nature of action research whether it should take a qualitative or a quantitative approach. This issue is discussed extensively from the perspective of a research paradigm in the following section.

3.6.1 Paradigm

Paradigm comes from the Greek “paradeiknyai” which means a pattern or example of something. Cohen, et. al. (2000) defines a paradigm as a basic understanding to interpret the social reality. For Burrell and Morgan (1979), a paradigm is used to “view the world in a particular way" (pp. 24). Willis (2007) provides a definition of a paradigm as “a comprehensive belief system, world view, or framework that guides research and practice in a field” (pp. 8). In brief, a paradigm is referred as a broad framework of the researchers’ perceptions, comprehensions, beliefs and values within which theories and practices are inter-related. A paradigm helps the researcher to reflect their beliefs in their research designs on how the data are to be collected and analysed, and how the research outcomes are presented. Through the recognition of their own paradigm, researchers can identify their roles in the research process and develop their research projects.

According to Willis (2007), the exact number of paradigms and the names associated with a particular paradigm vary from author to author. Generally, there are three basic research paradigms: positivism, interpretivism and critical science (Smith, 1989; Guba, 1990; Greene, et. al., 2001). Positivism is the scientific approach often referred to quantitative methodology. In contrast, interpretivism which is often referred to as qualitative methodology, seeks to understand the meanings of the social world through the exploration of the richness, depth, and complexity of phenomena. Strauss and Corbin (1990) broadly define qualitative research as "any kind of research that produces findings not arrived at by means of statistical procedures or other means of quantification" (pp. 17). Critical science explores the social world, looks at the functions of the society and

tries to address the imbalances of the social inequities. Comstock (1982) suggests that within this paradigm, individuals take actions to change injustices.

In social science research, positivism (quantitative) and interpretivism (qualitative) are the two main competing paradigms. This has brought about the quantitative versus qualitative debate. According to Guba and Lincoln (1994), scientific research has been dominated by the quantitative approach which uses mathematic formulas to quantify hypotheses so as to control and predict the natural phenomena. However, in social phenomena, non-numerical data are interpreted using qualitative techniques that shed light on the meaning of human behaviour (Guba and Lincoln, 1994).

3.6.2 The philosophical research

At the philosophical level, each research paradigm has its own ontological and epistemological characteristics. Grix (2002) emphasises the importance of having a clear and transparent knowledge of the ontological and epistemological assumptions in order to comprehend the inter-dependent of the key components of research. Therefore, it is vital for researchers to derive their own epistemological and ontological perspectives that will legitimate their specific way of conducting research and determine their findings as a valid contribution to knowledge and theory (Peter and Olsen, 1983). Willis (2007) further explains in detail that both terms of ontology and epistemology are "the two major aspects of a branch of philosophy called metaphysics" (pp. 9).

3.6.2.1 Ontology

Metaphysics is related to the two fundamental questions. First, "what are the characteristics of existence?" Or, in other words, "what are the characteristics of things that exist?" Or "what are the universal characteristics of things that exist?" (Willis, 2007) These are the ontological questions. Thus, ontology refers to the nature of social entities and social reality (Bryman, 2004; Willis, 2007). Grix (2002) further adds "if ontology is about what we may know, then epistemology is about how we come to know what we know" (pp. 177).

3.6.2.2 Epistemology

The second aspect of metaphysics poses the following epistemological questions: “What is the relationship between the knower and what is known?” “How do we know what we know?” “What counts as knowledge?” (Krauss, 2005).Trochim (2000) briefly describes epistemology as the philosophy of knowledge or how we come to know. It also means the nature of knowing and construction of knowledge. According to Bryman (2004), epistemology looks at the “question of whether the social world can and should be studied according to the same principles, procedures, and ethos as the natural sciences” (pp. 11). This epistemology is divided into two stances: positivist and non-positivist. The positivist (positivism) is related to quantitative approach while the non-positivist (interpretivism) is related to the qualitative approach. According to Krauss (2005), “epistemology addresses how we come to know that reality while methodology identifies the particular practices used to attain knowledge of it”. (pp. 758-759)

3.6.3 My research perspective

Having discussed the two fundamental considerations of ontology and epistemology, I arrive at my research perspective in determining what constitutes knowledge, how knowledge is generated and what research approach I should take. As I strongly believe that knowledge is constantly constructed by students and teacher, the process of knowledge creation is dynamic. It involves a continuous process of making meanings about the ever-changing world around us. It has a direct or indirect influence on our values and beliefs that eventually become part of the social reality.

In the context of this study, teachers are not solely to be held responsible for developing teaching practice. It must consider both the students' and teachers' experiences working in a blended mode. This will also encourage reflective practice from the students so that the teacher learns to modify his teaching practice continually in order to improve it. As action research is fundamentally about change, it suits this study. According to Coghlan and Brannick (2005), action research helps researchers to understand, plan and implement the change in groups, organisations and communities. Furthermore, action researchers do not only observe something happen but are actively working at making it happen as they are

immersed in the research setting. The focus is on knowledge in action where the knowledge is contextually embedded through data interpretation (Coghlan and Brannick, 2005). Thus, action research consists of a family of research methodologies aims at pursuing action and research outcomes concurrently. This is the ontology position that I make.

Although quantitative research is seen as the dominant paradigm in many areas of the social sciences (Willis, 2007), the choice of action research for the study of blended learning should not take the approach of hypothesis-testing. Neither it is considered as the scientific method that provides data on teaching and arrives at precise conclusions. In quantitative approach, the data analysis which is based on logical reasoning produce certain generalisations. However, the complexity of educational phenomena namely in the study of online learning research poses a challenge to construct these generalisations. The significant feature of an action research in this thesis should be in qualitative approach. This is my epistemology stance. Furthermore, undertaking an action research will engage researchers in their own review of these philosophical issues. Researchers of action research do not have to justify their selves in comparison to other approaches. They are engaged in their own reviews and evaluated within their own frame of reference. According to Coghlan and Brannick (2005), as action research focuses on knowledge in action, where "the knowledge created is particular, situational and out of praxis" (pp. 7).

3.6.4 Praxis

The word praxis is from Greek which originally meant the art of acting upon the conditions one faces in order to change them (O'Brien, 2001). Taylor and Wallace (1996) describe praxis as "the way in which the researcher attempts to take deliberate action towards changing practice" (pp. 1). However, changing practice is not the only concern as it relates to the theory. According to Zuber-Skerritt (2001), this is another problem in social science where theory may be viewed as separate form practice. In other words, theory and practice are seen as dichotomous. According to Elliot (1991), the 'theory' construct has two implications on teachers "first, it implies remoteness from their professional

knowledge/experience" (p47) and "second, it implies a threat to their professional knowledge and status from the academic community" (p47).

This raises the issue of theory-practice divide. In cutting across this divide, Zuber-Skerritt (2001) suggest developing the dialectical relationship of theory and practice as praxis in action research. For Somekh and Lewin (2005), action research addresses the problem of the division between theory and practice. This would encourage a practitioner to consider both theory and practice as part of a single entity. According to Elliot (1991), through action research, theories are not validated separately but instead, "they are validated through practice" (pp. 69). Somekh and Lewin (2005) further explain that knowledge is not produced through a linear process. Instead, research knowledge is constructed through a cyclic process and integrated with the development of practice. These existing practices could be improved and elements for change could be identified. Likewise, Elliot (1991) also explains that action research could mainly be used to improve practice rather than to reproduce knowledge. "The production and utilisation of knowledge is subordinate to and conditioned by this practice improvement". (Elliot, 1991, pp. 49). Thus, praxis ties my ontology position to my epistemology approach

3.7 Situating the blended learning study in a research paradigm of praxis

Through the idea of reflective practitioner, Rolfe (2000) relates the method of action research to praxis. Thus, in building research methods for blended learning, I must note that both knowledge and practice are equally important and interdependent. My research on blended learning constituted as a new knowledge when the practice of combining classroom and online activities are framed through praxis. So, it is moving from *knowledge* to *practice.* However, developing the interventions to improve blended activities is informed by the research questions which are derived from the theoretical framework (4.20). Inversely, it is moving from *practice* to *knowledge*. Therefore, it is an on-going process of an action research where a paradigm of praxis is employed.

In the context of this thesis, the theoretical framework introduced in chapter 2, represents the theory while the teaching strategies in a blended mode represent the practice. However, this practice has to be translated into an action research framework that focuses on the 'process' of how the blended strategies are developed.

3.8 The definitions of action research

There are many definitions of action research in the literature. For Elliot (1991), action research is defined as "the study of a social situation with a view to improving the quality of action within it" (p. 69). Zuber-Skerritt (2001) defines action research as "a cyclical iterative process of action and reflection on and in action" (pp. 2). Thus, action research is more "systematic, rigorous, scrutinisable, and verifiable", and most importantly, it is always "made public (in publications or written reports)" (pp. 2) (Zuber-Skerritt, 2001).

3.9 The fundamental elements of an action research

In qualifying the practice of conducting blended learning as a research, the study must be undertaken with a research attitude. The evaluation studies (chapter 4) should provide me with a platform and questions to propose a more systematic approach to making pedagogic decisions about blended learning. Some of the important features derived from the evaluation studies prior to the study in this thesis are iterative, cyclic and participative. Each feature is discussed below.

3.9.1 Iterative

Being iterative means repeating an action. In the context of blended learning, the action refers to the practice of teaching the students with the combination of online and classroom activities in a blended environment. Each teaching strategy is diagnosed and from here the researcher builds up their understanding further. Then, the teaching strategies could be developed bit by bit as the researcher gradually understands the best approach to teach in blended mode. It is a deliberate process in which the teaching practice are maximised. At the same time, the research process can also be reflected up and be further refined and understood. This helps to gradually understand how best to conduct a study of blended learning.

3.9.2 Cyclic

The description of action research operating in cycle or as a spiral was first acknowledged by Kurt Lewin. According to Lewin (1948), action research comprises a spiral of stages about action and planning. Lewin's action research spiral advocates the following basic stages: (1) identifying a general idea, (2) planning the action, (3) implementing the action (4) evaluating the action (5) revising the action and (6) planning and implementing the second action.

Since then, a variety of forms of action research have evolved. Different action researchers arrange the stages differently. For examples, Kemmis and McTaggart (1988) describe each cycle as consisting of the plan, act, observe and reflect (see figure 4.1). The experiences gained from the initial cycle informed the development of the action plans for the subsequent cycle. These action plans can be revised when the research process is repeated.

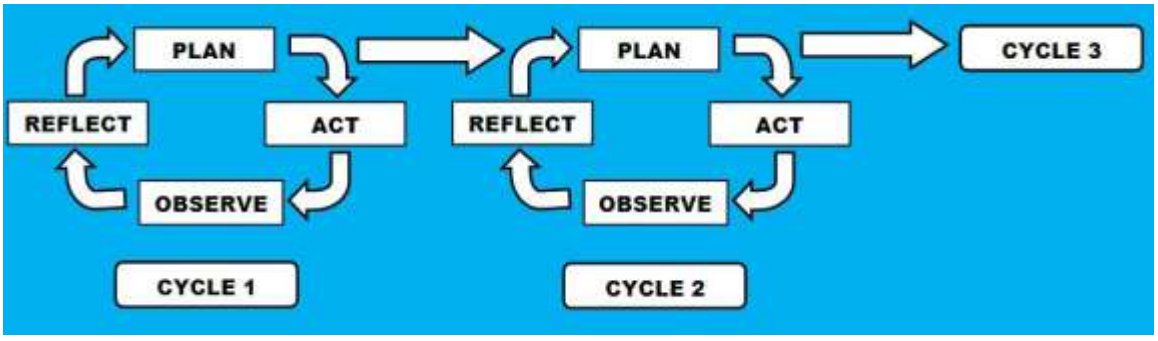


Figure 3.1: The iterative and cyclic nature of an action research based on Kemmis and McTaggart (1988)

The description of the cyclic process from Kemmis and McTaggart has some similarities with the experiential learning cycle by David Kolb (1986). Kolb (1986) outlines learning process in the following steps: (1) concrete experience, (2) reflective observation, (3) abstract generalisation and (4) active experimentation. From these steps, Kolb (1986) explains that knowledge is created through critical reflection based on one's own action and experiences which leads to the formation of abstract concepts. Then, these concepts are applied and tested in the new environment in order to see its implications.

Because of this iterative and cyclic process, action research becomes flexible. Coghlan and Brannick (2005) describe the sequence of events in action research as consisting of the iterative cycles of collecting data, returning to the method, analysing the data, planning the action, evaluating the action, and determining further data gathering. At every event or step, something new could be learned. The teaching strategies that have been planned could be revised and re-developed. According to McKay and Marshall (2001), a precise research methodology is developed later as the research process is further revised gradually over time. Thus, both the data gathering technique and the data analysis could be planned and revised concurrently. This is the reason why action research is considered as an emergent methodology. If a cyclic process occurs in any steps within one particular cycle, action research could be conceptualised to consist of cycles within cycles.

For Gummesson (2000), the cyclic process is termed as 'hermeneutic spiral" which describes each new cycle that is developed as being based on the feedback and understanding of the previous one. However, McTaggart (1996) warned that the spiral nature of action research should not be regarded as a procedure or a method. Instead, it should be viewed as "a series of commitments to observe and problematise through practice a series of principles for conducting social enquiry" (pp. 248). Although the cycle in all action research models represents the systematic research process, it does not necessarily produce the same outcomes. This is because in reality, the research environment is complex and challenging.

3.9.3 Participative

In general, action research is considered participative as it involved the researcher and the participants in the research setting.

3.9.3.1 The action researcher

According to Calhoun (1993), there are different types of action research. First, there is an individual action research in which an individual researcher works on refining their own his strategies and practices. Second, there is collaborative action research where a group of researchers work collaboratively on the data they have gathered and identify the challenges before starting on their research. Third, there is a schoolwide action research where the research involves the entire faculty members in improving the organisation.

Whitehead (1985) has emphasised the individual nature of action research where the reflections derived from practice are based on the strong intentions, values and beliefs of the researcher. These elements are "intensely" personal. In contrast, Elliot (1991) claims that working collaboratively on action research is the best method as it involves a group of researcher in exploring and challenging the constraints of their professional undertakings.

In the context of the blended learning research in this thesis, the study takes the approach of an individual researcher. Calhoun's (1993) detailed descriptions of the features of the individual type of action research map against the features of the current research and these are as follows:

3.9.3.2 The participant

The participants who involved in the research setting are called informants (Neuman, 2003). The extent of participation by informant in action research can vary. The informants usually work closely with the researcher. However, when the researcher keeps separate roles from the informants for some reason, the participation becomes limited. Reason and Bradbury (2008) introduce the concept of stakeholder where the role of the participant is not only as an informant but could become a co-researcher. This is because

of the fact that the participant has a stake in the situation being researched. A deeper participation can increase the diversity of data that can lead to enhance understanding (Reason and Bradbury, 2008). Thus, action researcher should seek higher level of participation from the informants.

However, from the aspect of ethics, researcher cannot make use of the informants but respect them as a person. In order not to put the informant or research subject at a disadvantage, Kiegelmann (1986) suggest that research agenda must be disclosed. However, the confidentiality of the informant in the research must be protected. The question of confidentiality is related to informed consent and informed consent is a key issue in research with human being. In this research context, the researcher is a teacher who actively involved in the research setting. According to Mohr (1996), teacher as researcher is doubly bound to ethical behaviour and codes of ethics. This is further discussed in section 3.13 and 3.14.

3.9.4 Reflective

In spite of a variety of action research models (section 3.7), these different versions could be summarised as two fundamental cycles which alternate between action and critical reflection (Dick, 2002). It is the process of reflection that the researcher analyses what has happened and plans for the next course of action. Therefore, it helps the researcher to understand their existing knowledge in response to their experiences with the people in their learning environment within their pedagogical practices. Bain, et. al. (2002) describes reflection as "an intrinsically good and desirable aspect of professional development". (pp. 10).

Willis (2007) introduces the strategy of reflective notes where the researcher thinks about the issues and problems as they teach the course. He then uses these reflections to plan for future action. Willis (2007) refers to Schon's (1987) concepts of reflective practice which describes two types of reflections: reflection in action and reflection on action. Reflection in action takes place when a researcher needs to make a decision during practice and cannot find solutions to a unique problem based on the standard rules and thus, has to refer

to their professional experience to decide on the appropriate action at that point in time. As for the reflection on action, the researcher thinks through a past experience to develop a deeper understanding of practice.

3.10 Preparation for action researcher

According to Calhoun (1993), action research could be carried out by an individual teacher. Obviously, the focus of the project is determined by the researcher himself as a teacher and practitioner. Educational action research can also be conducted by a collaborative group of colleagues who share an interest in a common problem, or by the entire faculty of a school (Sagor, 2005).

3.11 The teacher as a participant observer

As an action researcher, I am directly involved in the research setting. As a teacher, I have to spend considerable time teaching the class throughout the whole academic semester and observe the process as it occurs. When I meet the students regularly inside and outside the classroom, observe their online communication through e-learning regularly, and constantly communicate with them face-to-face or online, my role is considered as participant as observer. According to Bryman (2004), participants and observers are "fully functioning members of the social setting, but members of the social setting are aware of the researcher's status as a researcher" (pp. 101). However, there is a phenomenon called "Heisenberg effect" where the presence of the researcher could change the behaviour of the students he is studying (Bogdan and Biklen, 2003). As the students in this research setting are used to evaluations, conversations with them were designed to support their learning. The research was intentionally designed to change their behaviours. Therefore, this phenomenon is less of an issue. However, the "Hawthorne effect" may be more relevant in this study. Gay (1996) describes it as "a situation in which subjects' behaviour is affected not by the treatment per se, but by their knowledge of participation in the study" (p. 356). It could mean the tendency of the students and the participant observer who are making extra efforts to ensure the research to be successful. This is also discussed in section 5.5.3.

The following section describes how the action research was planned and conducted.

3.12 Planning the conduct of action research

Conducting action research could range from a whole academic semester to one year academic calendar and through an extensive period of testing and refinement of the interventions. Prior to initiating a full-scale actual study, two "pre-studies" with trial procedures were conducted. This is to maximise the possibility that the actual study which consists of the first and second cycle would be conducted successfully.

3.13 Conducting preliminary study and reconnaissance phase

Smith, et al (2015) suggests two kinds of "pre-studies" or investigations – the preliminary study and reconnaissance phase. The preliminary study suggests that a researcher needs to develop specific aspects of procedures in order to facilitate the conduct of the research. Once the preliminary study has been conducted, the reconnaissance phase is carried out. Smith, et al (2015) warn that a reconnaissance phase has to be carefully planned to ensure that the topic is sufficiently focused. In an action research qualitative study, the pilot study is referred to as the reconnaissance phase.

3.13.1 Preliminary study

The first step is to decide the topic of the study. However, a topic for action research must be manageable (Fraenkel & Wallen, 2003). In this thesis, the preliminary study is the evaluation study conducted in three consecutive semesters. This was explained in details in chapter 4. The purpose is to estimate the size of the study, identify sample of participants, and to propose the suitable research instruments. These research instruments were proposed as a result of the proposed interventions based on the theoretical framework of third generation of an aligned activity system.

3.13.1.1 Collecting data

The decisions to collect and analyse data depends primarily on the type of research approach adopted by the researcher, whether it is quantitative or qualitative. In traditional quantitative approach, data analysis takes place after the completion of data collection. In traditional qualitative approach, data analysis occurs during data collection and it can still continue throughout the process of collecting data. According to Mertler (2009), action research combines these two approaches.

In determining what type of specific data to be collected and how they should be collected, I referred to the outcome of the preliminary study. The outcome listed three important research instruments which are also suggested by Fraenkel and Wallen (2003). They are documents or records, observations and interviews. The fourth instrument added is peer assessment.

Documents and records: In this study, the students' online and face to face discussions had to be documented or recorded. The online discussions would be derived from the students' posting on the e-learning forum while face to face discussions would be provided in form of a meeting report by each group.

Observation: Teacher observation is one of several types of reporting techniques that provides information on student demonstrations of their learning outcomes. The reports also should indicate the progress made by students at the time of reporting. The teacher needed to see and record as accurately and as objectively as possible.

Interview: This interview approach is useful for eliciting meaningful information or responses about specific topics such as student's learning experiences and for exploring student individual differences. As the interview yields valuable information, the researchers need to decide what kind of information they would like to learn from the students.

Peer assessment: Peer assessment would be used in the first and second cycle of the study. It requires every student working in a small group to assess the work of their peers against set assessment criteria. It primarily looks at group cooperation. The data gathered through this assessment are used to support findings derived from content analysis

3.13.1.2 Analysing data

In qualitative approach, document analysis involves skimming and reading the documents a number of times. The process of qualitative data analysis is labour intensive and time consuming. It is an iterative process that involves the examination and re-examination of data. The procedures to analyse these data is through content analysis. Content analysis is described as a method of analysing written, verbal or visual communication messages (Cole 1988)

Using content analysis based on different interaction analysis models (AIM) as discussed in chapter 2 is meant only for analysing online discussion. From the literature, the interaction analysis models were mainly the conference analysis categories used to analyse the content of postings made by students in an asynchronous online discussions. Thus, in this blended learning study, a new instrument needed to be developed in order to analyse both the transcripts of the asynchronous online discussions as well as the face to face group discussions

According to Elo and Kyngas (2008), content analysis could be used in an inductive or deductive way. Inductive approach moves from specific observations to broader generalisations and theories. The inductive approach is recommended when the knowledge is not sufficient about a phenomena or the knowledge is fragmented. (Lauri & Kynga¨s 2005). Deductive approach works from the more general to the more specific. Deductive content analysis is used when the analysis process is based on the previous knowledge (Kynga¨s & Vanhanen 1999). As the blended learning research in this thesis was a longitudinal study, the combination of inductive and deductive approach was adapted. This was further explained when the conceptual framework was formulated.

3.13.1.3 Data saturation

Qualitative data analysis will eventually reach a point called saturation that signals the completion of the study. This means that no more data is needed or no need for more sampling as researcher could already draw conclusions. According to Bowen (2008), failure to reach data saturation will affect the conduct of the research and content validity. O'Reilly and Parker (2012) describe data saturation is reached when there is sufficient information to replicate. Guest et al. (2006) remind researchers of data saturation when they have enough data to obtain new information and coding process are no longer needed. Thus, when deciding on a study design, I must be able to estimate how much time I needed to complete my whole research study within a time frame of three years.

3.13.2 The reconnaissance phase

According to Mills (2007), the reconnaissance process could be carried out asself-reflection, description, and explanation. Through reconnaissance, the researcher is able to take time to reflect on his own beliefs and to gain a better understanding of the nature and context of the research problem (Mills, 2007). Reconnaissance is considered as the beginning of action research where the researcher makes decisions "where they are at, what they hope to achieve and how they think that they will get there" (McNiff, et al, 2003, p.35). In other words, reconnaissance allows a researcher to be more alert of where their stages are, what their hopes are, and how are they plan to reach there.

The main purpose was to develop a thorough understanding of the use of the instruments to analyse students' online and face to face discussions. Then, it was tested on a sample of group of participants working in a small group. It was also to provide up-to-date data in order to estimate the sample size and the proportions of the students working both online and face to face required for the actual study. Any problems related to the procedures would be identified so that they could be rectified or altered before starting the actual study. A significant outcome of reconnaissance is the clarification of where I was starting from in my action research project (McNiff, et al, 2003).

While conducting the reconnaissance phase, I also viewed more formal information from the literature review. This formal supporting evidence would be valuable to support my study as I could construct my synthesis well.

3.14 Matching research instruments with research questions

In deriving the findings to address the research questions, it is important to identify the types of data to be collected through research instruments or tools. In deriving the findings to address the research questions, it is important to identify the types of data to be collected through research instruments or tools. This is followed by the types of research instruments that are suitable to match the research questions. In this study, the researcher will determine which types of instruments to use based on the research questions after the evaluation studies are completed.

3.15 Developing an action plan

The selection of the qualitative approach has been extensively discussed in the section of paradigm of praxis (section 3.6). According to Neuman (2003), the process of conducting qualitative research was more nonlinear and cyclical. The advantage of the cyclic process helps me to reflect on the practice of the students learning and to leap back and forth between stages. In relation to an action research approach, not all qualitative researchers considered qualitative findings could be generalised (Bogdan and Biklen, 2003). Frankel and Wallen (2006) stated that the findings had minimal importance to be generalised to other studies. Therefore, the term generalisability was referred to the particular study in a specific research setting whatever the findings were (section 3.12).

According to Creswell (2005), the action researcher should decide who could provide the data, how many participants are needed for the study, and how to gain access to those individuals. Based on the iterative and cyclic nature of action research by Kemmis and McTaggart (1988), the study continued with the first and second research cycle. Both cycles employed the use of the instrument to analyse data on students' discussion in blended mode and the rest of instruments proposed in the preliminary study.

3.15.1 Conducting study of the first cycle

The next step is to determine the research methodology for the first and second cycle which is the development of a research design and plan for collecting data. The methodologies of action research and case study were chosen for this study. The three main research questions derived from the theoretical framework of the third generation of an aligned activity system were developed in chapter 2. These research questions provided the guiding structure to the study and they were the questions I sought to answer. From the research questions, researcher would be able to identify the variables. Each variable has its own characteristics. It is important that these variables could be observed and measured. Based on the characteristics of these variables, I could determine the appropriate procedures to collect data. The way the data were collected would reflect the design of the study.

3.15.1.1 Adopting data triangulation

In qualitative research, data analysis is usually supplemented with other sources of information. The process is called triangulation. This is vital to increase the trust in the validity of the findings. Triangulation is regarded as a qualitative research strategy used to test validity through the convergence of information from different sources. According to Patton (1990), triangulation can also be regarded as the use of multiple methods or data sources in qualitative research to develop a thorough understanding of phenomena. This triangulation of data strengthens the research study because it ensures the validity of the research.

Denzin (1978) and Patton (1999) identified several types of triangulation. They are method triangulation, theory triangulation, and data source triangulation. When conducting primary research at different times and in different places, method triangulation normally combines multiple methods to gather data from various sources, such as documents, interviews, observations, questionnaires or surveys. In other words, it is to ensure the consistency of findings generated by different data collection methods. As for theory triangulation, it is referred to using more than one theoretical approach (theory) to interpret and support data. Data source triangulation is referred to using evidence from

different types of data sources, such as primary and secondary research or interviews, documents, public records, photographs and observations.

In this thesis, the method triangulation is applied using evidence from different types of data sources. For example, the findings from the content analysis of the students' online and face to face discussions are complemented with findings from the interviews, peer assessment, and observations. In action research, researcher is allowed to relate multiple sources of data establish the quality and accuracy of the findings. Thus, the process of triangulation substantiate and tests the consistency of the findings of students working in blended mode obtained through different data collection methods

3.15.1.2 Developing coding process

The coding process in this study was mainly based on the Coding Manual for Qualitative Researchers by Saldana (2009). The coding procedure was developed in the coding process in this study was mainly based on the Coding Manual for Qualitative Researchers by Saldana (2009). The coding procedure was developed in the reconnaissance phase where two coders were employed to analyse students' conversations through online forum discussions. This was to derive several learning strategies from online mode. Next, the coders analysed students' meeting reports and came out with learning strategies from face-to-face mode. The same learning strategies derived from both modes were referred to as blended learning strategies and a coding procedure was developed. Then, the coding procedure was used to identify students' learning strategies working in a blended mode in the first and second cycle. These are explained in details in the respective chapters.

3.15.2 Conducting study of the second cycle

Greater understanding from the first cycle pointed the way to improved practice with another group of participants. Then, a second cycle was carried out with an improved methodology and another different sample of participants.

3.16 Proposing a conceptual framework based on action research

In developing the conceptual framework, I refer to both action research approaches of Burns (1999) and Mills (2003). Burns (1999) introduced an inductive approach which begins with specific things and could perfectly describe the evaluation studies. As for the action research in blended learning, I shall be using a deductive approach by Mills (2003) to construct the method of data collection and data analysis. *Deductive* reasoning works from the more general to the more specific.

3.16.1 The inductive approach

The process in which the evaluation studies were conducted (section 1.8 and chapter 4) followed the interrelated activities as outlined by Burns (1999).

• Explore an issue in teaching or learning: When online learning was first introduced in UTM, there were no specific guidelines to follow. The teachers were left on their own to explore the best possible approach to conduct online activities in a campus-based environment.

• Identify areas of concern: The coursework (assignments) can help the students develop their understanding of the module/course through effective scaffolding. Thus, my utmost concern was how to incorporate online and classroom activities to support the students' assignments. I read previous studies that provided ample evidence about improving learning activities in blended learning. Despite the promising findings, however, many questions on blended learning were unexplored. Based on my reading, I developed learning activities using trial and error method. The main idea was to teach the students how to work effectively though online and classroom activities. I also discussed with regular classroom teachers and figured out what would be the promising strategies to improve learning activities in a blended mode.

• Observe how those areas play out in the setting of the study: As the class moved on, I observed regularly how these strategies (combination of online and classroom activities in the assignment) were implemented. It was interesting to see various feedbacks on students' experiences working in a blended mode. In certain learning activities, the students worked more face-to-face rather than online or vice-versa. This had created the imbalance and the students had failed to work properly in a blended mode.

• Discuss how the issue might be addressed: The question was how to address the "imbalance"? What was the ideal "balance" for the students to work both face-to-face and online? I gathered the students' feedbacks and learned how they perceived working online and face-to-face. I also discussed further the effectiveness of my strategies with other teachers. This had to be addressed by improving the learning activities, amending where necessary and implementing them in the following academic semester.

• Collect data to determine the action to be taken: The strategies that indicated strong positive learning among the students as a result of blended learning were strengthened while the weak strategies were improved. These had provided data to possibly formulate the interventions. New learning activities introduced in the following semester were recorded. The record provided data to formulate the strategic intervention plans.

• Plan strategic: By the third semester, I was able to identify promising learning activities for the students to work strategically in a blended mode and thus, developed strategic intervention action plans. These intervention plans were ready to be implemented in the reconnaissance phase.

The sequence of the activities in this evaluation studies would take an inductive approach. Burns (1999) suggests that action research should explore the changes that are expected.

3.16.2 The deductive approach

After the evaluation studies, the next step was to decide how to conduct the blended learning research. A plan was developed for the research process referring to Mills' (2003) deductive approach and Kemmis and McTaggart's (1988) four fundamental stages in action research which consists of plan (developing a plan), act (implementing the plan), observe (documenting the effects of the plan) and reflect (reflecting on the effects of the plan for further planning and actions) (see table 3.1). When reading the action research stages plan, it is helpful for the reader to know that there were three (3) cycles in this research, a reconnaissance phase, cycle 1 and cycle 2.

Table 3.1: The action research stages plan based on deductive approach (Mills, 2003) and the four fundamental stages in action research (Kemmis and McTaggart, 1998)

The four fundamental stages by Kemmis and McTaggart (1998)	Deductive approach (Mills, 2003)	Planning the research process for the study of blended learning
The plan stage (developing a plan)	• Describe the problem and area of focus.	• The online technology was introduced in a campus-based University. (1) The teacher developed effective teaching strategies that comprised both online and face-to-face activities. (2) The strategies also included how to get the students to work in a blended environment.
	• Define the factors involved in your area of focus (e.g., the curriculum, school setting, student outcomes, and instructional strategies).	• There are twofold. First, the weekly class throughout the semester remains as an important meeting between the teacher and the students. Outside the class, the students can still keep in contact with the teacher online. Second, the students are required to work on their group assignments in a blended mode.
	• Develop research questions.	• The research questions are developed through the theoretical framework of the third generation of an aligned activity system.
	• Describe the intervention or innovation to be implemented.	• Based on the intervention plans derived from the evaluation studies, a research methodology is discussed and developed.
The act stage (implementing the plan)	• Develop a timeline for implementation.	• Each study is to be carried out in a single academic semester. Thus, three semesters are involved for the *reconnaissance phase*, first and second cycle).
	• Describe the membership of the action research group.	• The teacher and the students (research sampling) are directly involved in the research setting within the faculty of education; the support from the administration and technical staff will ensure the smooth process of the learning activities which are the focus of the research.
	• Develop a list of resources to implement the plan.	• Elearning facilities provide online activities such as asynchronous forum, uploading and downloading learning materials, and journal. Face-to-face activities include group meetings.

	• Describe the data to be collected. • Develop a data collection and analysis plan. • Select appropriate tools of inquiry.	• The data to be collected will be online forum discussion from each group, interviews with the group leaders, and face-to-face activities from the groups' meeting reports • Data are collected throughout the academic semester. Some data are analysed to inform conversations with the group leaders. • (1) The transcripts of the online forum discussion and the interviews; (2) the face-to-face meeting reports
The observe stage (documenting the effects of the plan)	• Carry out the plan (implementation, data collection, data analysis).	• The teacher is involved in the research setting. As the module is taught throughout the semester, data are gathered. The data will be analysed after the module has been completed.
The reflect stage (reflecting on the effects of the plan for further planning and actions).	• Report the results.	• The results derived from the first cycle will lead the teachers to improve the teaching strategies in blended mode and to develop the step-by-step and systematic intervention plans for the next cycle.

According to Donato (2003), while Burns' inductive approach stresses planning for action, Kemmis and McTaggert's deductive approach emphasises implementing an action plan.

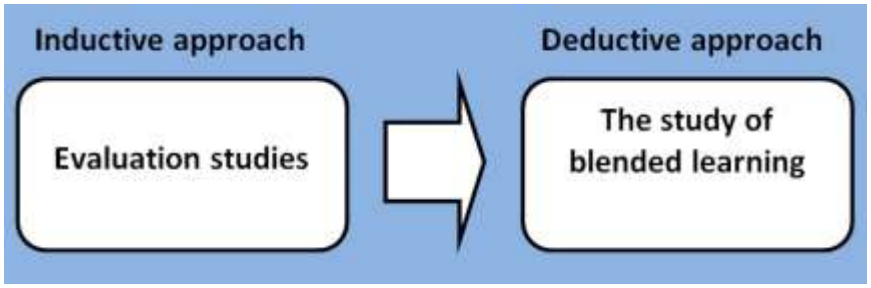


Figure 3.2: The use of inductive and deductive approach in developing an action research design for the study of blended learning

3.16.3 The inductive-deductive approach

Based on the combination of the inductive-deductive approach by Burns (1998) and Mills (2003), the research setting in the faculty where the study of the blended learning was to be conducted could be considered "highly contextualised and localised" (Donato, 2003). The positive outcomes of the research was intended to change the "tacit knowledge" of the students' progress/effective strategies working in a blended mode to "explicit knowledge" in the form of effective strategies that could be used as effective guidelines by academic staffs in the faculty. These guidelines could be further shared with the academic staffs from other faculties within the University.

3.17 The concept of validity and reliability in qualitative research

In quantitative approach, Cohen, et. al. (2000) refer internal validity to the "explanation of a particular event, issue or set of data which a piece of research provides can actually be sustained by the data" while external validity is "the degree to which the results can be generalised to the wider population, cases or situations" (page 107). Reliability refers to the consistency of the means of data collection which means using the same methods and sample to generate the same results by controlling and manipulating the phenomena (Cohen, et. al., 2007).

However, according to Golafshani (2003) and Frankel and Wallen (2006), the concepts of validity and reliability as used in quantitative research are inappropriate and must be re-defined for qualitative research. Qualitative research "does not seek to be consistent or to gain consistent results" (p. 320) (Finlay, 2006) and thus, the criteria of generalisability must be rejected by qualitative researchers. Cohen, et. al. (2007) provide examples of two different researchers conducting a research in a similar setting might produce different findings but both sets of findings could be considered reliable. Cohen, et. al. (2007) refer to Denzin and Lincoln (1994) who suggest replicability could also be achieved in qualitative approach through stability of observations, parallel forms and inter-rater reliability.

Finlay (2006) cites Lincoln and Guba (1985) who propose four criteria for evaluating qualitative research – credibility, transferability, dependability and conformability. The concept of credibility replaces internal validity which makes sense of the findings; transferability replaces external validity by providing details of the research setting so that researchers could apply the findings to other settings; dependability replaces reliability where the researchers allow their documentation of data and methods to be viewed by other researchers; and conformability replaces the concept of objectivity. Later, Guba and Lincoln (1994) incorporated a fifth concept of 'authenticity' which is related to ethics. According to Neuman (2003), qualitative researchers are more interested in establishing the authenticity of the findings rather than the validity (Newman, 2003). Authenticity refers to "giving a fair, honest, and balanced account of social life from the viewpoint of someone who lives it every day" (p.185).

3.18 Ethical considerations

Action researchers are bounded with the policies and procedures of the institution where the research is being conducted. Researchers of action research have the dual role of teacher and researcher. The challenge of this dual role is that it could lead to a conflict of interest. This is also related to the research ethics as researchers face an array of ethical requirements

Most ethical concern is about the students' confidentiality. Flicker, et. al. (2004) define the protection of the users as respecting their rights to privacy and anonymity. Although the 'Revised Ethical Guidelines for Education Research' (BERA, 2004) guarantee the anonymity of the students involved in the research setting, an exception is made to this blended learning research.

According to Pritchard (2002), the complexities of ethical issues in professional practice have to be carefully considered. James and Busher (2007) warn education researchers who are using online learning as a site for qualitative study to be aware of their responsibilities in dealing with ethical issues.

As researchers are faced with an array of ethical requirements, they must meet the standards for conducting research with human participants and the manner in which research is commissioned. The researcher must know how to estimate the risks of harm to participants and organisations and how the participants' consent may have to be treated. The participants' involvement should be voluntary and anonymity or confidentiality must be maintained for individual research.

In this research context, the important issues are related to the notion of the students' volunteering and the power relationship I have over these students. I have to seek permission from the students through informed consent. Fischman (2000) emphasises that informed consent should comprise a precise statement of the purposes, procedures, risks, and benefits of the research project as well as the commitment between the participants and the researcher. However, the student may misunderstand the nature of the voluntary participation and it is voluntary when the students participate at their own will but it becomes coercive if their withdrawal from the research setting results in penalty or loss of benefits. For example, the students may feel a risk of having their grades lowered because of their reluctant to continue participating in the research. This was a crucial factor that I had to consider.

In examining the discussion contents of two student cohort, Jonesa and Cookeb (2006) sought permission from students to use their postings for data analysis. The students' names in forum discussions had been changed to ensure full anonymity. The students who did not allow their reflections in the assignments to be analysed, were excluded from the study. Thus, when users do not agree to be part of the research setting, their data would not be included in the data analysis. However, according to Flicker, et. al. (2004), there will be a direct implication on the research findings due to the absence of the data. First, there are conversations in the forum among group members that lead to specific purpose, for example, showing the students developing understanding on specific course content. If some of these postings are omitted from the transcripts, the flow of discussions would be interrupted. Second, if the quotes are extremely important but could not be taken into the qualitative analysis, these would also affect the findings.

Nolen and Putten (2007) differentiate between joint projects and insider projects. Joint projects which are normally funded and conducted are large scale and are shared between several groups such as the University, the faculty, the researchers, and the education ministry. Any ethical issues arising will be thoroughly addressed by the University or the funded organisation. However, the insider project, like the blended learning research in this thesis has particular ethical issues. This is because the role of a teacher-cum-researcher can be conflicting at certain times. According to Nolen and Putten (2007), "these potentially conflicting roles can confound the individual's primary objective in the classroom or school that is the student learning" (pp. 402). In the UK, these conflicting roles can be avoided as long as the conduct of the study is in compliance with the ethical guidelines by the British Educational Research Association (BERA). BERA outlines a set of ethical guidelines that stipulate specifically "all educational research should be conducted within an ethic of respect for persons, respect for knowledge, respect for democratic values, and respect for the quality of educational research" (BERA, 2009).

3.19 Meeting ethical requirements

Before starting the research, it was extremely important to secure the dean's permission to conduct research in the faculty and to use the students as research sampling in gathering data. The ethical clearance through a letter of request was addressed to the dean. The dean granted permission by signing the letter. (Appendix 8) The data were collected during the normal process of teaching and learning throughout the semester. I had to ensure the confidentiality of the people involved in the research and the research findings were protected.

In my research context, the main focus had been on the questions on the students' confidentiality. It was important to ensure that every student or individual involved in my research was respected as a person. At the beginning of the class, I had to directly inform the students that their learning activities were used for research purpose. The activities included their discussions through asynchronous online forum, synchronous online forum and their face-to-face meetings. The ethical approach included informed consent which

sought the students' agreement in the following situations that were related to the research setting (appendix 7).

First, by participating in the research, my students had given their consent and as a teacher, I had avoided any kinds of personal violation. The research setting took place within the proximity of the campus (UTM) and the students were informed that they are part of the study. The students were also informed of the likely risks or potential consequences involved after participating in the research. Thus, they could opt out if they felt the study could be harmful to them.

Second, upholding individual privacy in using an e-learning was not an easy task. The transcripts of the online forums and the reports of the face-to-face meeting from each group were used to generate data. The most important issue needed to be resolved was related to the ownership of the transcripts and the reports. Through the informed consent, the students must agree to allow theirs interaction and discussions in the online transcripts as well as in the face-to-face meeting reports to be analysed after they had completed the module. As a teacher and researcher, I had the right to use that information for the data analysis.

The students were required to work in group through online and face-to-face learning activities in completing their assignments. Each individual's co-operation was vital and each project team was expected to adopt different collaborative team style. If the group members collaborated effectively, they would not feel hesitate to allow their online forum discussions and face-to-face meeting reports to be analysed. But if the students failed to build an efficient team, they might feel reluctant to be part of the study. Regardless of what the outcomes of the collaboration, I had to convince the students that their groups would be made anonymous if the findings were to be reported to the faculty.

Beside online forum discussions and meeting reports, the students also used their personalised online journal to communicate with the teacher. This journal kept mostly students' personal communication with the teacher and their confidentiality was protected.

Any feedbacks or comments from the students about their teamwork or the module using blended learning would also be made anonymous. However, there was a big challenge for me. When the students' privacy, confidentiality, and anonymity were at stake, the process of data collection would be affected. Then, if the students felt reluctance to participate further in the research, they could opt out of the data set. Thus, I had to be cautious as this situation of seeking consent can become a counter-productive (Bassett and O'Riordan, 2002).

Third, I plan to report the findings of this study publicly in detail in order to reach wider audiences. But this has ethical implications as I will be revealing some performing and not-performing groups. The research setting will be made known to public and this information will be difficult to anonymise. So permissions needed to be sought beforehand. As the research setting would take place in UTM, I will not face any difficulties. However, revealing the performance of student groups brings up a question of how they will feel and what harm will be involved if the findings published in a journal article.

Fourth, the software of the VLE in UTM required each student to use a password to access the learning materials, online journal and the online forum discussion. The password provided authentication to each student in order to prevent any possibility of the third-party involvement. However, the students were rest assured that it was only the staff of the ICT centre could only access their accounts.

3.20 Conclusion

This chapter provides a rationale for the action research approach taken and discussed how key issues related to operationalising the plan such as ethical issues were addressed.

Chapter 4

The Evaluation Studies

4.1 Introduction

This chapter describes the evaluation studies of the computer subject (authoring language) module that was taught in three (3) consecutive semesters prior to the start of the research. Based on the constructive alignment concept that aligns classroom and online activities in the third generation of an aligned activity system (chapter 1), eight contradiction categories were derived. In each contradiction category, I provided my reflections on teaching the module of authoring language. The rationales to improve the blended learning were suggested which leads to the development of the planned interventions which included they types of research instruments to be developed or used and the types of data to be collected.

4.2 Teaching in blended mode

A single academic semester consists of 15 weeks excluding one week for mid-term break. The module was conducted in blended mode. Besides attending 2 hours lecture and 1 hour for lab session, the students were required to use online forum for group discussions. The assessments for the module were individual and written assignment, group project (developing simple multimedia learning), tests and exams. The number of students normally exceeded 50 in a single class. Therefore, students had to work in groups. There were two main reasons why the students needed to work in groups. First, the Authoring Language module required the students to develop simple educational courseware within a short period of one semester using the authoring software. The students needed to work in groups. Second, the University had outlined that teaching strategies must incorporate three important skills namely communication, team working and problem solving. There was a need for the students to interact and socialise among one another as group work was considered to contribute to productive working relationships and outcomes. The students from different majors, who enrolled in the module of the Authoring Language module, were from the field of Physics, Mathematics, Chemistry, Teaching English as a Second Language (TESL), Sport Sciences and Islamic Studies.

4.3 Teaching the module in blended mode for three consecutive semesters

The evaluation studies were conducted in three consecutive semesters started from semester 1 of 2005/06 academic session. It continued in the second semester of the same academic year and finally, it covered the first semester of 2005/06 academic year. Towards the third semester, my teaching strategies had become more focussed. I had applied collaborative group work, made fair division of group workloads among group members, rectified previous mistakes in group formations, and began to learn something new about online activities and group works.

4.4 Developing contradiction categories

My observations throughout the three consecutive semesters showed that there existed some difficulties in using online and classroom activities to complement each other and that some activities seemed best suited to different modes. From these difficulties, certain contradictions were revealed. The contradictions within the module between classroom activities and online activities in managing the Authoring Language module were divided into eight categories. They were the group members, group assignment, online group discussion, group workloads, the teacher's and students' roles, online forum discussion assessment, assignment submission, and evaluation and grading. These categories were contrasted between online and face-to-face and elaborated in Table 4.1.

Table 4.1: The contradictions within the module between classroom activities and online activities.

Contradictions	Classroom Activities	Online Activities
1. Group Members	• The group formation in class could be between 5 to 10 members	• The online group formation was ideal at 3 to 4 members
2. Group Assignments	• The instructions for group assignments were clear with the teacher's explanation.	• The instructions for online activities were sometimes misunderstood or misinterpreted by the students
3. Group Discussion	• The teacher could manage large-group discussion in classroom	• The teacher could not manage (monitor) large group discussions well but could manage small-group online discussion
4. Group Workload	• The fair and equal distribution of assignment workloads among group members could be monitored by the teacher during the face-to-face meeting in the classroom with the groups.	• The fair and equal distribution of assignment workloads among group members could not be monitored by the teacher online.
5. Teacher's and students' roles	• The teacher initiated discussion in classroom. • The teacher monopolised discussion. • Teacher-centred discussion.	• The students initiated discussion online. • The students monopolised online discussion • The student-centred discussion, teacher as a facilitator to assist discussion.
6. Discussion Assessment	• No assessment historically had been used for classroom discussion • -- •	• The teacher referred to a standard scheme which listed criteria to assess online forum discussion. • The teacher would decide the suitable research method to analyse the effectiveness of online forum discussion.
7. Assignment Submission	• The assignments that did not meet the deadline were to be submitted to the teacher personally in class.	• The assignments were to be submitted online before the deadline.
8. Assessment and Grading	• The teacher conducted peer assessment using rubrics in the classroom. • --	• -- • The teacher assessed online group discussions which allocated certain percentage in the overall mark.

4.5 Analysing my reflections on teaching Authoring Language module

My reflections on teaching the module in blended mode is discussed in relation to the contradiction categories.

Table 4.2: My reflections on teaching the module of the Authoring Language module in three consecutive semesters in relation to the contradiction categories.

Reflections	Contradiction categories
• Semester 1, Session 2005/06 Since this was the first time online activities were introduced, I was not sure of how to form students' group members. The groups were formed mostly to discuss group projects in a face-to-face setting. • Semester 2, Session 2005/06 I had tried to rectify the problem of monitoring large group discussion. I started to divide the students into several small groups based on their majors, for example, all members in the same group were from Physics or Chemistry major. • Semester 1, Session 2006/07 Forming small group discussion based on the same major had caused the group members to communicate less via online forum. To rectify the problem. I introduced small group discussions by grouping the students from different majors.	Group Members
• Semester 1, Session 2005/06 This was the first time I planned for the online activities as the University had already started imposing the rules that all modules had to be taught through e-learning as well besides classroom learning. Thus, I had to convert classroom activities to online activities, and to experiment with these online activities in a blended classroom setting. • Semester 2, Session 2005/06 The group assignments were still comprised online activities and the group projects. I began to draw clear guidelines for working in the group projects and the group online discussion. • Semester 1, Session 2006/07 Since Authoring Language was a subject dealing mostly with mastering authoring software to develop a simple prototype of an educational courseware, there was no need to assess the students based on written and individual assignment. The course assessment put a strong emphasis on the group assignment.	Group Assignment
• Semester 1, Session 2005/06 As this was my first time organising online activities for my own class, I was not sure of which classroom-based activities were adaptable to the online environment. Thus, I was mostly experimenting with the forum discussions in a hope that students would find it beneficial in their learning process. All online activities were made available for large online group discussion. This large online group discussion involved the whole class. The teacher discovered that the discussions through online forums were sometimes misused by the students. They were not just discussing the assignments, but creating a tense atmosphere by expressing hostile remarks towards other students.	Group Discussion

I was forced to put on a warning at the beginning of every forum discussion reminding the students to be courteous at all times whenever they went online. • Semester 2, Session 2005/06 This time I had learned that online group discussions must be conducted with specific purposes. Besides contributing on how to go about completing their group projects, they were expected to share views, ideas, and theoretical aspects of the courseware development. • Semester 1, Session 2006/07 The online group discussions had been designed in details and they were more focussed. There were 3 assignments to be completed by the groups. The three forum discussions were created for each group. The term "Group Discussion" was referred to as GD. GD1, GD2 and GD3 were used by students to discuss online to complete Assignment 1, Assignment 2 and Assignment 3 respectively.	
Semester 1, Session 2005/06 • The workloads among group members were not distributed fairly. There were cases where members of the groups were not satisfied with their members who contributed less or did not contribute at all in completing the group assignment. Semester 2, Session 2005/06 • I started using rubrics that would enable the students to evaluate other members in their own groups. The rubrics based on Conrad and Donaldson (2004, p. 32) (appendix 1) was used to develop a comprehensive peer assessment form. It was more for my reference to monitor any students who contributed less or did not contribute anything at all in completing their assignments. Whenever necessary, I would invite the group to meet me personally and discussed any issues related to their assignments. Semester 1, Session 2006/07 • Peer assessment was introduced and it was an important strategy to ensure that the workload was distributed equally among group members. The rubric (appendix 1) was used to evaluate the contributions from every member in the group which contributed 3% to their module assignment grade. The students were not informed of the marks.	Group Workloads
Semester 1, Session 2005/06 • This was the first time I had to handle my own module online. It was quite frustrating to find out that large group online discussion was very difficult to monitor. Semester 2, Session 2005/06 • My role was to mediate and manage the online forum discussions. The students' role was to initiate the discussion. Being a facilitator, I monitored the students' discussion. A warning message was clearly stated on the top of every forum to ensure appropriate behaviour. Semester 1, Session 2006/07 • At this stage, I felt it was important for me to monitor the students' online activities at every stage of their progress in completing the assignments.	Teacher's and students' roles

• Semester 1, Session 2005/06 The topics to be discussed in the online forum discussions became more out of context and it was difficult for me to grade them. After all, I myself was not sure of what standard criteria to refer to for the grading. • Semester 2, Session 2005/06 Besides providing and online group discussion for the individual as well as for the group assignment, I was a bit ambitious in this semester when I provided 3 topics to be discussed online. I made this compulsory to participate for every single student to participate in the forum. A mark of 5% was allocated for these activities. As a result, the students were actively involved in their online discussions. • Semester 1, Session 2006/07 The students were involved actively in all the forum discussions contributing opinions, sharing ideas, and providing suggestions to the completion of the assignments. To evaluate a successful online group discussion, teachers used standard measurement procedures.	Discussion Assessment
• Semester 1, Session 2005/06 When every student submitted their individual assignments (multimedia prototype) online, the system was bombarded with data. The system was further "burdened" with the uploading of the group assignments. At times, individual and group assignments were uploaded on the VLE more than once. • Semester 2, Session 2005/06 The assignment submission had been problematic without imposing any dateline in the VLE without which it was impossible to be sure which were late submissions. Thus, in this semester, the teacher had ruled out that the assignment must be uploaded through VLE and must meet the due date. • Semester 1, Session 2006/07 The students uploaded their assignment through VLE. The dateline for each group project had been set to prevent any late submission.	Assignment Submission
• Semester 1, Session 2005/06 The online activities were allocated for 5% of the overall mark for the coursework. This seemed to be a way of getting all the students to take seriously the online activities. • Semester 2, Session 2005/06 Reading all the opinions posted online become a burden. There was no standard criterion to refer to for grading. • Semester 1, Session 2006/07 All online activities and projects that involved the co-operation of group members were assessed through peer assessment with the use of rubrics (appendix 1).	Assessment and Grading

4.6 Analysing using the perspective of the third generation of activity systems

The following sections describe the use of the third generation of activity systems to analyse the blended learning within the module of Authoring Language from a wider and theoretical perspective. The third generation of Activity Theory (Engstrom, 1999), studies two interacting Activity Systems. The first Activity System represents the face-to-face activities system while the second Activity System represents the online activities. Based on this, I analysed the Authoring Language module using the elements of the subject, object, rules, division of labour, instruments, community and outcomes within an Activity System (fig 4.1).

Subjects: The subjects were all participants involved in the process of blended learning. These participants were the students and the teacher.

Rules: The important regulation was that all students had to work within the VLE and they had to work in group in completing the assignments. All the students were assessed by teachers. However, the VLE and the group work were allowed to be conducted with different approaches. At the University level, all academics staff were required to utilise the VLE for their online subjects. The university ICT Centre kept track of the teachers who did not utilise the system. Reports were published and sent to the faculties. The faculties acknowledged the reports and advised the teachers.

In terms of assessment of group projects, the Faculty of Education had ruled that coursework for undergraduate courses must comprise 60 percent while the remaining 40 percent was for the final exam.

For the subject of Authoring Language module, I set the rules that every single student in the class must involve in the online activities. The students had to complete 3 group projects and 3 online forum discussions. The details of how to develop the group projects and the procedures for communicating online through forum discussions were elaborated by me as the teacher at the beginning of the semester in class and online.

Division of Labour: The students were required to engage in team work. They had to work collectively and collaboratively in completing their group assignments. The division of works were shared among group members and they contributed to the online forum discussions.

Instruments: As the class was conducted in a blended setting, there were two components of teachings involved. First, it referred to the classroom learning where students attended the face-to-face weekly 2 hours lecture in the classroom and 1 hour lab session. Second, the teacher and the students used the VLE in their teaching and learning process.

Instrument 1: During the face-to-face classroom meeting, the teacher delivered the subject content to students, attended to students' inquiries on the subject content and assignments, and reminded students to participate in the compulsory online forum discussions.

Instrument 2: In the online environment, the Authoring Language module was made available through the VLE. All matters pertaining to the subject such as announcements about cancellation of classes, dates and venues for substitute classes, changing of assignments deadlines and the venue for mid-term exam, which were not mentioned in class, could be made available online and students were expected to access there.

Community: The community was the participants who were directly involved in the online learning in a broader context.

Object: The objects were the group projects/assignments and online activities that were designed by the teachers. These project assignments were completed through a blend of face-to-face and online activity.

Object 1: These parts of the assignments were completed through face-to-face activities.

Object 2: These parts of the assignments were completed through online activities.

Outcome: Two important skills were expected to be acquired by the students at the end of the semester. First, basic subject skills using the authoring language software so that they could develop a simple educational prototype, and second, most importantly the generic skills acquired by the student through working in a group that led to developing and sharing the knowledge.

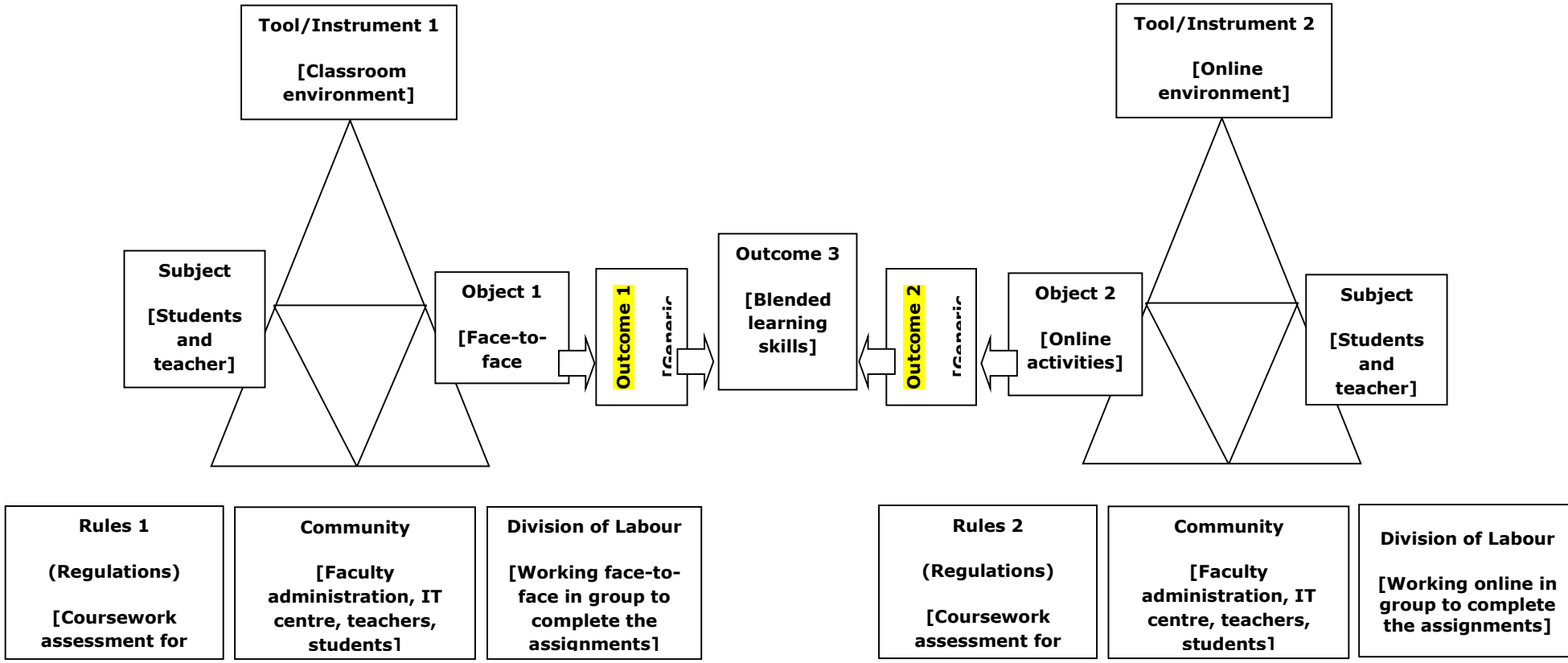
Outcome 1: The students acquire communication, team working and problem solving skills from the face-to-face activities

Outcome 2: The students acquire communication, team working and problem solving skills from the online activities

The combination of outcomes 1 and 2 from both interacting activity systems yields outcome 3.

Outcome 3: The acquisition of blended learning skills in completing the assignments.

Activity theory illuminates three important aspects that exist in learning organisation. These are contradictions, changes and outcomes (Engestrom, 1999). Contradictions are referred to the learning activities conducted online and face-to-face. Contradictions are central to the discussion in this chapter on evaluation studies and are viewed from the different perspective of students' working in classroom and online. When a group is not working well in one semester, a teacher will assess the situation and devise a plan of action in the next class. These are the changes or interventions that the teacher is making in the hope of improving the teaching and learning experience, for example that will yield positive outcomes.



Activity system for classroom learning

Activity system for online learning

Figure 4.1: The third generation of activity system - adapted from Engestrom (1999)

4.7 The contradiction categories

Both classroom and online learning activities are observed and compared in order to arrive at contradiction categories. There are eight contradiction categories that could be derived from my experiences teaching the modules in blended mode for three consecutive semesters during the evaluation studies. The contradiction categories include the group assignment, online group discussion, group members, group workloads, teachers and students roles, online assessment, and assignment uploading.

4.8 The three sub-triangles

The contradiction categories are grouped according to Jenlink's (2001) three sub-triangles within a single activity system (figure 4.2).

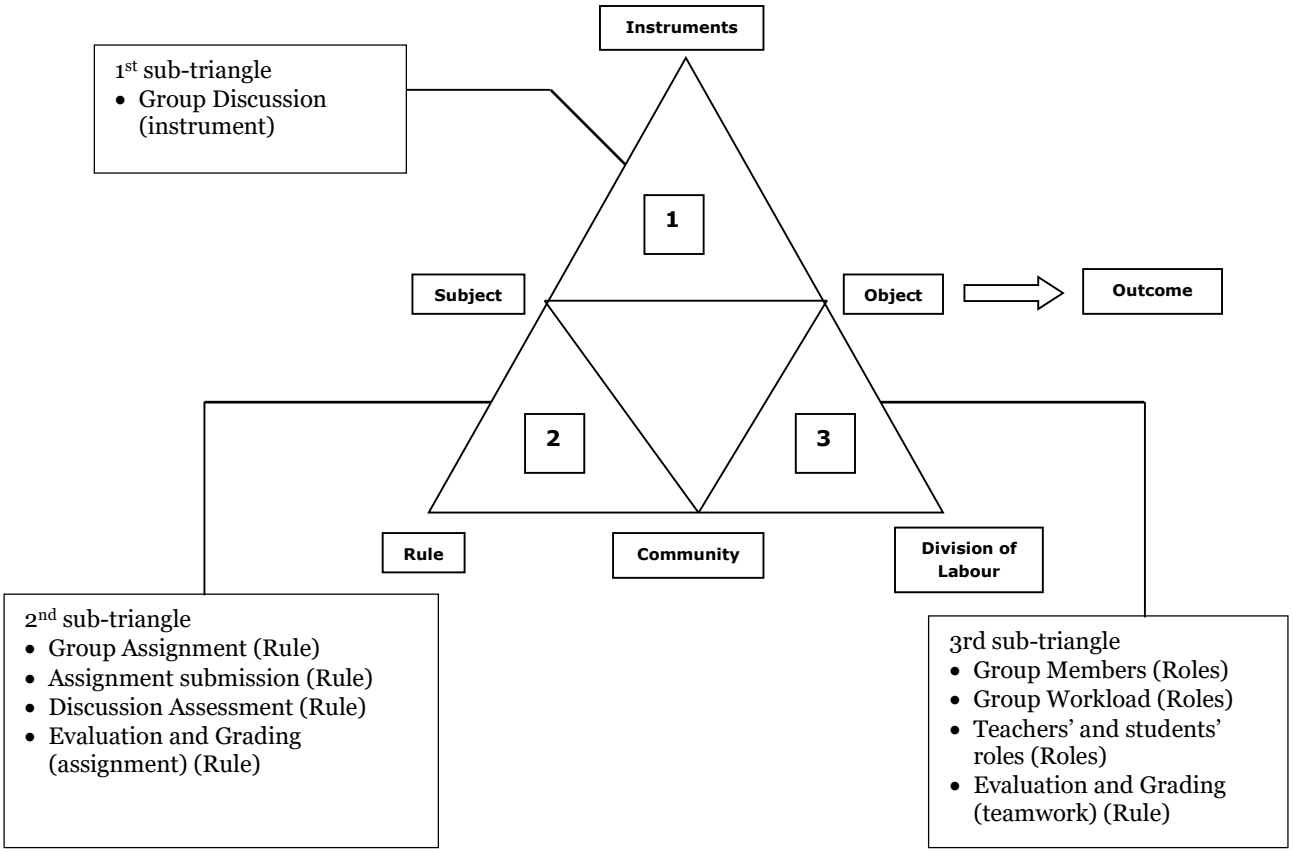


Figure 4.2: The eight contradiction categories are assigned into three different sub-triangles as formed by Jenlink (2001).

The first sub-triangle consists of group assignment while the second sub-triangle comprises group assignments, assignment submission, discussion assessment, and the teachers' and the students' roles, and evaluation and grading for assignments. The third sub-triangle comprises the group members, group workload, teacher's and students' roles, and evaluation and grading for teamwork.

Although the activity system of the third generation was used to derive the contradiction categories from my teaching experiences in three consecutive semesters, the blended learning research in this thesis was to close the gap between the classroom and online learning. Based on the theoretical framework of the third aligned activity system, the concept of constructive alignment (Biggs, 1999) is used.

4.9 Developing interventions based on the contradiction categories

From the contradiction categories, the interventions were derived. These interventions are strategies to close the gap between online and face to face and to combine online and classroom activities effectively in a blended mode.

Sub-triangle 1: Group Discussions

4.9.1 Encouraging face to face discussion with online discussion

The students must initiate the face to face and online discussion with their group members. Each group member must show their commitment so they can exchange ideas and opinions about their assignment and get regular peer feedback.

Sub-triangle 2: Group Assignments

4.9.2 Developing collaborative group assignments

In a campus-based university such as UTM, a face-to-face meeting is still an important feature but it had to be integrated with online activities. Thus, developing group assignments that included both online and face-to-face mode was vital.

Sub-triangle 2: Assignment Submission

4.9.3 Submitting assignments online and in hardcopy

Besides handing the assignments in hardcopy in class, the groups had to submit online. As for the online, the deadlines for three assignments were to be scheduled differently so as not to avoid system congestion. A dateline should be applied to prevent any late submission. There were 3 different group projects which had different datelines.

Sub-triangle 2: Discussion Assessment

4.9.4 Using rubric for assessing groups' online and face to face discussions

Roblyer and Wiencke (2003) suggest the use of rubric to assess interactivity in an online class. The rubric, which was based on Baeur and Anderson (2000) (appendix 2), aims at assessing the students' online forum group discussions. As for the face to face discussions, the groups' interactivity is assessed through their reports.

Sub-triangle 3: Group Member

4.9.5 Forming small groups with reasonable members

The formation of group teams needs to comprise students who were not staying in the same residential hostel or area. This is to promote the use of VLE among the students. It is assumed that students would tend to discuss online after a lecture. However, group size needs to be considered for effective teaching and learning and will depend on, the number of tutors, the nature of the task(s). In this case the nature of the research did not determine the group size. Johnson and Johnson (1991) describe three types of group work - informal learning groups, formal learning groups, and study teams. Davis (1993) further explains the study team as a "long-term group" that usually work together throughout the course of a semester and providing support, encouragement and assistance in completing the assignments. It is important to keep the group small, for example, less than six members. According to Livingstone and Lunt (1994), the ideal number for small group members was about four to six. A small group of 4 to 6 students was sufficient to provide diversity of opinions and experiences. The drawback for group size larger than 6 is that some members may easily become passive rather than active participants (Davis, 1991). These small-group interactions could be facilitated in an assigned discussion. The teacher could go from group to group interjecting comments, as it was done in a face-to-face classroom. The group reporting could be assigned to one individual per group, who may provide a summary to the teacher of their assignment progress. This intervention could be used for group members.

Sub-triangle 3: Group workload

4.9.6 Using rubric for peer assessment

The rubric based on the peer assessment form from Conrad and Donaldson (2004) (appendix 1) with some amendments was introduced to the groups and used for peer assessment. With the rubric, it was expected that the group would foster a high level of commitment to complete their works. When members of the group knew they were assessed by their own members, it was hoped that they would feel motivated to work as a team. The rationale is that each member in the group must contribute fairly and share the workloads collectively to complete their group assignment. Each group must create a code of conduct that must be abided by members. This code of conduct could be in form an agreement that bounded the members to work together as a team. A copy of the code must be given to me for my own record. The marks of certain percentage from the rubrics would be part of the overall mark for the group assignment.

Sub-triangle 3: Teacher's and students' roles

4.9.7 The role of teacher and students

The teacher has two important roles. First, the teacher must monitor the online discussions, contributes occasionally whenever possible or necessary, and triggers ideas. The teacher also needs to mediate the groups in their face to face discussions when they are in class. Second, the teacher has to facilitate the use of online forums in completing group assignments.

Sub-triangle 3: Evaluation and grading (based on teamwork)

4.9.8 Making team work an important part of the course assessment.

Any changes in the assignments were notified in the VLE. Each group leader is responsible to keep the group on task and coordinates face-to-face team meetings and online discussions. In co-ordinating face-to-face with online activities, the group leaders are required to submit their face-to-face meeting reports to me. At the same time, each group's online forum discussion was monitored. The rationale is that the students have to initiate ideas and discussion with group members regarding the process to complete their group project. This is viewed from the perspective of student-centred learning. On the

other hand, teacher facilitates the learning process of the students. The teacher could not only be a content expert but must be skilful as well at managing the VLE.

4.9.9 Identifying blended activities

Working in a blended mode required the students to meet face-to-face and online in discussing their assignment. The data are derived from the students' online discussions and their face-to-face meeting reports. Both, the transcripts from online discussion and the reports had to be combined. In analysing the data, an instrument must be created.

4.10 Identifying the research instruments

The planned interventions are developed to resolve the contradictions. These planned contradictions are matched with the research questions and the research instruments/tools. Thus, it is rich qualitative data that can provide answers to these types of questions. The qualitative approach is also about developing the appropriate questions and how helpful they are in improving teaching and learning both online and face-to-face.

The development of the research instruments is summarised in Table 4.3.

Table 4.3: Developing the research instruments based on the evaluation studies

Sub-triangle	Research questions	Contradiction categories	Planned interventions	Research instruments
Sub-triangle 1 (Tool)	1. How does the blend of communication tools (discussion/text/forum etc) used affect the blended learning context?	Group discussion	Encouraging face to face discussion with online discussion	• Transcripts of online discussions • Reports of face-to-face meetings • Interview
Sub-triangle 2 (Rules)	2. How does the nature of the regulations (assignment) affect the blended learning context? 3. How does assignment submission through online affect the teacher and the students in a blended learning mode? 4. How does the teacher conduct the evaluation and grading of students' assignments and online forum discussion in the blended learning mode? 5. To what extent does the group assignment, which is elaborated by the teacher in class and available online, facilitate students' learning?	Group assignments	Developing collaborative group assignments	• Peer assessment form • Interview
		Assignment submission	Submitting assignments online and in hardcopy	--
		Discussion assessment	Using rubric for assessing groups' online and face to face discussions	• Transcripts of online discussions • Reports of face-to-face meetings • Interview
Sub-triangle 3 (Roles)	6. What are the roles (division of labour) taken by the learners? a. Do students distribute the workload of completing the assignments equally among group members? b. Do students distribute the workload of contributing to online forum discussion equally among group members?	Group members	Forming small groups with reasonable members	• Interview
		Group workload	Using rubric for peer assessment	• Peer assessment form • Interview
		Teacher's and students' role	Making team work an important part of the group assignment.	• Transcripts of online reflective journal

	c. What is the appropriate balance of assignment workload among group members? d. To what extent does the group workload facilitate co-operation among group members in the blended learning mode? 7. How does the blended learning context affect the roles taken by the learners a. How often do students initiate discussion in their online group? b. How often do teachers contribute to the discussion as initiated by the students? 8. How does students' group formation facilitate students' learning in a in a blended mode? a. What is teacher's perspective in forming students' group members? b. What are the students' perspectives in forming students' group members? c. To what extent forming students' group members facilitate students learning in a blended mode?	Evaluation and grading (teamwork)	Making team work an important part of the course assessment.	• The peer assessment form; • The assessment on the group projects and online forum discussions.

4.11 Conclusion

The principles of action research from the perspective of research paradigm has been discussed in detail, and then elaborated on how the action research operates within the paradigm of praxis which eventually leads to the development of a research framework. On the basis of these evaluation studies, the *reconnaissance phase* was designed. The *reconnaissance phase* may indicate the necessity of further refining the planned interventions so that the suitable action research design would be determined.

Chapter 5

A Reconnaissance Phase

5.1 Introduction

From the evaluation studies (chapter 4), there is a need to establish a method on how to identify the students' learning activities conducted in blended mode. This instrument must be developed prior to a larger study (cycle 1 and 2). Thus, the focus was on the two important research instruments - the online forum discussion and the face-to-face meeting/progress.

5.2 Gathering online and face-to-face discussions

The two important instruments to collect data are the online forum and the face-to-face meeting reports. To ensure the instruments were used appropriately, these were both introduced to the groups in the face-to-face session at the start of the course and expectations for engagement were outlined.

5.2.1 The transcripts of the online discussions

The online forum allowed the students to participate in on-going discussion in completing their assignments. Hara, et. al. (2000) describe the asynchronous online forum as providing students with opportunities for more thought, reflection and processing of information. Through the VLE, the students could communicate asynchronously by posting their messages in the online forums, and the messages became threaded with topic headings or titles. A close examination of the transcripts of the online threaded discussions provided a significant insight into the students' learning and interactions.

5.2.2 The meeting/progress reports – the record of the face-to-face discussions

When each group met face-to-face, they recorded the outcome of their discussions in their reports. However, according to McConnell (2000), the skills and strategies developed in face-to-face learning environment could not be assumed that it would work well in the online environment. Thus, the face-to-face discussions recorded in the meeting reports are used to complement the online discussions. The reports reveal the frequency with which the group met face-to-face and the intention was that this should be weekly. Each group was required to submit their face-to-face meeting reports at the end of the semester.

5.3 Developing the methods to analyse online and face-to-face discussions

In order to analyse the data from the transcripts and the reports, two instruments are created - the table for blended activities and the blended learning strategies map.

5.3.1 The table for blended activities

In the table for blended activities, the activities are divided into columns with the main headings of week, meeting/discussion/mode/strategies, mode and strategy (see Table 5.1). Both online and face-to-face learning activities were summarised and placed in the table according to each week for fifteen weeks during the semester. This would enable me to identify which learning activities were used both online and face-to-face.

Table 5.1: A sample of a table of blended activities

Week	Meeting/Discussion/Communication	Mode	Learning activities
Week 1	•	•	•

5.3.2 The blended learning strategies map

The blended learning strategies map (Table 5.2) describes the online and face-to-face learning strategies/activities that were used by the students within the blended activities identified in the table of blended activities.

Table 5.2: A sample of a blended learning strategy map

Strategy Category	Labels	Online Mode	Face-to-face Mode
I			
II			

5.4 Preparing for the reconnaissance phase

After developing the instruments to collect data on online and face-to-face discussions, this was followed by a decision regarding the type of respondents and the research sample, and how these should be involved in the research setting.

5.4.1 The research setting – the blended learning context

The study was conducted throughout the semester (31st December 2007 – 4th May 2008) within the Department of Educational Multimedia, Faculty of Education. One learning module on Authoring language subject code of SPM2322 was chosen. The module was developed as a blended learning module and was taught by the researcher throughout an academic semester which consisted of 15 weeks (comprising 14 teaching weeks and a one-week semester break). It included a weekly two-hour lecture and a one-hour computer laboratory session. The course materials could be downloaded from the e-learning. In the very first class of the semester, I explained to the students that they had to work in a blended mode. There were three group assignments to be completed in sequence. The first and second assignment were required to be completed in three weeks' time while assignment 3 in 4 weeks. Each group must consist of 3 or 4 members.

Table 5.3: The assignment tasks

Assignment	Tasks
Assignment 1 Weeks 2- 4	Each group had to develop an important interface (main menu) for a courseware. They had to integrate proper elements of graphics, text, colours and animations. They could import graphics and animations from other sources. They had to engage in online discussion through their own discussion forum to achieve this. The group leader had to upload the assignment to the teacher through Moodle.
Assignment 2 Weeks 6-8	Each group was required to develop interactive exercises which comprised multiple-choice questions, subjective questions and matching tasks. Students had to engage in online discussion through their own discussion forum. The group leader had to upload the assignment to the teacher through Moodle.
Assignment 3 Weeks 10-13	Each group had to develop a multimedia prototype which integrated main menu, exercises and brief content. They had to engage in online discussion through their own discussion forum. The group leader had to upload the prototype to the teacher through Moodle.

5.4.2 Research sampling

In qualitative approach, purposive sampling is the common technique. According to Devers and Frankel (2000), this type of sampling provides in-depth understandings of the respondents' experiences in achieving the objectives of their research. The respondents in the study were volunteers from a group of third-year students who had enrolled on the Authoring Language module. The total number of students involved was 82, comprising 62 females and 20 males. They were from five different course majors – physics (SPP), mathematics (SPT), chemistry (SPK), science education (SPN), and sport science (SPS). One way of ensuring active participation of students in an online forum is to encourage them to working collaboratively within small groups. The students were allowed to form group to a maximum of five members and there were 13 groups. I personally checked the background of every member in the group to ensure they were not from the same majors.

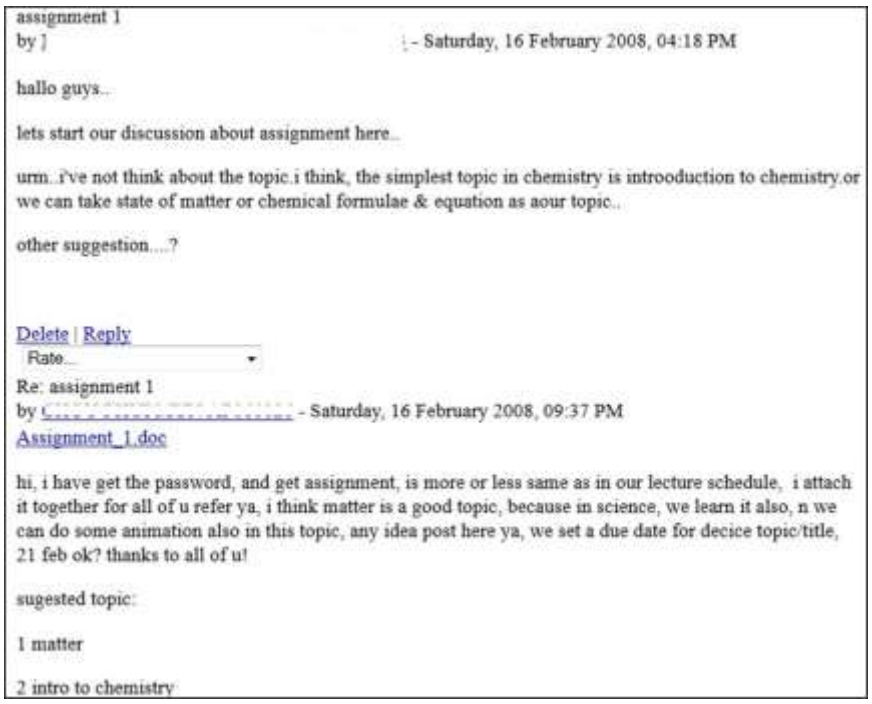
The three assignments required the students to work in permanent learning groups throughout the semester. Thus, the group would be responsible for completing all the three assignments and ultimately, the intention was to provide a sense of ownership among the group members. Each group appointed a leader and determined how their group would operate. Then, I created a discussion forum for each group to collaborate on and discuss their group assignment. Three forum discussions were created for the three assignments. The first forum was named GD-1; the second forum was GD-2, and the third forum was GD-3. Each forum was named after the group leader, for example, GD1-Wan Mustafa.

5.4.3 Distributing the consent form

The students agreed to participate in the research by signing the consent forms which were distributed in class. The students were asked to fill up the form immediately and later, the forms were returned to me.

5.5 Data collection

The process of data collection involved gathering the students' online and face-to-face discussions. Each group's online discussions were printed out (section 5.2.1) while their face-to-face meeting reports were submitted to teachers (5.2.2). The excerpts of the groups' online discussions and their face-to-face meeting reports are shown in figure 5.1 and 5.2 respectively.


assignment 1
by] - Saturday, 16 February 2008, 04:18 PM

hallo guys..

lets start our discussion about assignment here..

urm..i've not think about the topic.i think, the simplest topic in chemistry is introoduction to chemistry.or we can take state of matter or chemical formulae & equation as aour topic..

other suggestion....?

Delete | Reply
Rate...
Re: assignment 1
by [redacted] - Saturday, 16 February 2008, 09:37 PM
Assignment_1.doc

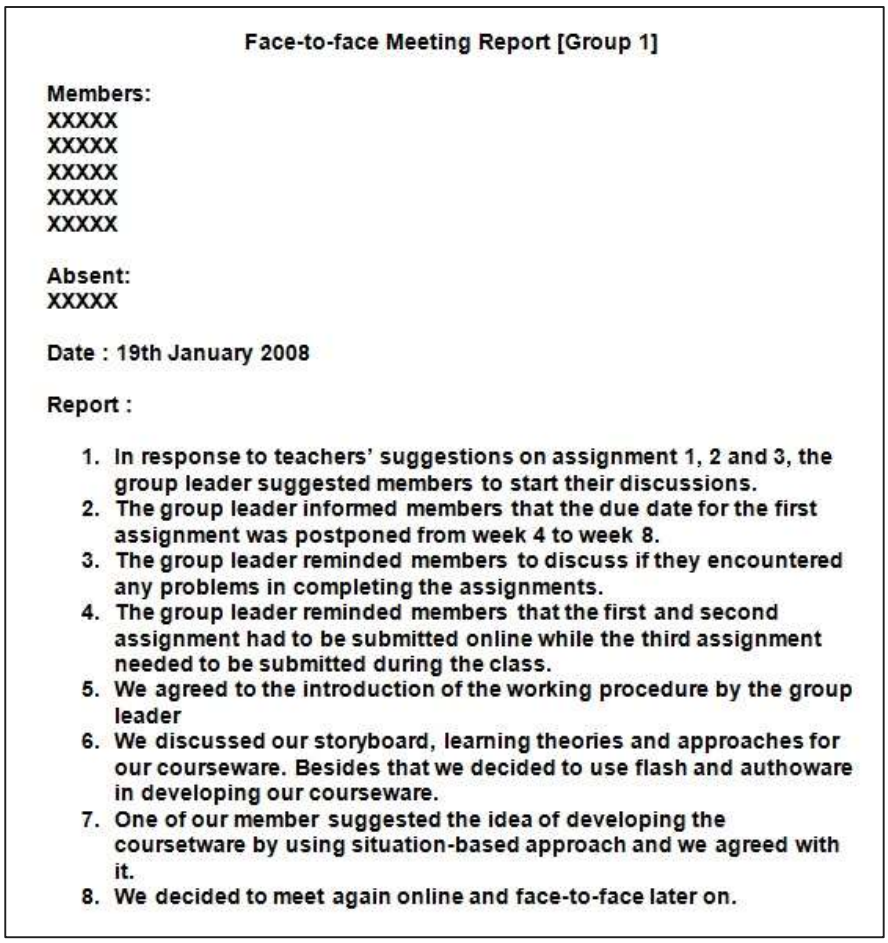
hi, i have get the password, and get assignment, is more or less same as in our lecture schedule, i attach it together for all of u refer ya, i think matter is a good topic, because in science, we learn it also, n we can do some animation also in this topic, any idea post here ya, we set a due date for decice topic/title, 21 feb ok? thanks to all of u!

sugested topic:

1 matter

2 intro to chemistry

Figure 5.1: An excerpt of the first group's online discussions



Face-to-face Meeting Report [Group 1]

Members:
XXXXX
XXXXX
XXXXX
XXXXX
XXXXX

Absent:
XXXXX

Date : 19th January 2008

Report :

1. In response to teachers' suggestions on assignment 1, 2 and 3, the group leader suggested members to start their discussions.
2. The group leader informed members that the due date for the first assignment was postponed from week 4 to week 8.
3. The group leader reminded members to discuss if they encountered any problems in completing the assignments.
4. The group leader reminded members that the first and second assignment had to be submitted online while the third assignment needed to be submitted during the class.
5. We agreed to the introduction of the working procedure by the group leader
6. We discussed our storyboard, learning theories and approaches for our courseware. Besides that we decided to use flash and authoware in developing our courseware.
7. One of our member suggested the idea of developing the coursetware by using situation-based approach and we agreed with it.
8. We decided to meet again online and face-to-face later on.

Figure 5.2: A sample of the first group's face-to-face meeting reports.

5.6 Data Analysis

Only two groups were chosen in this reconnaissance phase. This was based on their message postings in the online forums and their discussions in the face-to-face meeting reports that held rich interactions among members and contributed to the completion of their assignments. The process of data analysis started with identifying learning strategies by summarising students' online discussions and then, placing these summaries along with the summaries of their face-to-face group discussions (derived from their meeting report) in the table for blended activities (table 5.2)

5.6.1 Summarising online group discussions

The online discussions in the forum contained the students' conversations in completing their assignments. These conversations needed to be summarised and the summarising

process involved analysing the content of online discussions. From the literature, in understanding the students' participation in the forum, de Laat, et. al. (2007) suggest researchers to look at the members' interaction within the threaded online discussion. Hara, et. al. (2001) further add that online discussions should be analysed not based on "an idea unit" within the messages but within the context of the discussions which involved group members' participations. Therefore, in deriving the learning activities from the online discussions, the messages posted in the online forum were summarised in a context that related to other group members' participations.

Besides summarising the online discussions on my own, I hired two teachers to do the same task. These teachers who had experiences in teaching the module in a blended mode acted as raters to summarise the same online forums. While doing the summaries, the raters were advised to focus on the learning activities that were focused on completing the assignments. By hiring these teachers, I employed a coding filter technique from the coding manual by Saldana (2009). The technique allows the teachers to use their own "analytical lens" (pp. 6) to perceive and interpret the data. However, the data sometimes were interpreted differently. To overcome this problem, comparisons were made at an inter-rater meeting among the three of us to reach a compromise in finalising the summaries. The process involved a final *check* against the online discussion transcripts was made. The process of summarising the online forums is shown in figure 5.3.

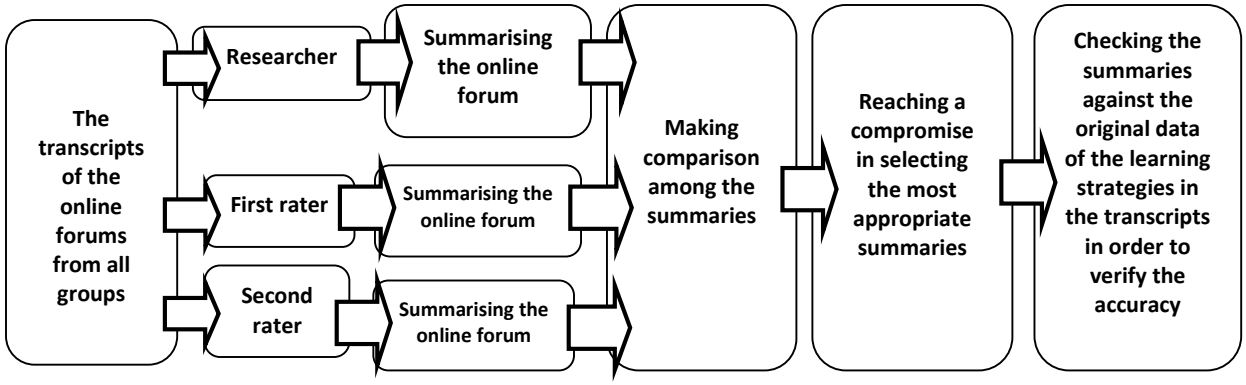


Figure 5.3: The process of the summarising the learning strategies from the transcripts of the online forums

To start, the transcripts from the online forum and the reports from the group's face-to-face meetings were analysed manually. The full transcripts of all three forum discussions (GD-1, GD-2 and GD-3) over the whole semester constituted the data of the students' online discussions.

5.6.2 Gathering the summaries of face-to-face group discussions

The face-to-face meeting reports were prepared by each group and contained the summaries of the groups' learning activities. The reports provided evidence of further actions when they came into contact with each other. These face-to-face meeting reports for the three assignments were submitted to the teachers by the end of the semester. Figure 5.2 shows a sample of their face-to-face meeting reports.

5.6.3 Using the table for blended activities

The summaries of the online activities from the transcripts and the summaries of the face-to-face activities from the meeting reports of the first group were placed in the table for blended activities (table 5.4). The names of the group members were made anonymous.

Table 5.4: Using the table for blended activities to combine online and face-to-face activities from group 1.

Week	Meeting/Discussion/ Communication	Mode	Strategies
Week 1 31 Dec 2007-6 Jan 2009	• Brief meeting after the class	• Face-to-face	• Getting to know group members from other courses for the first time. **Group Leader** (GL) fixed the time and date to meet of the next meeting.
Week 2 7-13 Jan 2008	• Brief meeting after the class	• Face-to-face	• Planning for a face-to-face meeting but the group was unsure as other members had unsettled matters with the schedule of other subjects; exchanging of mobile phone numbers among members.
	• Communication on mobile device	• Text messaging	• GL sent text messages reminding the group to meet up the following week right after the class.
Week 3 14-20 Jan 2008	• Brief meeting after the class	• Face-to-face	• Confirming that all members were ready to meet face-to-face and to start discussing the first assignment.
	• Meeting (19 Jan 2008)	• Face-to-face	• Responding to teacher's explanation, ideas and suggestions on all assignments 1, 2 and 3; confirming with the group that the due date for the first assignment

			had been postponed from Week 4 to Week 8; confirming that the first and second assignment were to be uploaded while the third assignment was to be submitted to the teacher in class. GL reminded the group to communicate online as the forum discussion would be evaluated by the teacher. GL introduced a working procedure for the group to follow in completing the assignments. The group leader welcomed ideas both for the topic and content contributions and the improvements to the ways the group should work.
Week 4 21 – 27 Jan 2008	• Forum discussion (thread dated 22 Jan 2009) • Forum discussion (thread dated between 22 January to 15 February 2008)	• Online • Online	• The teacher informed the group that he had asked a new member to join the group. GL welcomed the new member to the group. • A member reminded the GL to start thinking of the topic for Assignment 1. Doria also reminded GL to request a password from the teacher to open the file which could be downloaded from Moodle. The file contained the details of the question for Assignment 1. The password would be given only to the group leader through online journal. One member suggested the group propose a topic and then the group should start to compare. However, GL admitted that she was not sure of what to expect and wanted the group to wait until the next lecture before suggesting any topic. GL welcomed 2 new members to the group and to the online forum. (12 postings)
Week 5 28 Jan – 3 Feb 2008	• Forum discussion (thread dated between 28 – 29 Feb 2008) • Communication on mobile device	• Online • Text messaging	• A member had suggested the group bring food during the face-to-face discussion. The suggestion was responded to with light jokes from others. (6 postings) • GL reminded the group to attend the meeting through text messaging.
Week 6 4-10 Feb 2008	• Brief meeting after the class	• Face-to-face	• GL mediated different opinions from group members on choosing the topic for the first assignment. Since it was just a brief meeting, GL informed the group the discussion would continue online.
Week 7 11-17 Feb 2008	• Forum discussion (thread dated between 16 - 27 Feb 2008)	• Online	• This thread showed an in-depth discussion among group members to decide the topic of the first assignment. There was a suggestion the topic could be from Chemistry. Another member added that Chemistry was suitable as the subject had lots of animation that they could produce. She further related the topic to the possible educational theory (constructivism). Another member had a brief face-to-face meeting shortly after the class with a few members. She decided the topic and suggested the place and time to meet face-to-face. The face-to-face meeting would be held on 21st Feb 2008. She reminded the group to bring together their samples of layouts and designs for the courseware. Later, she made a second announcement to change the date for the face-to-face meeting. The meeting, which was originally scheduled for 21 Feb, was postponed to 26th Feb 2008. Other members responded by stating that they

			had found some materials for the assignments and would like the group to view them during the face-to-face meeting. One member reminded the group that the assignment must be no more that 2MB in size and suggested that any materials the group was working on should be in reasonable file size. (32 postings)s
Week 8 18-24 Feb 2008	• Communication through mobile device • Meeting (21 Feb 2008)	• Text messaging • Face-to-face	• GL reminded the group to attend the meeting through text messaging. • Finalising the materials for the topic the group had decided to select "The Matter" from Chemistry.
Week 9 25 Feb – 2 March 2008	• Communication through mobile device • Meeting (26 Feb 2008) • Forum discussion (thread dated 1 March 2008) • Forum discussion (thread dated between 2-11 March 2008) • Forum discussion (thread dated 28 February – 12 March 2008)	• Text messaging • Face-to-face • Online • Online • Online	• GL reminded the group to attend the meeting through text messaging. • Viewing materials for the assignment from each member; checking the materials the compatibility with the authoring software; finalising the content flow of the courseware; delivering all content materials to the member in charge of the authoring software to compile and package; the packaged courseware was passed to GL to upload. • GL informed the group that the first assignment had been submitted by being uploading onto Moodle. She expressed her gratitude and thanked the group. GL also wrote that she was very appreciative of the fact that the group members had been very co-operative and had portrayed their commitments and willingness to stay back in completing the assignment. (1 posting) • One member informed the group that since the first assignment had been submitted online, it was now time to think of the second assignment. Other member reminded the group to start thinking of the second assignment. A member asked the group to state the date specifically to start discussing Assignment 1. (5 postings) • One member informed the group that he had prepared the audio materials for the second assignment. He described to another curious member how he had changed the audio file format from midi to mp3 using an audio software called soundforge. The teacher interrupted the discussion to explain to the group that while it was not wrong to use soundforge, they would learn the software in another course later. A member raised a question to the member who used soundforge whether the audio file could be compressed. (9 postings)
Week 10 3-9 March 2008			
Week 11 10-16 March 2008	• Forum discussion (thread dated between 12 March – 3 April 2008)	• Online	• GL had agreed on the idea as suggested by a member in another thread that the group should continue using the materials from the first assignment to start the second assignment. She invited the group to suggest the time, date and venue to meet face-to-face. A member negotiated the date for the meeting with the group

			because there were certain dates she could not make as she had tests for other subjects. After the group had compromised on the date, GL began to re-confirm the face-to-face meeting. The face-to-face meeting was to be held on 21 March 2008. She explained to the group how the overall picture of her visualization of the courseware development for the second assignment should be. The teacher praised her ideas on the courseware. The group also discussed the features of the authoring software. GL added some suggestions about her group member's ideas about the courseware. GL announced to the group that the venue for the face-to-face meeting on 21 March would have to be changed because the place previously suggested was not convenient. (23 postings)
Week 12 17-23 March 2008	• Communication through mobile device • Meeting (21 March 2008)	• Text messaging • Face-to-face	• GL reminded the group to attend the meeting. • Testing the compatibility of the content materials with the authoring software for the second assignment; finalising the content flow of the courseware; packaging the courseware; identifying any faults after the packaging process/ Once the group were satisfied, GL was ready to upload the assignment.
Week 13 24-30 March 2008	• Brief meeting after the class • Forum discussion (thread dated between 27 March – 16 April 2008)	• Face-to-face • Online	• Discussing the third assignment and re-confirming each and every member's task. • There had been suggestion by one member that the group should start working early on Assignment 3. GL agreed and asked the group straight away to propose the date, time and venue for the next face-to-face meeting. GL informed the group that she would be away for a few days and reminded them to continue working on their tasks and discussing online. GL gave her e-mail address should the members had important matters to refer to her while she was away. One member suggested a new date. GL further suggested the ideal features and layout of their Assignment 3 should look like. (23 postings)
Week 14 31 March – 6 April 2008	• Asynchronous communication	• E-mail	• Some group members sent their work for the third assignment to Choy for review before their face-to-face meeting in the following week.
Week 15 7-13 April 2008	• Meeting (8 April 2008) • Meeting (11 April 2008)	• Face-to-face • Face-to-face	• Gathering all content materials; identifying the compatible format files for the authoring software; solving problems related to the content flow of the courseware. • Packaging the courseware; GL was ready to submit to the teacher.

5.6.4 Identifying learning strategies from online and face-to-face discussions

In order to identify learning strategies from online and face-to-face discussions, I referred again to the coding manual for patterns by Saldana (2009). In qualitative approach, a code is a word or short phrase that represents a specific attribute from data sets. The data were the learning strategies embedded within the summaries of the online and face-to-face discussions from the table for blended activities. Each unit of data (as represented by specific learning strategy) was marked and given its own unique code. For example, the learning strategy of "reminding group members of the due date for the assignment" was assigned as Strategy V. Another learning strategy of "assigning tasks to group members" was marked as Strategy XI. When the same learning strategy was employed by the students repeatedly during online and face-to-face discussions throughout the semester, it became a "repetitive pattern of action" and the same code was used to mark them.

The summaries of the learning activities in the online and face-to-face mode were read several times so that a deeper understanding could be developed before any conclusions were made regarding categories and general themes. As the table above shows, several blended strategies could be identified from group 1. These blended strategies were listed in the blended learning strategy map. Each strategy was numbered with a strategy category (table 5.5). However, strategy of XIII (checking file format compatibility), XIV (rectifying the content materials) and XV (checking the flow of content materials) were the only strategies that could not be conducted in blended mode due to the limitation of the VLE system.

Table 5.5: Using the blended learning strategy map to list the learning strategies derived from the first group.

Learning Strategy	Labels	Online Mode	Face-to-face Mode
I.	Fixing the time, date and venue for the face-to-face meeting	√	√
II.	Welcoming new members to the group	√	√
III.	Exchanging mobile phone numbers with group members	√	√
IV.	Reminding group members of the oncoming face-to-face meeting	√	√
V.	Reminding group members of the due date for the assignment	√	√
VI.	Reminding group members to communicate through online forum	√	√
VII.	Introducing working procedures for the group	√	√

VIII.	Confirming with group members the oncoming face-to-face meeting	√	√
IX.	Brainstorming/discussing ideas and suggestions for the topic of the assignment	√	√
X.	Brainstorming/discussing ideas and suggestions for the content of the assignment	√	√
XI.	Assigning tasks to group members	√	√
XII.	Discussing with the group the compatibility of the file formats with the authoring software	√	√
XIII.	Viewing and checking the content materials for the assignment, whether the file formats were compatible with the authoring software	X	√
XIV.	Rectifying the content materials for the assignment so that the file formats were compatible with the authoring software	X	√
XV.	Checking the flow of the content materials of the assignment	X	√
XVI.	Submitting assignment	√	√
XVII.	Appreciating the concerted effort and work from group members in completing the assignment	√	√

Next, these learning strategies were labelled in the table for blended activities of the second group (table 5.6).

Table 5.6: Labelling the learning strategies in the table for blended activities of group 2

Week	Meeting/Discussion/Communication	Mode	Strategies
Week 1 31 Dec 2007-6 Jan 2008	• Brief meeting after the class	• Face-to-face	• Getting to know group members from other courses for the first time; exchanging mobile phone numbers. [strategy III]
Week 2 7-13 January 2008	• Brief meeting after the class	• Face-to-face	• Planning for a face-to-face meeting [strategy I] but the group was unsure as other members had unresolved issues with the schedule of other subjects.
Week 3 14-20 Jan 2008	• Brief meeting after the class	• Face-to-face	• Meeting a new member.
Week 4 21 – 27 Jan 2008	• Forum discussion (thread dated between 22 Jan – 21 Feb 2008)	• Online	• One member welcomed a new student who had just joined the group [strategy II]. Another member also welcomed the new member and hoped that the group could get along with each other to complete Assignment 1. The new member appreciated the warm welcome from the group. Another member raised the question as to when exactly they had to start working on the first assignment. (5 postings)
Week 5 28 Jan – 3 Feb 2008	• Forum discussion (thread dated between 31 Jan – 26 Feb 2008)	• Online	• One member started the forum by asking every member to identify their strengths and skills before starting with their first assignment. Some members admitted that they were not really good with graphics and authoring software. However, the group's discussion was not really in-depth. (6 postings)

Week 6 4-10 Feb 2008	• Brief meeting after the class	• Face-to-face	• Finding out from the group about the decision to select a topic for the first assignment but no final decision was made. The GL reminded the group of the postponement of the due date for the first and second assignment to Week 4 and Week 8 respectively [strategy V]. Identifying each member's strengths and skills before starting with their assignment. Assigning tasks to each group member [strategy XI]. The GL suggested the group communicate online in a synchronous way.
Week 7 11-17 Feb 2008	• Brief meeting after the class	• Face-to-face	• The topic was decided but not confirmed as the other two members were absent. However, the group continued with their discussion
Week 8 18-24 Feb 2008	• Forum discussion (thread dated 19 Feb 2008) • Communication on mobile device • Meeting (20 February 2008)	• Online • Text messaging and/or call • Face-to-face	• Two members were asking the group whether they had decided on any topic for the first assignment. (2 postings) • Reminding the group of the oncoming meeting on 20 February 2008.[strategy IV] • During the meeting, the two members who were not sure of the topic were informed of the topic the group had selected earlier. Then, the group did strategy XI and XII. A member reminded the group to continue discussions online regarding their next face-to-face meeting [strategy VI]
Week 9 25 Feb – 2 March 2008	• Forum discussion (thread dated 25 – 27 Feb 2008) [The group communicated through online forum in a synchronous mode.] • Meeting (27 February 2008)	• Online • Face-to-face	• The GL suggested the group meet on 27 February 2008. One member could not make it as she had another activity. However, the proposed meeting went ahead. (8 postings) • During the meeting, the group used [strategies XIII, XIV and XV]. The group leader was ready to upload the first assignment. The group planned to use the existing materials for their second assignment to extend to be their third assignment. However, no final decision was made.
Week 10 3-9 March 2008	• Forum discussion (thread dated 3 – 4 March 2008)	• Online	• One member reminded the group to proceed with the discussion for the third assignment even though they had not completed Assignment 1. However, another member recommended the group to be patient as the second assignment had not been completed yet. (3 postings)
Week 11 10-16 March 2008	• Forum discussion (thread dated 10 – 18 March 2008) [The group communicated through online forum in a synchronous mode.]	• Online	• Since the second assignment had been uploaded (before the due date), one member asked the group whether they should continue using the second assignment materials and extend them for their third assignment. Another member suggested 2 dates for the face-to-face meeting. No confirmed date was discussed on the forum. However, the face-to-face

			meeting was conducted during the weekend (15 March 2008). (7 postings)
	• Communication on mobile device	• Text messaging and/or call	• Reminding the group of the oncoming meeting on 13 March 2008 [strategy IV]
	• Meeting (13 March 2008)	• Face-to-face	• During the meeting, the group did strategy XI and XII. The GL reminded the group of the next meeting which was in two days time[strategy IV].
	• Meeting (15 March 2008)	• Face-to-face	• During the meeting, the group did strategy XIII, XIV and XV. The GL was ready to upload the second assignment. The GL reminded her members of the next meeting, which was scheduled for 20 March 2008.
	• Forum discussion (thread dated 10 – 17 March 2008)	• Online	• The GL informed the group that they could get a copy of the second assignment from her. (3 postings)
Week 12 17-23 March 2008	• Brief meeting after the class	• Face-to-face	• The group had a brief discussion to decide for a face-to-face meeting on 1 April 2008.
Week 13 24-30 March 2008	• Meeting (1 April 2008)	• Face-to-face	• The group met to discuss the third assignment. One member was not informed either through text messaging or through online forum.
Week 14 31 March – 6 April 2008	• Forum discussion (thread dated 2 – 22 April 2008)	• Online	• One member asked when the group would hold the next meeting to discuss the third assignment. Another member informed him that they had already conducted the meeting without him (5 postings).
Week 15 7-13 April 2008	• Brief meeting after the class	• Face-to-face	• The group updated one member about what they had discussed earlier(the member was not at the meeting because the group did not inform him) about it. The GL mentioned to the group the need to communicate among members.
	• Forum discussion (thread dated 10 – 22 April 2008) [The group communicated through online forum in a synchronous mode]	• Online	• One member asked the group what other materials they would want to add in the third assignment. Other members suggested banner, pictures, videos and animation. However, one particular member reminded the group that while it was important to have attractive pictures and animation in their courseware, the main focus should be on the content [strategy IX and X]. (5 postings)
	• Forum discussion (thread dated 10 – 22 April 2008) [The group communicated through online forum in a synchronous mode]	• Online	• The GL tried to find out from the group if any one of them knew how to use FrontPage software as required by the third assignment. One member brought up a specific question on the feature of "bookmark" in the software. Other members responded to the inquiry by saying that they were also not sure of the specific features. At the end of the discussion, one member elaborated technically upon the use of "bookmark" and listed the somewhat detailed instructions. (6 postings) •

Week 16 14 – 20 April 2008	• Communication on mobile device • Meeting (15 April 2008)	• Text messaging • Face-to-face	• Reminding the group of their last face-to-face meeting on 15 April 2008 [strategy IV]. • During the meeting, the group did strategy XII, XIII, XIV and XV.
Week 17 21 – 27 April 2008	• Forum discussion (thread dated 22 April 2008)	• Online	• The GL confirmed with the group that the third assignment had been submitted, and thanked the entire group for their co-operation [strategy XVII]. (1 posting)

Group 2 introduced an additional new strategy whereby the group communicated through an asynchronous online forum in a synchronous mode. This strategy was carried out as follows. All group members agreed to log into the forum at an agreed specified time and this was planned earlier. When a message was sent by one member, the group continued to respond and provide synchronous feedback as if they were instant messaging. This could be seen from the forum record as each message had the time it was sent alongside the message itself and the time on each posting followed closely to previous ones. The following is an example of how members in group 1 communicated synchronously using the online forum (figure 5.4).



Figure 5.4: An example of how group 2 communicated synchronously using online forum

The strategy was included in the list of blended learning strategies used by group 2 (table 5.7).

Table 5.7: Using the blended learning strategy map to list blended strategy categories from both groups.

Strategy Category	Labels	First Group		Second Group	
		Online Mode	Face-to-face Mode	Online Mode	Face-to-face Mode
I.	Fixing the time, date and venue for the face-to-face meeting	√	√	√	√
II.	Welcoming new members to the group	√	√	√	√
III.	Exchanging mobile phone numbers with group members	√	√	√	√
IV.	Reminding group members of the oncoming face-to-face meeting	√	√	√	√
V.	Reminding group members of the due date for the assignment	√	√	√	√
VI.	Reminding group members to communicate through online forum	√	√	√	√
VII.	Introducing working procedures for the group	√	√	This strategy was not used	
VIII.	Confirming with group members the oncoming face-to-face meeting	√	√	√	√
IX.	Brainstorming/discussing ideas and suggestions for the topic of the assignment	√	√	√	√
X.	Brainstorming/discussing ideas and suggestions for the content of the assignment	√	√	√	√
XI.	Assigning tasks to group members	√	√	√	√
XII.	Discussing with the group the compatibility of the file formats with the authoring software	√	√	√	√
XIII.	Viewing and checking the content materials for the assignment, whether the file formats were compatible with the authoring software	X	√	X	√
XIV.	Rectifying the content materials for the assignment so that the file formats were compatible with the authoring software	X	√	X	√
XV.	Checking the flow of the content materials of the assignment	X	√	X	√
XVI.	Submitting the assignment	√	√	√	√
XVII.	Appreciating the concerted effort and work from group members on completing the assignment	√	√	√	√
XVIII.	Communicating through asynchronous online forum in a synchronous mode	This strategy was not used		√	X

5.7 Reflections on the data collection

The table of blended activities and blended learning strategy map developed in this phase were found to be highly appropriate instruments to analyse data from online and face-to-face interactions in blended environment. The data analysis (table 5.5 dan 5.7) revealed useful information in relation to the learning strategies these two groups were using to blend the face-to-face and the online modes to complete their assignments.

Although 18 learning strategies were conducted during the reconnaissance phase (table 5.7), it was not an easy process to identify those strategies. There were two significant weaknesses with the data gathering using the online forum and face-to-face meeting reports.

First, not all conversations in the threaded discussions could be followed smoothly especially when the flow of the discussions became disconnected as the online forums were not used systematically. The messages were arbitrarily posted in different threads. The raters/readers had difficulties following the online discussions and had to search other threads for the continuation of the discussions. The discussions seemed confused and disorganised. For example, learning strategy of *confirming with group members the oncoming face-to-face meeting* [strategy VIII] for their first meeting was traced from the online forum but the continuation of the discussion was not found in the face-to face meeting report. However, the strategy VIII for their second meeting was found in the online discussions but was not reported in their face-to-face interactions. Another example was the strategy of *introducing working procedures for the group* [strategy VII] where it could be found in the face-to-face meeting but could not be traced in the online discussions. Thus, summarising the online discussions became a time-consuming process.

Second, as for the face-to-face meeting, although the groups summarised their own reports, some contents were brief and lacked key information. For example, I had expected them to continue discussing their assignments in the online forum after they had met face-to-face or vice-versa. When I analysed the data, I had difficulties looking for similar

learning strategies used in the online forum and the face-to-face meeting reports. Thus, I had to ask the group leader to explain their reports.

In solving these problems in the next cycle, I introduced two interventions. First, as a teacher, I had to play an effective role in guiding the students to use the online forum effectively. The group should be told to specify a single online thread for a specific discussion so that when they met face-to-face, they knew exactly what they wanted to discuss and which learning strategy they should use so that there would be a systematic co-ordination between online and face-to-face interactions. The strategy of using the (asynchronous) online forum in a synchronous mode introduced by the second group was an innovative strategy. Salmon (2004) suggests teacher should constantly guide the students on the use of the forum and supervise their online discussions. Andererson, et. al. (2001) describe the importance of the teacher's involvement in motivating the students to develop successful online discussions. Second, I had to develop a strategy to keep the group working as a co-operative team throughout the semester and building team synergy to complete their assignments.

As more details were required on integrating face-to-face with online learning activities, the other research instruments identified in table 5.1 (students' peer assessments, the students' reflective journals, interviews and my personal observations) are included in the next cycle. First, working in group requires all team members to take responsibility and to focus on collective effort. In term of teams and group accountability, peers are considered the most appropriate evaluators of the group members. Second, the students' reflective online journal would provide some reflections throughout their module. It was expected that the journal entries would be regular to help students understand the purpose of the module conducted in a blended mode. Third, an interview needed to be conducted with the leader representing the group to further understand how the group worked in blended mode. This would allow me to gain more insight into each student working collaboratively with other members in the group. Fourth, my observations (as teacher and researcher) would be supervising the students' online and face-to-face discussions and overseeing the use of the data collection instruments.

5.8 Conclusion

This reconnaissance study was a starting point in providing me with an initial insight into how to conduct research into blended learning. It allowed me to carefully make further intervention plans in which part of the module face-to-face and online activities could be blended. There are still much that could be improved, especially refining the research instruments in gathering and analysing the online and face-to-face discussions. In the next chapter for the first research cycle (Chapter 6), the methods for data collection and data analysis were further refined.

Chapter 6

Research Cycle 1: Plan & Act

6.1 Introduction

This chapter describes the planning phase of the first action research cycle. It is one of the stages in a cycle formation that involves the evaluation studies and the reconnaissance phase. However, research cycle 1 is not conducted to address the research questions yet. It serves two important purposes. First it describes the research preparations and procedures as a result of the interventions introduced in the reconnaissance cycle. Second, it develops a more detailed understanding on data collection on learning and teaching strategies in blended learning.

6.2 The findings from the reconnaissance cycle

The findings from the reconnaissance study provided a basis for conducting blended learning research for the first research cycle. It was found that the two groups involved in the study were generally not using the online forum and the face-to-face meeting reports systematically. There were certain important discussions on assignments discussed in the face-to-face meeting rather than in the online forum, and because they were not recorded, there was some confusion about what had been agreed. The main problem lay in the co-ordination of online discussions and face-to-face meetings when working in a blended mode. Thus, it was important to develop effective learning strategies that could guide students on how to work in both modes.

The reconnaissance study suggested two new strategies that could support the learning process within the groups – a strategy to communicate synchronously through an asynchronous online forum and a strategy to bind the group to work as an effective team. These new strategies were used as part of the interventions.

6.3 Preparing for the first research cycle

It was important to develop an understanding of the ways the online forum and the face-to-face meeting were used, so that, as a teacher, I could offer guidance to the students. The guidance offered was not just at the start through the recommendations I proposed but throughout the module, and in particular when they had completed their first and second assignments. There was a need to provide groups with formative feedback on effective strategies so that the groups studying the module, as well as future students, would benefit from the action research.

The two strategies of the interventions derived from the reconnaissance cycle were introduced. The interventions introduced were (a) improving the use of the online forum and (b), the face-to-face meeting and promoting effective teamwork. As more data was needed from the students, the research instruments derived from the evaluation studies – students' peer assessment, the students' reflective journals, interviews and my observations (as the teacher and the researcher) – were also introduced in this first cycle.

6.3.1 Introducing effective strategies for online forum use

Implementing successful online discussion relied on students using the forum strategically and communicating effectively throughout the module. The online forum allowed the students to participate in on-going discussions in completing their assignments. The forum was to support them in exploring the content of their assignment and to further discuss the final products. The forum could also be used to provide a record of work already completed. In order to encourage meaningful participation rather than high numbers of unhelpful postings to gain a high mark, the students were informed that the quality of discussion was to be taken into account in the assessment rather than the quantity of messages being posted on the forum. The students' role was to take charge of their own discussion. Three important strategies were suggested – conducting synchronous communication, uploading materials and specifying a single thread for specific discussion

6.3.1.1. Introducing synchronous communication through an asynchronous online forum

It was found from the reconnaissance study that communicating synchronously using an asynchronous online forum was an effective means of organising group work. In this first cycle, the value of synchronous communication through the online forum was emphasised. Synchronous communication allowed for real-time interaction between members and this supported two important aspects. First, online forum discussion is an asynchronous tool and thus communication occurs at different times and places. However, the online forum could also be used to communicate synchronously as a means of 'chatting' amongst group members. Second, from the perspective of pedagogy, Chickering and Gamson (1991) state that the advantage of chatting is that it provides immediacy in both online and face-to-face mode. For Robert and Dennis (2005), synchronous communication allows the users to feel motivated to read the message and respond to it immediately.

One issue when interacting synchronously through an online forum was that meetings have to be organised and members have to recognise the importance of keeping to the set times, for example, turning up on time for the online group work. However, through this online synchronous forum, the content of the discussions would be permanently recorded. Although this meets the need for the group to have accurate records of decisions made, it could have led to some group members missing meetings, as they could catch up on progress without contributing anything.

6.3.1.2. Uploading materials in the online forum

From the findings in the reconnaissance study, it was interesting to note that the group did not use the online forum discussion only as a platform to convey ideas or thoughts in text, but used it also to upload materials such as documents and multimedia files. It seemed effective for the group as they did not have to wait until the next face-to-face meeting to discuss the materials and to engage in further discussion. Therefore, this strategy was also recommended as part of the interventions introduced in this first cycle.

6.3.1.3. Specifying a single thread for a specific topic of discussion

The reconnaissance study found that some groups did not use the online forum systematically which led to the occurrence of an arbitrary communication pattern across different threads. The suggestion was that if they wanted to start discussing the interface of the main menu, they should create a new thread. This strategy would enable the students to easily contribute their ideas and see how their ideas developed over time. The advantages were: (1) the group discussion would be more focussed, (2) the members could respond to the previous comment easily, (3) the group could follow the directions of the discussion, (4), the discussion would be organised and (5), would be content-rich. As a result, the online discussions looked well-organised and the thread would be easy to follow. This was vital not only for the students to make use of this to support their understanding and decision making but to allow effective analysis of the transcript for the research. There are several approaches that have been used to analyse online forum transcripts, for example, Gunawardena, Lowe and Anderson (1997) and Garrison et al. (2000). The outcome of the online text-based discussion could then be effectively used at the face-to-face meetings to support the on-going group work.

6.3.2 Preparing face-to-face meeting report

The reconnaissance study found that the face-to-face meeting reports submitted by the students were brief, lacked detail of how they worked face-to-face and did not seem to correspond with their online discussions (section 5.7). The reports also lacked clarity as to how the group agreed on issues such as selecting the topic or content materials for their assignment. In order to ensure the face-to-face discussions would be productive in this cycle, I reminded each group that the contents of their meetings needed to include the task flow and the work distributions in completing each assignment. Most importantly, the reports needed to complement their discussion in the online forum. For this action research cycle to support this process, all groups were expected to submit their face-to-face meeting reports at the end of the module.

6.3.3 Promoting team work among group members

The intention of the collaborative work was to generate deeper levels of understanding (Chang & Fisher, 2003). It was expected that the students would collaborate effectively and value the online as well as the face-to-face aspects of this collaborative work. Throughout the assignments, the students were required to work with other members as a team. It was important to ensure that the students' discussions were fully engaging with key courseware design issues. There was a need to advise every member to contribute their ideas to the discussion so that any decisions were always made by the group instead of a single member. Whether discussing online or face-to-face, each group member needed to learn to respect the views of other members. I was aware of the challenges involved in getting the students to work in a group. Thus, it was important for me to ensure that the students were prepared before any group discussions began. I also introduced two important written documents to support teamwork in this first cycle – the learning contract and the netiquette document.

6.3.3.1. Introducing the learning contract to the groups.

According to Bennett and Dunne (1991), when students are placed in groups, it is unlikely that they will work collaboratively straight away. Every individual needs to be made aware of the need to take responsibility for their own learning and for working collaboratively with group members. An online forum does not automatically produce online collaboration, so online social interaction has to be practically encouraged (Hathorn and Ingram, 2002). However, the outcomes of effective collaborative working are that every member benefits through the exchange and creation of new knowledge. There is the potential for changes in mental models and knowledge construction that support critical thinking (Jonassen et al., 1995). The skill of critical thinking has been shown to increase a student's abilities to formulate their own perspective on learning, improve their decision-making, and control their learning circumstances (Youngblood & Beitz, 2001). In order to get the group to work as an effective collaborative team, a learning contract was introduced. The learning contract was a formal written agreement intended to support collaboration and was given to the teacher (the researcher) once it was completed, with a copy kept by each group member. According to Berggren and Söderlund, (2008), the

contract also helps the teacher and the students to evaluate whether they met the learning and teaching objectives. In this first research cycle, I asked each group to prepare their personalised group learning contract. I guided each group in using the learning contract. With my assistance, the group formulated their own learning objectives for completing the assignments. Both the teacher and each group kept a copy of this agreement as an example of a learning contract.

6.3.3.2. Introducing netiquette to the groups.

Netiquette is the code related to acceptable and courteous behaviour when interacting with others online. When the students meet face-to-face, their body language and tone of voice indicates their behaviour, and groups will be familiar with what is acceptable. Online interaction can take different forms, such as chat, social networking and formal discussion, and the students need to be aware of the need for appropriate postings within the course discussions (Wang & Woo, 2007). The transcripts of online communication remained as permanent records in the e-learning system, and could be re-read at a later time. The students needed to be aware of this and adopt appropriate language when communicating with other members and the teacher.

The beliefs and experiences expressed by a student could be viewed differently by another student. In order to make the communication more effective, the students had to double check their writing, particularly the use of punctuation and consecutive capitalisation, before posting the messages to the forum. The students had to know when to contribute their opinions to a discussion, how to read other members' feedback meaningfully, and how to respond cordially to any ideas brought up by the group. The messages had to say what they were intended to say. It was important to ensure that the online discussion encouraged the students to analyse alternative ways of thinking and explore their own experiences so they could deliver their thoughts and become better critical thinkers and contributors. They were made aware of the need to be considerate, challenge ideas but not the person, and learn to compromise in order to move things forward. The netiquette document used was taken from a website and is shown in appendix 3.

Besides the online forum and face-to-face meeting report, the other research instruments derived from the evaluation studies (chapter 4) are peer assessment, student's reflective online journal, interview and researcher/teacher's observation.

6.3.4 Assessing peers in each group

Peterson and Peterson (2011) refer to two types of peer assessment from the literature – members who *rank* other members in a team and members who *rate* other members. In the ranking method, members who contribute more would be awarded higher marks, while members who contribute less received lower marks (Carson & Glaser, 2010), while the rating method states that a member is assessed based on his performance characteristics and not related to the rating by his teammates (Li, 2001). Based on suggestions from Falchikov and Goldfinch (2000) and Lejk and Wyvill (2001), Peterson and Peterson (2011) refer to peer ranking methods as more suitable for grading. The rubric for peer assessment introduced in the evaluation studies (appendix 1) was used to assess each member's contribution to the group.

6.3.5 Capturing students' reflections through their reflective online journal

The journals not only offered insights into the strengths and weaknesses of the online subject module from the student's perspective, but they also provided insights into the criteria that the students applied in assessing the subject. Through this journal, the students could communicate privately with me. They could reflect on what they had been doing in completing their assignments, as part of the learning process. Although I did not make use of the online journal compulsory for this first research cycle, it seemed to me it had the potential to capture additional data about the students' reflections on the collaborative group work, and more generally, about how effectively they had been working in a blended mode. I could also respond to any inquiries from the students and provide frequent and timely feedback. There have been various discussions on the advantages of using online journal in the literature. For example, the journal could be used as a tool to reflect students' learning (O'Connel & Dyment, 2006; Roberts, 2009), encourage active learning and professional practice (Thorpe, 2004) and become aware of the progress of their learning (Chirema, 2007). Fell et al. (2003) state that reflective online journals can assist

the teacher to keep track of students' progress with the subject content and online activities, as well as identify areas where students have most difficulties. As the content of the reflective journal could be considered confidential, it could promote a critical analysis of the activities by the students. Gillis (2001) adds that an online reflective journal helps students to make a link between themselves and their professional roles, which eventually promotes their professional development. For Glaze (2002), the use of a reflective journal promotes students' confidence in making decisions in their professional fields.

6.3.6 Interview

Conducting an interview in the qualitative approach is "a one-to-one session in which the researcher asks a series of open-ended, probing questions" (Gay (1996), pp. 223). In this first cycle, I conducted interviews only with the leaders, as they represented the group members. I used a face-to-face, one-to-one semi-structured interview technique. Each interview session lasted thirty to forty five minutes. The purpose of the interview was to find any discrepancies between what was recorded in the discussion forum and what subsequently seemed to take place in the face-to-face meeting and vice versa, or to find any missing data that could have related to missing strategies that the students were employing in this blended learning situation. (see appendix 9) The interview was also used to get a clearer picture of how the group members worked as a team. The group members had by that time submitted peer assessment marks, and I studied these before each interview. Besides peer assessment, the students' reflections in the online journal on the module or groups' co-operations could potentially be used to derive additional questions. The interviews were audio recorded and then transcribed.

6.3.7 My personal observations

As I would be teaching throughout the semester, I would be involved in the research setting and functioning as a participant observer to gather data and generate findings (see 3.11).

6.3.8 The research setting

The research setting for the first cycle was the same as in the reconnaissance phase. The research study on blended learning was conducted within the Faculty of Education, University Technology Malaysia and as an action researcher, I was directly involved in designing and teaching the module. The delivery format of the module was a weekly two-hour lecture over 15 weeks. However, the blended learning strategies that facilitated a meaningful integration of online and face-to-face activities working on three different assignments in a semester-long team project were the main focus. The class was divided into small subject discipline groups comprising three to five students (see 6.3.9 for the sampling strategy). The three assignments required the students to work in permanent learning groups throughout the semester. Thus, the group would be responsible for completing all three assignments and ultimately, the intention was to provide a sense of ownership among the group members. The three assignments are described in table 6.1.

Table 6.1: Three assignments for the module of CD-ROM-based Multimedia Development

Assignment	Tasks
Assignment 1	The assignment required every group to produce Courseware Documentation, for example, documents that are needed before and during the development process of the courseware. To include the following items. • Learning problem • Solutions to learning problems • Courseware learning objectives • Selecting learning approach • Content of the courseware • Flowchart • Draft of the storyboard (front page, main menu, 2 screens of subject content, 2 screens of exercises, positive feedback, negative feedback, activities) • Budget and costing on the courseware development • Gantt chart produced by appropriate software outlining the tasks, time and resource allocation • References
Assignment 2	Based on what the groups proposed in the documentation for assignment 1, the actual courseware prototype was developed in the form of

	educational multimedia courseware. Each group determined their own topic which had to relate to students' subject discipline groups.
Assignment 3	Each group was required to produce a Final Report. This included the completed prototype courseware and all activities and tasks undertaken by the each group member throughout the development process.

6.3.9 The research sampling

Forty-two students (42) from three different subject disciplines (physics, chemistry and science), studied the module. A purposeful sampling approach was taken as discussed in 5.4.2. As in the reconnaissance study, the students were divided into small groups. However, each group of 3 to 5 students was required to include members from each subject discipline. The group had to collaboratively decide upon the topic for the assignments.

6.4 Planning for the data analysis

The same table of blended activities from the reconnaissance cycle was used (table 5.1). However, the blended learning strategies map (table 5.2) would be modified when the new coding strategy was adopted in this cycle. With more data from peer assessment, reflective online journal, interviews and observation, I could delve deeper into the structure of working in a blended learning.

6.5 Conclusion

This chapter presented several important new interventions in action research cycle one to provide further data on the strategies that groups were using to support their learning in this blended learning context. These interventions were related to improving the data collection and to enhancing the teaching and learning process, using VLE.

Chapter 7

Research Cycle 1: Reflect

7.1 Introduction

This chapter describes an in-depth analysis of the data on students' learning strategies in blended environment. The first research cycle is not conducted to address the research question yet but to reflect on the findings using the 3 sub-triangles of activity theory so as to derive interventions on what other aspects on data collection and analysis that should be improved.

7.2 The data analysis strategy

The strategies to analyse the data in this cycle involved (1) developing coding strategy, (2) improving the strategy of summarising each group's online discussions, (3) gathering the summaries of each group's face-to-face discussions from their meeting reports, (4) analysing the summaries of the online and face-to-face discussions in the table for blended activities using the new coding strategy, (5) analysing data gathered from peer assessment, reflective online journal, interviews and observations and (6), reflecting the data analysis based on the three sub-triangles of activity theory.

7.2.1. Developing a coding strategy

Before starting with data analysis, a systematic coding strategy was developed. There are 18 learning strategies adopted by the students working in a blended mode identified from the reconnaissance phase (chapter 5). Based on the "bottom-up" approach outlined by Creswell (2008), I grouped these learning strategies in such a way as to arrive at specific categories and general themes. The first task was to assign several learning strategies to a single strategy category. Eleven main strategy categories were identified. These were: reminders, scheduling, confirmation, communication, motivation, socialisation, introduction, organisation, brainstorming, assignment engagement, and administration.

Secondly, the strategy categories were further grouped into three main themes: action planning (AP), group development (GD), and task-related (TR). From this coding, a new blended learning strategies map for this research cycle (table 7.1) was developed.

Table 7.1: The first draft of the new blended learning strategies map that was formed based on the learning strategies derived from the reconnaissance phase.

Themes	Strategy Category	Strategies
Action Planning [AP]	1. Reminders [AP]	1.1. Reminder of the face-to-face meeting 1.2. Reminder of the online meeting 1.3. Reminder of the due date for the assignment
	2. Scheduling [AP]	2.1. Scheduling the date, time and venue for the face-to-face meeting
	3. Confirmation [AP]	3.1. Confirming the date, time and venue for the face-to-face meeting
	4. Communication [AP]	4.1. Exchanging mobile phone numbers
		4.2. Communicating through asynchronous online forum in a synchronous mode
Group Development [GD]	5. Motivation [GD]	5.1. Appreciating the group' efforts/works in completing the assignment
	6. Socialisation [GD]	6.1. Welcoming new members to the group
Task-related [TR]	7. Introduction [TR]	7.1. Introducing working procedures for the group members
	8. Organisation [TR]	8.1. Assigning/dividing tasks to the group members
	9. Brainstorming [TR]	9.1. Brainstorming for the assignment topic 9.2. Brainstorming for the assignment materials
	10. Assignment Engagement [TR]	10.1. Discussing the compatibility of the file formats with the authoring software
		10.2. Identifying any compatibility problems of the file formats with the authoring software 10.3. Rectifying any compatibility problems of the file formats with the authoring software. 10.4. Checking the flow of the content materials of the assignment
	11. Administration [TR]	11.1. Submitting assignments

The coding process involved using [Theme-Strategy Category-Learning Strategy] labels. For example, if the learning strategy of 10.1 (discussing the compatibility of the file formats) was discovered in the table of blended activities of the group, it was coded as

[TR-ASSIGNMENT-10.1] (see table 8.5). An example of how this was applied to identify the learning strategies used by each group is shown in table 8.7.

In order to make the coding process in identifying learning strategies used by each group transparent, I referred to the concept of trustworthiness by Lincoln and Guba (1985) who divide it into credibility, transferability, dependability and confirmability.

Credibility is achieved after a prolonged involvement in a study and receiving criticisms or comments from peer reviewers. As the development of the coding strategy in this study was identified as a process, it needed to be credible and in addressing this, I employed two techniques. Firstly, I referred to the coding manual by Saldana (2009) where similar coded data are grouped into categories which share the same criteria. However, as it was rare to get the right coding in the first cycle, these data could be re-coded and re-categorised. Secondly, I used the technique of "member checking", as it is the most important technique to establish credibility (Lincoln & Guba, 1985). This technique refers back to the students to double check certain learning strategies derived from their conversations in the online forum discussions that could have been summarised or interpreted incorrectly. The students would indicate the correct summary/interpretation.

Transferability refers to a detailed description of the research setting that generates findings that could be applied to other settings. In addressing transferability, the map (table 7.1) is used as a guideline to identify learning strategies conducted in a blended mode. The map could also be used in other courses or modules as it helps the researcher identify learning strategies and not the content subject.

In addressing the dependability and confirmability, I use an audit trail which provided a clear explanation in developing the blended learning strategies map. Lincoln and Guba (1985) refer to Halpern's (1983) strategies to describe the research process when developing an audit trail which includes raw data, data reduction and data reconstruction. I sought help from an expert in collaborative learning, to audit the raw data of the students' discussions in the online forum from the reconnaissance phase, the data reduction through

the summarising process of their online discussions, and the data reconstruction when the learning strategies derived from the table for blended activities were further coded and categorised.

7.2.2. Summarising online discussions and gathering face-to-face meeting reports

The process to identify learning strategies from online and face-to-face discussions involved summarising the discussions from the online forums and gathering face-to-face meeting reports from all groups.

7.2.2.1. Gathering postings from the online forums

In this cycle, the respondents were divided into eight groups. The way of knowing how much they had discussed online was through the number of messages posted in the forums. At the end of the semester in which the course was taught, I had compiled all the transcripts of the online forum from each group. Figures 7.1 and 7.2 show examples of the online discussions for groups 2 and 3.



Figure 7.1: An example of an online discussion by group 2



Figure 7.2: An example of an online discussion by group 3

There were 348 forum posts for assignment 1, 695 for assignment 2 and 145 for assignment 3. In total, there were 1188 postings. The detail of the messages posted in the forum by each group is shown in table 7.2.

Table 7.2: The number of message postings for assignments 1, 2 and 3.

.	Number of messages posted in the online forum discussion for assignment 1	Number of messages posted in the online forum discussion for assignment 2	Number of messages posted in the online forum discussion for assignment 3	TOTAL
Group 7	46	132	21	199
Group 5	70	88	31	189
Group 6	53	110	20	183
Group 8	66	90	17	173
Group 2	28	77	26	131
Group 3	30	83	12	125
Group 4	36	56	13	105
Group 1	22	59	5	86
OVERALL TOTAL	348	695	145	1188

Table 7.2 shows that group 7 had the highest number of messages posted in the online forum throughout the three assignments, while group 1 had the lowest. For each group, an

online forum was provided to discuss each of the three assignments in turn. Each online forum contained several threads as recommended, and the number of postings varied for each group for each of the assignments, though for each group the second assignment had the highest number and the final assignment the lowest. In understanding the usage pattern of the online forum, it was important to know what was required for each assignment. In assignment 1, the brainstorming session was considered vital, as the groups were struggling to decide the topic for their courseware prototype. Group 5 made the highest postings with 70 messages, followed by group 8 (66 messages) and group 6 (53 messages). Group 1 made the lowest number of postings with 22 messages. In dealing with assignment 2, the groups needed more time to develop the prototype courseware with a need for many on-going adjustments to the design, and thus they had to communicate on a more frequent basis. Group 7 made the highest number of postings with 132 messages followed by group 6 (110 messages) and group 8 (90 messages). Group 1 once again posted the lowest number of messages (59 messages). As for assignment 3, online participation was much lower. This was due to the fact that the students were rushing to complete their prototype (assignment 3) and so preferred to meet more face-to-face than online. The highest postings was by group 5 (31 messages) while the lowest was group 1 (5 messages).

7.2.2.2. Summarising and identifying the learning strategies from the online forums

Each single thread of the online discussion was analysed and summarised to support the identification of the learning strategy. The process of identifying learning strategies from the students' online discussions was similar to the reconnaissance cycle (section 5.7.1).

7.2.2.3. Gathering the face-to-face meeting reports from each group

The process of preparing the face-to-face meeting reports was conducted in the same way as in the reconnaissance cycle (section 5.6.2). The reports submitted were well-prepared as each group was made aware of its proper preparation (section 6.3.2). However, in this cycle, all groups were required to upload their reports into the VLE besides submitting them in class at the end of the semester.

7.2.3. Analysing data from the summaries of online and face-to-face discussions

The summaries of the online activities and face-to-face activities from each group were placed in the table of blended activities. The process of analysing the data (the summaries of online and face-to-face discussions) started with applying the coding strategy that was developed for this cycle (section 3.2) with group 1, while identifying new learning strategies conducted both online and face-to-face.

7.2.3.1. Using the coding strategy

To begin with, the coding strategy (see 7.2.1 and table 7.1) was used to label learning strategies in the table of blended activities for group 1 according to the starting date of the discussion or meeting. The learning strategies that assisted the blended learning process, for example, ensuring the online and face-to-face activities were fully integrated, were then identified, and this process is described here and illustrated through the example of group 1 as shown in table 8.3. For example, group 1 met face-to-face on 10th of July 2008 where all members contributed their draft ideas on the most suitable topic for their assignments. On the 23rd, the members continued to contribute their ideas in the threaded discussions in their online forums; the strategy 9.1 [TR-BRAINSTORMING-9.1] was labelled in both places. The same process of labelling was used for other learning strategies. When existing learning strategy categories did not match what was recorded in the table of learning activities, new ones were added and an entry of ADDED LEARNING STRATEGY was placed in the table (see table 7.3).

Table 7.3: The table of blended activities for the group 1 was coded using the first draft of the coding strategies.

Group 1
No. of Group Members: 4
Course: CDROM-Based Multimedia Development

Week	Meeting/Discussion/ Communication/Event	Mode	Strategies
Week 1 7 - 13 July 2008	• Classroom Meeting	• Face-to-face	• During the class, the teacher made an important announcement. The proposed group leader must submit the list of their group members to the teacher and online.
	• Brief meeting after the class	• Face-to-face	• Getting to know group members from other courses for the first time [GD-SOCIALISATION-6.1]. The group also exchanged mobile phone numbers among members. [AP-COMMUNICATION-4.1]GL (group leader) scheduled the time, date and venue for the first meeting to start discussing their assignments. [AP-REMINDER-1.1][AP-SCHEDULING-2.1]. GL informed the group that she would be sending the list of the group members to the teacher by hand and through online forum [ADDED LEARNING STRATEGY]
	• Meeting for Assignment 1 (10 July 2008)	• Face-to-face	• In the first meeting, the group got to know each other further particularly identifying the members' expertise in developing the courseware using authoring or programming software [ADDED LEARNING STRATEGY]. They discussed the coursework requirement (completing 3 assignments) throughout the semester. At this point, the group leader would be appointed based on their English cloze test. GL acted as a temporary group leader. GL led the discussion and began assigning tasks to each member [TR-ORGANISATION- 8.2]. For the first task in this meeting, all members contributed their draft ideas on the most suitable topic for their assignments [TR-BRAINSTORMING-9.1]. For each topic proposed by the group, they also provided ideas as to where the sources were easily available [TR-BRAINSTORMING-9.2]. As a start, the group planned to develop an interface for credit ending for Assignment 1, 2 and 3. This credit ending would include

			the photos and profiles of the group members as developers [ADDED LEARNING STRATEGY].
	• Sending email through e-learning	• Online	• The group sent the names of his group members through message to the teacher through-learning [TR-ADMINISTRATION-11.1]
Week 2 14 July - 20 July 2008	• Classroom Meeting	• Face-to-face	• The teacher announced that the result of the English cloze test would be released soon. However, no specific date was stated.
	• E-learning announcement (July 16th, 2008)	• Online	• The teacher announced in the elearning that the appointment of the group leader
Week 3 21 July - 27 July 2008	• Forum discussion 1 (thread dated 23 – 29 July 2008)	• Online	• GL asked group members to provide their mobile phone numbers in the online forum [AP-COMMUNICATION-4.1]. GL was wondering whether she was the group leader and she welcomed any ideas from the group. For this inquiry, the teacher made a passing remark that the group leader would be appointed based on the English cloze test marks. One member expressed her hope that the group would co-operate to complete their assignment. Another member paraphrased the assignment instructions. She came up with an idea of a topic of chemistry. The title suggested was Matter [TR-BRAINSTORMING-9.1]. She provided detailed reasons, stating that an intangible concept such as atom movement was hard to visualise but could be shown through multimedia courseware [TR-BRAINSTORMING-9.2]. One member suggested adopting Bloom's Taxonomy concept in their courseware development. A table of contents for the courseware was suggested. [TR-BRAINSTORMING-9.2]GL uploaded a file of the beginning chapter of their assignment 1 (proposal documentation) in the forum and asked the group to review. GL concluded that the topic was accepted and agreed by all members. But first, she had to identify every group member's skill [TR-ORGANISATION-8.1]. The group started drafting the storyboard [ADDED LEARNING STRATEGY] . (16 postings)
	• E-learning announcement & Classroom Meeting	• Online & face-to-face	• The teacher informed the class that the temporary group leaders were now the official group leaders.

Week 4 28 July - 3 August 2008	• Forum discussion 1 (thread dated 29 July – 4 August 2008)	• Online	• GL suggested holding another group meeting to finalise their assignment 1 (proposal documentation). One member suggested the group confirm the date. Another member suggested Wednesday (30 July 2008) at 2 pm. (6 postings) [AP-REMINDER-1.1][AP-SCHEDULING-2.1]. GL reminded the group of the due date for their assignment [AP-REMINDER-1.3]
	• Communication through mobile device	• Calls or Text messaging	• GL reminded the group of the meeting either by giving a call or sending a text [AP-REMINDERS-1.1].
	• Meeting for Assignment 1 (30 July 2008)	• Face-to-face	• The group discussed and amended the storyboard where necessary [ADDED LEARNING STRATEGY]. All completed tasks for assignment 1 from each member were gathered and compiled by GL [ADDED LEARNING STRATEGY]. GL checked the compilation and the content flow [TR-ASSIGNMENT-10.11]. GL reminded the group that the assignment must be finalised in the meeting to meet the due date of Week 4 [AP-REMINDER-1.3].

7.2.3.2. Updating the coding strategies

Based on the table of blended activities for group 1 (table 7.3), several new learning strategies were identified. They were marked as ADDED LEARNING STRATEGY. These learning strategies were mainly related to completing the assignments and were the main focus for the data analysis. If the learning strategy was found to be unrelated to completing the tasks, it was not labelled. For example, the strategy of presenting assignments (final prototype development) in class in week 13 was not taken into account. This explained why some learning strategies in the table of blended activities were represented by coding while others were not represented. It was also important to obtain the learning strategies that were needed to support blended learning in the blended learning strategies map. The new learning strategies were listed in the new blended learning strategies map (table 7.4).

Table 7.4: The new updated blended learning strategies map with added new learning strategies

Themes	Strategy Category	Strategies
Action Planning [AP]	1. Reminders [AP]	9.1 Reminder of the face-to-face meeting 9.2 Reminder of the online meeting 9.3 Reminder of the due date for the assignment
	2. Scheduling [AP]	2.1. Scheduling the date, time and venue for the face-to-face meeting 2.2. Scheduling the date and time for synchronous online meeting [ADDED LEARNING STRATEGY]
	3. Confirmation [AP]	3.1. Confirming the date, time and venue for the face-to-face meeting 3.2. Confirming the date and time for synchronous online meeting [ADDED LEARNING STRATEGY]
	4. Communication [AP]	4.1. Exchanging mobile phone numbers
		4.2. Communicating through asynchronous online forum in a synchronous mode
Group Development [GD]	5. Motivation [GD]	5.1. Appreciating the group' efforts/works in completing the assignment
	6. Socialisation [GD]	6.1. Welcoming new members to the group 6.2. Welcoming the existing members back to the group for discussion and/or working on the assignment [ADDED LEARNING STRATEGY]
Task-related [TR]	7. Introduction [TR]	7.1. Introducing working procedures for the group members
	8. Organisation [TR]	8.1. Identifying strengths and skills of the group members 8.2. Assigning/dividing tasks to the group members [ADDED LEARNING STRATEGY]
	9. Brainstorming [TR]	9.1. Brainstorming for the assignment topic 9.2. Brainstorming for the assignment materials 9.3. Specifying one thread of online forum for specific topic of discussion [ADDED LEARNING STRATEGY]
	10. Assignment Engagement [TR]	10.1. Developing the storyboard for the courseware [ADDED LEARNING STRATEGY] 10.2. Developing the subject content for the courseware [ADDED LEARNING STRATEGY] 10.3. Developing the multimedia content (audio, video, animation, graphics, etc) for the courseware [ADDED LEARNING STRATEGY]

		10.4. Developing the courseware interfaces (main menu, sub-menu, exercises, glossary, etc) [ADDED LEARNING STRATEGY] 10.5. Uploading/posting the courseware interfaces (main menu, sub-menu, exercises, glossary, etc) in the forum [ADDED LEARNING STRATEGY] 10.6. Uploading/posting multimedia files (montage, animation, etc) in the forum [ADDED LEARNING STRATEGY] 10.7. Posting/sharing document file(s) for discussion/compilation with group members [ADDED LEARNING STRATEGY]
		10.8. Discussing the compatibility of the file formats with the authoring software
		10.9. Identifying any compatibility problems of the file formats with the authoring software 10.10. Rectifying any compatibility problems of the file formats with the authoring software. 10.11. Checking the flow of the content materials of the assignment
	11. Administration [TR]	11.1 Submitting lists of group members' names to the teacher [ADDED LEARNING STRATEGY] 11.2 Submitting assignments

7.2.3.3. Using the new coding strategy to label the learning strategies

Using the new blended learning strategies map, the table of blended activities for group 1 was coded once again (table 7.5 and appendix 4).

Table 7.5: The table of blended activities for the group 1 was coded again using the new blended learning strategies map.

Group 1
No. of Group Members: 4
Course: CDROM-Based Multimedia Development

Week	Meeting/Discussion/ Communication/Event	Mode	Strategies
Week 1 7 - 13 July 2008	• Classroom Meeting	• Face-to-face	• During the class, the teacher made two important announcements. First, all the students must sit an English cloze test. Second, the proposed group leader must submit the list of their group members to the teacher and online.

	• Brief meeting after the class	• Face-to-face	• Getting to know group members from other courses for the first time [GD-SOCIALISATION-6.1]. The group also exchanged mobile phone numbers among members [AP-COMMUNICATION-4.1]. GL scheduled the time, date and venue for the first meeting to start discussing their assignments. [AP-REMINDER-1.1][AP-SCHEDULING- 2.1]. GL informed the group that she would be sending the list of the group members to the teacher by hand and through online forum [ADDED LEARNING STRATEGY] [TR-ADMINISTRATION-11.1].
	• Meeting for Assignment 1 (10 July 2008)	• Face-to-face	• In the first meeting, the group got to know each other further particularly identifying the members' expertise in developing the courseware using authoring or programming software [ADDED LEARNING STRATEGY] [TR-ORGANISATION-8.1]. They discussed the coursework requirement (completing 3 assignments) throughout the semester. At this point, the group leader would be appointed based on the result of the English cloze test. GL acted as a temporary group leader, led the discussion and began assigning tasks to each member [TR-ORGANISATION- 8.2]. For the first task in this meeting, all members contributed their draft ideas on the most suitable topic for their assignments [TR-BRAINSTORMING-9.1]. For each topic the group proposed, they also provided ideas as to where the sources were easily available [TR-BRAINSTORMING-9.2]. As a start, the group planned to develop an interface for credit ending for Assignment 1, 2 and 3. This credit ending would include the photos and profiles of the group members as developers [ADDED LEARNING STRATEGY][TR-ASSIGNMENT-10.3].
	• Sending email through e-learning	• Online	• The group sent the names of his group members through message to the teacher through-learning [TR-ADMINISTRATION-11.1]
Week 2 14 - 20 July 2008	• Classroom Meeting	• Face-to-face	• The teacher announced that the result of the English cloze test would be released soon. However, no specific date was stated.
	• E-learning announcement (July 16th, 2008)	• Online	• The teacher announced in the elearning that the appointment of the group leader would be based on the result of English cloze test.

Week 3 21 - 27 July 2008	• Forum discussion 1 (thread dated 23 – 29 July 2008)	• Online	• GL asked group members to provide their mobile phone numbers in the online forum [AP-COMMUNICATION-4.1]. GL wondered whether she was the group leader and welcomed any ideas from the group. For this inquiry, the teacher made a passing remark that group leader would be appointed based on the English cloze test marks. One member expressed her hope that the group would co-operate to complete their assignment. Another member paraphrased the assignment instructions. She came up with an idea of a topic of chemistry. The title suggested was Matter [TR-BRAINSTORMING-9.1]. She provided with detailed reason stating that intangible concept such as atom movement was hard to visualise but could be shown through multimedia courseware [TR-BRAINSTORMING-9.2]. One member suggested adopting Bloom's Taxonomy concept in their courseware development. A table of contents for the courseware was suggested. [TR-BRAINSTORMING-9.2]A member uploaded a file of the beginning chapter of their assignment 1 (proposal documentation) in the forum and asked the group to review. GL concluded that the topic was accepted and agreed by all members. But first, she had to identify every group member's skill [TR-ORGANISATION-8.1]. The group started drafting the storyboard ADDED LEARNING STRATEGY [TR-ASSIGMENT ENGAGEMENT-10.1]. (16 postings)
	• E-learning announcement & Classroom Meeting	• Online & face-to-face	• The teacher announced the name of the student with the highest mark in the English cloze test. Overall, the students' results were satisfactory. The teacher informed the class that the temporarily elected group leaders were now officially group leaders.
Week 4 28 July - 3 August 2008	• Forum discussion 1 (thread dated 29 July – 4 August 2008)	• Online	• GL suggested week 4 to hold another group meeting. The meeting was to finalise their assignment 1 (proposal documentation). One member suggested the group to confirm the date. Another member suggested on Wednesday (30 July 2008) at 2 pm. (6 postings) [AP-REMINDER-1.1][AP-SCHEDULING-2.1]
	• Communication through mobile device	• Calls or Text messaging	• GL reminded the group of the meeting either by giving a call or sending a text [AP-REMINDERS-1.1].

	• Meeting for Assignment 1 (30 July 2008)	• Face-to-face	• The group discussed and amended the storyboard where necessary [ADDED LEARNING STRATEGY][TR-ASSIGNMENT-10.1]. All completed tasks for assignment 1 from each member were gathered and compiled by GL [ADDED LEARNING STRATEGY][TR-ASSIGNMENT-10.2]. GL checked the compilation and the content flow [TR-ASSIGNMENT-10.11]. GL reminded the group that the assignment must be finalised in the meeting to meet the due date which was by Week 4 [AP-REMINDER-1.3].

Group 1 was used here as an example to explain how the students used learning strategies in a blended mode. This group was deliberately chosen to inform the development of the blended learning strategies map, as they had used a range of new strategies that had also been noted in other groups.

To further understand this, I illustrated briefly the process the group went through to complete their assignments in a blended mode. At the beginning of the semester, the students met the teacher in the classroom. As a teacher, I asked them to form small groups comprising 4 to 6 people. After the group was formed, they were asked to provide a learning contract as a guide to working effectively. I then explained to the students how the three group assignments should be completed throughout the semester. The students were told to use online forums to communicate within their group. Each group was provided with its own online forum and they were introduced to the netiquette guide. The involvement of the students in the online forums was assessed by the teacher and became part of the coursework marks. The students scheduled [AP-SCHEDULING-2.1] and confirmed [AP-CONFIRMATION-3.1] their meetings through both face-to-face and online modes. To keep in constant contact, the students exchanged their mobile phone numbers [AP-COMMUNICATION-4.1]. This group also used the online forum to communicate in a synchronous mode [AP-COMMUNICATION-4.2]. These students set the date and time to organise their meetings [AP-SCHEDULING-2.2]. In preparing for the assignments, the students had to brainstorm ideas for the topic [TR-BRAINSTORMING-9.1] and the content [TR-BRAINSTORMING-9.2]. The brainstorming sessions were conducted during face-to-face meetings and through online

forums. When the group had chosen the topic during the face-to-face meeting, they resumed their discussions in the online forum. Later, they met again in a face-to-face meeting to finalise the topic. The group leader reminded the group members about the date and time for meeting face-to-face [AP-REMINDER-1.1] or reminded them to be involved in the online discussion forum [AP-REMINDER 1.2]. The next crucial step was to divide the workloads equally among group members [TR-ORGANISATION-8.2] and each member voluntarily chose a task. In developing the courseware or multimedia prototype, the learning strategies involved were strategies 10.1 [TR-ASSIGNMNET-10.1] to 10.11 [TR-ASSIGNMENT-10.11]. However, strategy 10.1 (developing storyboard) [TR-ASSIGNMNET-10.1], 10.2 (developing subject content) [TR-ASSIGNMNET-10.2], 10.3 (developing multimedia content) [TR-ASSIGNMNET-10.3], 10.4 (developing courseware interfaces) [TR-ASSIGNMNET-10.4] and 10.8 (discussing compatibility) [TR-ASSIGNMNET-10.8] were done in a blended mode, while strategies 10.9 (identifying compatibility problems), 10.10 [TR-ASSIGNMNET-10.10] and 10.11 (checking the content flow) [TR-ASSIGNMNET-10.11] were conducted face-to-face. The first and third assignments were submitted online and, as previously explained, the second assignment was submitted in class.

After the table of blended activities for the first group was coded using the blended learning strategies map, the process was repeated for the remaining 7 groups.

7.2.3.4. Analysing the table of blended activities from all groups

In order to identify blended learning strategies, e.g., those that supported the integration of online and face-to-face learning, the learning strategies in the tables for blended activities from groups 1 to 8 were reviewed to identify whether the learning strategies were conducted either in face-to-face or online mode or both. Learning strategies that were marked in both modes were likely to be those that were fully blended. The outcomes of this analysis are shown in table 7.6 and 7.7.

However, there is an exception for the learning strategy of submitting assignments with a coding of TR-Assignment Engagement-11.2. This strategy is a blended activity only for

submitting the first and second assignment. Submitting the third assignment of the whole prototype online was not possible as the existing technology of VLE was unable to upload a single huge multimedia file. The strategy of communicating synchronously through online forum was considered not as a blended activity but supporting the use of online forum.

Table 7.6: The learning strategies that were marked in the table for blended strategies for group 1, 2, 3 and group 4

Themes	Strategy Category	Strategies	Group 1		Group 2		Group 3		Group 4	
			Online mode	F2F mode	Online mode	F2F mode	Online mode	F2F mode	Online mode	F2F mode
Action Planning [AP]	1. Reminders [AP]	1.1. Reminder of the face-to-face meeting	1.1	1.1	1.1	--	1.1	1.1	--	--
		1.2. Reminder of the online meeting	--	--	--	--	--	--	--	--
		1.3. Reminder of the due date for the assignment	1.3	1.3	--	--	--	--	--	--
	2. Scheduling [AP]	2.1. Scheduling the date, time and venue for the face-to-face meeting	2.1	2.1	--	--	2.1	--	2.1	2.1
		2.2. Scheduling the date and time for synchronous online meeting	2.2	2.2	--	--	--	--	--	--
	3. Confirmation [AP]	3.1. Confirming the date, time and venue for the face-to-face meeting	3.1	3.1	3.1	3.1	--	3.1	3.1	--
		3.2. Confirming the date and time for synchronous online meeting	3.2	3.2	--	--	--	--	--	--
	4. Communication [AP]	4.1. Exchanging mobile phone numbers	4.1	4.1	4.1	--	--	--	--	--
		4.2. Communicating through asynchronous online forum in a synchronous mode	4.2	--	--	--	4.2	--	4.2	--
	5. Motivation [GD]	5.1. Appreciating the group' efforts/works in completing the assignment	--	--	--	--	5	--	--	--

Group Development [GD]	6. Socialisation [GD]	6.1.	Welcoming new members to the group	--	--	--	--	--	--	6.1	--
		6.2.	Welcoming the existing members back to the group for discussion and/or working on the assignment	6.2	6.2	--	--	--	--	--	6.2
Task-related [TR]	7. Introduction [TR]	7.1.	Introducing working procedures for the group members	--	--	--	--	--	7.1	--	--
	8. Organisation [TR]	8.1.	Identifying strengths and skills of the group members	8.1	8.1	--	--	--	--	--	--
		8.2.	Assigning/dividing tasks to the group members	8.2	8.2	--	8.2	--	--	--	8.2
	9. Brainstorming [TR]	9.1.	Brainstorming for the assignment topic	9.1	9.1	9.1	9.1	9.1	9.1	--	9.1
		9.2.	Brainstorming for the assignment materials	9.2	9.2	9.2	--	9.2	9.2	9.2	--
		9.3.	Specifying one thread of online forum for specific topic of discussion	9.3	--	--	--	--	--	9.3	--
	10. Assignment Engagement [TR]	10.1.	Developing the storyboard for the courseware	10.1	10.1	10.1	10.1	10.1	10.1	--	--
		10.2.	Developing the subject content for the courseware	10.2	10.2	10.2	10.2	10.2	10.2	10.2	--
		10.3.	Developing the multimedia content (audio, video, animation, graphics, etc) for the courseware	10.3	10.3	10.3	--	10.3	--	--	10.3
		10.4.	Developing the courseware interfaces (main menu, sub-menu, exercises, glossary, etc)	10.4	10.4	--	10.4	10.4	--	10.4	10.4
		10.5.	Uploading/posting the courseware interfaces (main menu, sub-menu, exercises, glossary, etc) in the forum	10.5	--	10.5	10.5	10.5	--	10.5	10.5
		10.6.	Uploading/posting multimedia files (montage, animation, etc) in the forum								

		10.7.	Posting/sharing document file(s) for discussion/compilation with group members	10.6 ---	--- ---	10.6 ---	10.6 10.7	10.6 10.7	10.6 ---	10.6 10.7	--- 10.7
		10.8.	Discussing the compatibility of the file formats with the authoring software	10.8	10.8	10.8	10.8	---	10.8	10.8	10.8
		10.9. 10.10. 10.11.	Identifying any compatibility problems of the file formats with the authoring software Rectifying any compatibility problems of the file formats with the authoring software. Checking the flow of the content materials of the assignment	--- --- ---	10.9 10.10 10.11	--- --- ---	10.9 10.10 ---	--- --- ---	10.9 10.10 10.11	--- --- ---	10.9 10.10 10.11
	11. Administration [TR]	11.1. 11.2.	Submitting lists of group members' names to the teacher Submitting assignments	11.1 11.2	11.1 11.2	11.1 11.2	11.1 11.2	11.1 11.2	11.1 11.2	11.1 11.2	11.1 11.2

Table 7.7: The learning strategies that were marked in the table for blended strategies for group 5, 6, 7 and 8

Themes	Strategy Category	Strategies	Group 5		Group 6		Group 7		Group 8	
			Online mode	F2F mode	Online mode	F2F mode	Online mode	F2F mode	Online mode	F2F mode
Action Planning [AP]	1. Reminders [AP]	1.1. Reminder of the face-to-face meeting	1.1	--	--	--	--	--	--	--
		1.2. Reminder of the online meeting	--	--	1.2	--	--	--	1.2	--
		1.3. Reminder of the due date for the assignment	--	--	--	1.3	--	--	--	--
	2. Scheduling [AP]	2.1. Scheduling the date, time and venue for the face-to-face meeting	2.1	2.1	2.1	--	2.1	--	2.1	--
		2.2. Scheduling the date and time for synchronous online meeting	--	--	--	--	--	--	--	--
	3. Confirmation [AP]	3.1. Confirming the date, time and venue for the face-to-face meeting	3.1	3.1	3.1	--	3.1	--	3.1	--
		3.2. Confirming the date and time for synchronous online meeting	--	--	3.2	--	--	--	--	--
	4. Communication [AP]	4.1. Exchanging mobile phone numbers	--	--	4.1	--	--	--	4.1	--
		4.2. Communicating through asynchronous online forum in a synchronous mode	--	--	4.2	--	4.2	--	--	--

Group Development [GD]	5. Motivation [GD]	5.1.	Appreciating the group' efforts/works in completing the assignment	5	--	5	--	--	--	--	--
	6. Socialisation [GD]	6.1.	Welcoming new members to the group	6.1	--	6.1	--	6.1	--	6.1	--
		6.2.	Welcoming the existing members back to the group for discussion and/or working on the assignment	6.2	--	--	6.2	--	--	--	--
Task-related [TR]	7. Introduction [TR]	7.1.	Introducing working procedures for the group members	--	--	--	--	--	--	--	--
	8. Organisation [TR]	8.1.	Identifying strengths and skills of the group members	--	--	8.1	--	--	--	--	--
		8.2.	Assigning/dividing tasks to the group members	8.2	8.2	8.2	--	--	8.2	8.2	8.2
	9. Brainstorming [TR]	9.1.	Brainstorming for the assignment topic	9.1	9.1	--	9.1	9.1	--	9.1	--
		9.2.	Brainstorming for the assignment materials	9.2	--	9.2	9.2	--	9.2	9.2	--
		9.3.	Specifying one thread of online forum for specific topic of discussion	9.3	--	--	9.3	9.3	--	--	--
	10. Assignment Engagement [TR]	10.1.	Developing the storyboard for the courseware	--	10.1	10.1	--	--	10.1	--	--
		10.2.	Developing the subject content for the courseware	10.2	10.2	10.2	10.2	--	10.2	10.2	10.2
		10.3.	Developing the multimedia content (audio, video, animation, graphics, etc) for the courseware	10.3	--	10.3	10.3	--	10.3	10.3	10.3
		10.4.	Developing the courseware interfaces (main menu, sub-menu, exercises, glossary, etc) for discussion/compilation with group members	--	--	10.4	10.4	10.4	10.4	--	10.4
		10.5.	Posting/sharing the courseware interfaces (main menu, sub-menu, exercises, glossary, etc) for								

		discussion/compilation with group members	10.5	10.5	10.5	10.5	10.5	10.5	10.5	--
		10.6. Posting/sharing multimedia files (montage, animation, etc) for discussion/compilation with group members	10.6	10.6	10.6	10.6	--	10.6	10.6	--
		10.7. Posting/sharing document file(s) for discussion/compilation with group members	10.7	--	10.7	10.7	--	10.7	10.7	--
		10.8. Discussing the compatibility of the file formats with the authoring software	--	10.8	10.8	10.8	10.8	10.8	10.8	10.8
		10.9. Identifying any compatibility problems of the file formats with the authoring software	--	10.9	--	10.9	--	10.9	--	10.9
		10.10. Rectifying any compatibility problems of the file formats with the authoring software.	--	10.10	--	10.10	--	10.10	--	10.10
		10.11. Checking the flow of the content materials of the assignment	--	10.11	--	10.11	--	--	--	10.11
	11. Administration [TR]	11.1. Submitting lists of group members' names to the teacher	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1
		11.2. Submitting assignments	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2

The tables for blended strategies (tables 8.10 and 8.11) for all groups were summarised according to the three key themes – action planning, group development and task-related, to more easily identify similarities and differences between the groups. The results of this analysis are shown in table 8.8 (Action Planning), 8.9 (Group Development) and 8.10 (Task-related)

Action planning (AP)

The following learning strategies from the action planning theme were analysed and rated as online, face-to-face or blended mode.

Table 7.8: The learning strategies from the action planning (AP) theme.

Learning strategies	Brief analysis
1.1. Reminder of the face-to-face meeting	Group 1 and 3 used a blended mode to remind participants of their face-to-face meeting. Only group 2 used an online mode.
1.2. Reminder of the online meeting	Only group 6 and 8 used an online mode.
1.3. Reminder of the due date for the assignment	Only group 1 used a blended mode to remind participants of the due date to submit their assignment.
2.1. Scheduling the date, time and venue for the face-to-face meeting	Group 1, 4, and 5 used a blended mode. Group 3, 6, 7 and 8 used only an online mode.
2.2. Scheduling the date and time for synchronous online meeting	Only group 1used a blended mode.
3.1. Confirming the date, time and venue for the face-to-face meeting	Group 1, 2 and 5 used a blended learning. Group 6, 7 and 8 used an online mode while group 3 used a face-to-face mode.
3.2. Confirming the date and time for synchronous online meeting	Only group 1 used a blended mode. Only group 6 used an online mode.
4.1. Exchanging mobile phone numbers	Only group 1 used a blended mode. Group 2, 6 and 8 used an online mode.
4.2. Communicating through asynchronous online forum in a synchronous mode	Only group 1, 3, 4, 6 and 7 communicated synchronously online.

Group development (GD)

The following learning strategies from the group development theme were analysed and rated as online, face-to-face or blended mode.

Table 7.9: The learning strategies from the group development (GD) theme

Learning strategies	Brief analysis
5.1. Appreciating the group' efforts/works in completing the assignment	Group 3, 5 and 6 used an online mode.
6.1. Appreciating Welcoming new members to the group	Group 4, 6, and 8 used an online mode.
6.2. Welcoming the existing members back to the group for discussion and/or working on the assignment	Only group 1 used a blended mode. Only group 5 used an online mode. Group 4 and 6 used a face-to-face mode
7.1. Introducing working procedures for the group members	Only group 3 used face-to-face.

Task-related (TR)

The following learning strategies from the task-related theme were analysed and rated as online, face-to-face or blended mode

Table 7.10: The learning strategies from the task-related (TR) theme.

Learning strategies	Brief analysis
8.1. Identifying strengths and skills of the group members	Only group 1 used a blended mode and only group 6 used an online mode.
8.2. Assigning/dividing tasks to the group members	Group 1, 5 and 8 used a blended mode. Group 2, 4 and 7used a face-to-face mode. Only group 6 used an online mode.
8.1 Brainstorming for the assignment topic	Group 1, 2, 3 and 5 used a blended mode. Group 4 and 6, used a face-to-face mode, while group 7 and 8 used an online mode.

8.2	Specifying one thread of online forum for specific topic of discussion	Group 1 and 3 used a blended mode. Group 2, 4, 5 and 8 used an online mode. Only group 7 used a face-to-face mode.
8.3	Brainstorming for the assignment materials	Group 1, 4, 5 and 7 used an online mode. Only group 6 used a face-to-face mode.
10.1.	Developing the storyboard for the courseware	Group 1, 2 and 3 used a blended mode. Group 5 and 7 used a face-to-face mode. Only group 6 used an online mode.
10.2.	Developing the subject content for the courseware	Group 1, 2, 3, 5, 6 and 8 used a blended mode. Only group 4 used an online mode while only group 7 used a face-to-face mode.
10.3.	Developing the multimedia content (audio, video, animation, graphics, etc) for the courseware	Group 1, 6 and 8 used a blended mode. Group 2, 5 used an online mode. Group 4 and 7 used a face-to-face mode.
10.4.	Developing the courseware interfaces (main menu, sub-menu, exercises, glossary, etc) for discussion/compilation with group members	Group 1, 4, 6 and 7 used a blended mode. Only group 3 used an online mode while group 2 and 8 used a face-to-face mode.
10.5.	Posting/sharing the courseware interfaces (main menu, sub-menu, exercises, glossary, etc) for discussion/compilation with group members	Group 2, 4, 5, 6 and 7 used a blended mode. Group 1, 4 and 8 used a face-to-face mode.
10.6.	Posting/sharing multimedia files (montage, animation, etc) for discussion/compilation with group members	Group 2, 3 and 5 used a blended mode. Group 1, 4 and 8 used an online mode while only 7 used face-to-face.
10.7.	Posting/sharing document file(s) for discussion/compilation with group members	Group 4 and 6 used a blended mode. Group 3 and 8 used an online mode while group 1 and 7 used face-to-face.
10.8.	Discussing the compatibility of the file formats with the authoring software	Group 1, 2, 4, 6, 7 and 8 used a blended mode. Group 3 and 5 used a face-to-face mode.
10.9.	Identifying any compatibility problems of the file formats with the authoring software	All groups used a face-to-face mode.
10.10.	Rectifying any compatibility problems of the file formats with the authoring software.	All groups used a face-to-face mode.
10.11.	Checking the flow of the content materials of the assignment	Group 1, 3, 4, 5, 6, and 8 used face-to-face mode.

11.1. Submitting lists of group members' names to the teacher	All groups used a blended mode.
11.2. Submitting assignments	All groups used a blended mode.

The analysis of the blended strategies reveals key differences between the learning strategy modes. For the action planning theme, only groups 1, 2, 3, 4 and 5 used learning strategies in a blended mode. Group 1 worked the most in a blended mode, for example, within learning strategies 1.1, 1.3, 3.1, 3.2 and 4.1. For the group development theme, only group 1 worked totally in a blended mode. The rest of the groups worked either in a face-to-face mode or online mode for selected learning strategies. It was in the task-related theme that the blended learning strategies pre-dominated in most groups. However, there were differences in use between the groups. The differences between groups are shown in table 8.11, which presents the blended learning strategies used by each group.

Table 7.11: The number and type of blended strategies used by the groups

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Group	The types of learning strategies conducted in a blended mode			Number of blended strategies
	Action Planning [AP]	Group Development [GD]	Task-related [TR]	
1	1.1, 1.3, 2.1, 2.2, 3.1, 3.2, 4.1	6.2	8.1, 8.2, 9.1, 9.2, 10.1, 10.2, 10.3, 10.4, 10.8, 11.1, 11.2	19
6			9.2, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 11.1, 11.2	10
2	3.1		9.1, 10.1, 10.2, 10.5, 10.6, 10.8, 11.1, 11.2	9
5	2.1, 3.1		8.2, 9.1, 10.2, 10.5, 10.6, 11.1, 11.2	9
3	1.1		9.1, 9.2, 10.1, 10.2, 10.6, 11.1, 11.2	8
4	2.1		10.4, 10.5, 10.7, 10.8, 11.1, 11.2	7
8			8.2, 10.2, 10.3, 10.8, 11.1, 11.2	6
7			10.4, 10.5, 10.8, 11.1, 11.2	5

The only learning strategies that were conducted in a face-to-face mode by all groups were 10.9, 10.10 and 10.11. Group 1 was the most frequent blended learning strategy user - they used 19 blended strategies. Apart from learning strategies 9.3, 10.5 and 10.6, group 1 preferred to work on the task online. Other groups used these strategies less frequently. However, all groups used blended learning strategies 11.1 and 11.2, because the first and third assignment were required to be submitted online, while assignment 2 was submitted to the teacher in class due to the large file size of the courseware prototype.

Besides face-to-face meeting reports and online forum discussions, other instruments that contributed significantly to the study of blended learning are peer assessment, reflective online journal, interviews on group leaders and teacher's observations.

7.2.4. Peer assessment

Peer assessment was used to measure the teamwork performance and each member's contribution in completing the assignments. In assessing student contribution to group projects, a rubric was used (appendix 1) to allocate individual marks. The mark allocated for the peer assessment was 5%. The following table (table 7.12) indicates the *marks* generated *through peer assessment* for all groups with the highest score at 5 and the lowest at 4.2.

Table 7.12: The peer assessment marks for the three assignments

Group	Group members	Peer assessment mark (5%)		
		Assignment 1	Assignment 2	Assignment 3
1	1A	5	5	5
	1B	5	5	5
	1C	5	5	5
	1D	5	5	5
4	4A	5	5	5
	4B	5	5	5
	4C	5	5	5
	4D	5	5	5
6	6A	5	5	5
	6B	5	5	5
	6C	5	5	5
	6D	5	5	5
	6E	5	5	5
7	7A	5	5	5
	7B	5	5	5
	7C	5	5	5
	7D	5	5	5
5	5A	5	5	5
	5B	5	5	5
	5C	5	5	5
	5D	5	5	5
	5E	4.9	5	5
2	2A	4.7	5	5
	2B	4	5	4.2
	2C	4.5	5	5
	2D	4.6	5	4.2
	2E	5	5	5
8	8A	5	5	5
	8B	4.2	5	4.7
	8C	4.2	5	4.7
	8D	5	5	5
	8E	5	5	5
3	3A	5	5	5
	3B	5	4.5	4.6
	3C	5	4.3	5
	3D	5	4.5	4.6
	3E	4.7	4.3	5

All members in five of the groups received perfect or near perfect scores – all group members in groups 1, 4, 6 and 7 received scores of 5, with only one member of group 5

receiving a lower score. However, different contributions throughout the three assignments were reflected in the peer assessment marks among members in group 3. Assessments for group 2 and 8 revealed an inconsistent approach to team work. The performances of the individual's contribution in the first assignment varied as shown by the marks. Unexpectedly, the members in each group collaborated well for the second assignment but in the third assignment, the situation was reversed with unequal contributions by individuals to the workload. A further understanding of the peer assessment marks is provided by the interview data.

7.2.4.1. Analysing the interviews from the group leaders

I conducted separate interviews with each group leader according to the schedule. Two key questions were asked. First, how did the group work in a blended mode? Second, how did the groups work as a team (teamwork) in completing their assignments?

7.2.4.1.1. Working in a blended mode

The perceptions on working in a blended mode were derived from the responses of the group leaders. In general, all group leaders acknowledged the significance of the online forum to communicate and discuss their assignments, alongside the face-to-face meeting. The key points mentioned were (a) the advantage of online mode in complementing face-to-face discussions and (b), keeping in constant contact with the group members. The summaries of the interview responses from the group leaders on working in a blended mode are provided in table 8.13.

Table 7.13: The summaries of the interview responses from the group leaders on working in a blended mode

	How did the groups work in a blended mode?		
	Assignment 1	Assignment 2	Assignment 3
Group 1	Balanced use of face-to-face and online mode	Balanced use of face-to-face and online mode for discussion but more face-to-face	More face-to-face than online mode
Group 2	As in group 1	As in group 1	Balanced use of face-to-face and online mode
Group 3	As in group 1	As in group 1	As in group 2
Group 4	More face-to-face than online mode	As in group 1	As in group 2
Group 5	As in group 1	As in group 1	As in group 2
Group 6	As in group 1	As in group 1	As in group 2
Group 7	As in group 1	As in group 1	As in group 2
Group 8	As in group 1	As in group 1	As in group 2

For group 2, the VLE platform provided the flexible use, with no boundaries of time or space, of the online forum for communication, and thus their discussions became flexible as they could communicate at any time. Group 4 believed that the online forum helped the students to communicate not only between group members, but they could also seek advice from the teacher. Since the use of mobile phones has become so prevalent in our everyday life, making a call or sending a text message helped the students to work on their assignments. All leaders mentioned that group members used their mobile phones to support their work, for example, in arranging both online and face-to-face meetings.

There seemed to be a pattern in how the students communicated in the online forum and met face-to-face throughout the three assignments (table 7.15). For the first assignment, the students generally started to meet face-to-face when they attended the class. They then used the online forum to extend their face-to-face sessions and thus managed a balanced use of online and face-to-face modes. However, group 4 was an exception. According to the group leader, frequent technical problems with the wireless internet at their halls of residence led them to use a mainly face-to-face mode. For the second assignment, the groups were dealing with hands-on practical work including developing and testing the prototype; this could only be done when they met face-to-face. Their ideas and suggestions on modifying or improving the prototype continued online. As for the third assignment,

all but one of the groups had a more balanced use of online and face-to-face discussions. Only group 1 preferred to communicate more in face-to-face meetings because some of the members were not really involved in the online forum discussion.

These examples served as key evidence that the students had actually engaged effectively and at an in-depth level. There is considerable literature on working in a blended mode that could be referred to for background to the strategies the students used to integrate both face to face and online; these were covered within the learning strategies map. For example, in a study of blended learning by second year psychology students, Ellis et al. (2007) introduced blended discussions with classroom discussions being extended to online environment. The questions or issues which were discussed earlier in class continued in the online forums and the students were encouraged to start their own threaded discussions. Some marks were allocated to face-to-face discussions and online postings. According to Ellis and Calvo (2004, 2006) and Ellis et al. (2004, 2008), when the students perceived discussions as a learning process to enhance their understanding about a topic, they were likely to achieve (high?) learning outcomes. Thus, Bliuc et al. (2010) suggest that learning activities should be structured to include both online and face-to-face environments.

7.2.4.1.2. Working as a team (teamwork) in completing the assignments

The group leaders were interviewed on their experiences working in a group. During the interviews, their peer assessment marks were referred to, and defined as high, medium or low collaboration. The summaries of the interview responses from the group leaders on teamwork are provided in table 7.15.

Table 7.14: The summaries of the group leaders' perceptions on the level of collaboration across the assignments

Interview question	The interview responses from each group	Level of Collaboration							
		Group 1	Group 4	Group 6	Group 7	Group 5	Group 8	Group 2	Group 3
How did the groups work as a team (teamwork) in completing their assignments?	Assignment 1	High	High	High	High	Medium	Medium	Low	Medium
	Assignment 2	High	High	High	High	High	High	High	Low
	Assignment 3	High	High	High	High	High	Medium	Low	Low

As can be seen in the above table (table 7.14), groups 1, 4, 6 and 7 were considered to be highly collaborative by their group leaders. Groups 5 and 8 were considered to be medium collaborative groups, with group 5 facing only slight problems working on the first assignment while group 8 faced some problems in working on the first and third assignments. Group 2 were considered to be the group with the second lowest collaboration and faced major problems in completing the first and the third assignment; the members worked as a team in the second assignment. Group 3 exhibited the lowest collaboration and were the most problematic team. Initially, they faced a slight problem in the first assignment. However, the situation became worse with subsequent assignments due to differences in the level of contributions from group members. There were also disputes among individuals about the ideas to develop the assignments.

As for the interview with the group leaders on teamwork, the peer assessment was referred to. The marks from the peer assessment (table 7.12) show that groups 1, 4, 6 and 7 scored a perfect 5, and this is reflected in table 7.14, where there was high collaboration across the three assignments in these groups. Both the interview and the peer assessment considered group 3 to be the lowest collaborative group. However, a contradiction was raised. Although the table of peer assessment lists group 8 as the second lowest collaborative group, the interviews with the leaders showed otherwise. It was group 2 that

worked poorly as a team, based on their peer assessment marks. In a case such as this, the data from the peer assessment was more reliable.

7.2.4.2. The students' online reflective journal

The findings of the students' inputs from the online journal did not really provide a sufficient basis for data analysis. Its poor use was probably because it was not part of the course assessment, and it was not obvious to the students how it would support the completion of the assignments. Even though I have not gathered a complete set of data, for some students it appeared to have been a useful device for contacting me. It also served to provide some information that I used to support the work in the module. Thus, its use should not be dismissed.

For example, a member from group 8 complained that the two other members were rarely involved in the online discussions and skipped their face-to-face meetings. As they were not aware of her complaint, she had asked me to keep this matter confidential. As a teacher, I made an indirect warning in my announcement during class in the following week by referring to the problem of group members not co-operating within their groups. Another member from group 8 also complained about the slow progress of their assignment as some members ignored his short text messages on their mobile phones. (How would this slow things down?)

Apart from the complaints, some students talked about other matters. A member from group 5 complemented me for conducting a lively class. Another member from group 1 re-confirmed with me the sub-topics in their plan to start the first assignment. A member from group 6 asked for advice on technical problems the group had in developing the courseware. A member from group 1 asked me why her group should consist of members from other major fields of studies.

For group 7, the VLE had many advantages, which included downloading the teacher's notes easily and keeping track of the teacher's announcements regularly without waiting to attend class in the following week. Groups 4, 7 and 8 agreed that the use of online

journal provided the students with personal reflection on the assignments and personal communication with the teacher.

7.2.5. The reflections of data analysis based on the three sub-triangles

This research cycle had identified several groups that had efficiently employed learning strategies in a blended mode in completing their assignments. However, some details on how they moved from online to face-to-face mode and vice-versa were missing from the tables of blended activities of some groups. These issues are discussed using the activity system of three sub-triangles.

7.2.5.1. The TOOL sub-triangles

The focus on tools within the activity system identified two important factors that helped the students working in a blended mode. The first factor was the group composition that had encouraged the use of online forum among members. As each group comprised members from different majors (see 6.3.4), it was unlikely that they could meet face-to-face regularly to discuss their assignments, and the online forum helped the group to continue their discussion. How each group planned to start working using either online or meeting face-to-face depended on meeting the needs of their assignments. Thus, it was crucial for each group to identify an agreed approach to using the forum for online discussions and meeting face-to-face.

The second factor was an organisational one on how the group used the online forum and meeting face-to-face. The online mode and face-to-face mode were intended to complement each other in the students' learning activities and in completing their assignments. When the group started discussing online, they needed to continue their discussions in the face-to-face meeting, and the discussions then needed to be brought back to the online forum for further explanation. These could be seen in the table of blended activities for groups 1 to 8 (table 7.6, table 7.7). The tables also identified the mobile phone as an important tool to plan the date and venue for face-to-face meetings and remind the group members to communicate online.

The learning strategies that could only be conducted face-to-face due to the limitation of the present VLE system were the learning strategy of 10.9 (identifying file format compatibility), 10.10 (rectifying compatibility problems) and 10.11 (checking the flow of content materials). However, referring to the tables of blended activities, two missing strategies related to the sub-triangle TOOL were identified. These were the decision to meet face-to-face and to conduct online synchronous meetings

First, the decision to meet face-to-face. When someone proposed a face-to-face meeting on the online forum, the responses from other members were incomplete and no one finalised the proposal. In some cases, the face-to-face meeting was conducted but no discussion about this took place on the forum. The group could have communicated with each other through other communication devices, such as mobile phones, without this being mentioned in the online forum or in the face-to-face meeting reports. The proposed solution was that if a group met, they must have decided on the proposal to meet face-to-face; it was just that the process by which they arrived at this decision was missing. Thus, in order to resolve this issue, there could be two alternatives. (1) First, the teacher could simply let the students use whatever communication technology they wished in order to arrange a face-to-face meeting. These communication devices could be mobile phones, emails and chatting software such as Yahoo messenger, Skype or Window messenger. In this case, the group leader would need to keep a record of this. (2) Second, if the group used the online forum to arrange their face-to-face meeting, all group members would have to respond. If they agreed to meet on the proposed date, then the face-to-face meeting report would be provided with the same date. If no consensus on the proposed date was reached, a discussion on changing the date would be visible in the online forum.

The second missing strategy was the decision to discuss through synchronous online meeting. When someone proposed a synchronous meeting on the online forum, there was no evidence of how a consensus was reached. However, the synchronous online meeting had taken place. The proposed solution suggested the group leader record how the synchronous meeting was planned. If a student proposed a synchronous meeting in the online forum, all group members would have to respond. The group would have to (a)

specify a fresh thread to conduct the synchronous discussion with a specific title and date and (b), open a new thread if the group planned to conduct another online synchronous meeting.

7.2.5.2. The RULES sub-triangle

The main rule in completing the assignment was that the students must work in groups and in blended mode except for the learning strategies that could only be conducted face-to-face. The module had required the students to use online forums. Data analysis showed that the usage of online forum discussions among the students was very productive, with 1188 messages being posted across the 8 groups (table 7.2). Besides online discussion, each group submitted a summary of their face-to-face meetings. As a teacher and researcher, I used the summaries from the online forums and the reports from the face-to-face meetings to derive blended strategies from each group. Table 7.4 listed systematically the learning strategies from three themes (action planning, group development and task-related) employed in blended learning, while tables 7.6 and 7.7 stated clearly whether each strategy used by all 8 groups was done online, face-to-face or in blended mode. From the data analysis (table 7.11), many learning strategies, especially under the task-related category, were employed by all groups in completing their assignments.

However, the missing strategies that related to sub-triangle RULES were mainly the decisions to agree on the assignment topic, selection of content materials and the development of the interface designs; these were either incomplete or did not correspond with the face-to-face meeting report.

Decision on the assignment topic: The topic suggested in the online forum was different from what the group had chosen. The proposed solution was that if the discussion on the assignment topic in the online forum was not the same as the document/courseware they produced, the group leader would have to mention how and why the group had decided to change the topic in their face-to-face meeting report. The content of the report must correspond with the topics that had been discussed in the online forum.

Selection of the assignment content materials: The selection of the content materials in the online forum was either incomplete or did not correspond with the face-to-face meeting report. The proposed solution was that when the group discussed the assignment content materials in the online forum, the group leader must ensure that the meeting report contained the same discussion. However, if the group discussed different content materials during the face-to-face meeting, the leader would have to mention it in the report.

Developing interface designs of the courseware: The discussions on the development of the interface designs in the online forum was either incomplete or did not correspond with the face-to-face meeting report. The proposed solution was that the group would have to complete the following stages. (1) It was important to focus on a single thread at a time for each specific discussion. Thus, the group would have to specify a single thread to discuss the interface designs of the courseware. (2) In order to make discussion on the online forum clearer, the group could upload a sample of the interface design, which could be viewed by the rest of the group members. (3) The group leader would have to rationalise in the meeting report why the discussion on the interface design during the face-to-face meeting was different from the discussion in the online forum.

Developing the multimedia content for the courseware: Discussions on the development of the multimedia contents in the online forum was either incomplete or did not correspond with the face-to-face meeting report. The proposed solution was that the group should do the following. (1) Specify a single thread to discuss a specific topic on the interface designs of the courseware. (2) In order to make discussion in the online forum clearer, the group could upload a sample of the multimedia content which could be viewed by the rest of the group members. (3) The group leader would have to rationalise in the meeting report why the discussion on the interface design during the face-to-face meeting is different from the discussion in online forum.

7.2.5.3. The ROLES sub-triangle

In my role as the course teacher, I supervised the groups' online forums constantly to see how the students' discussions progressed. When the discussions became more student-

centred, the teacher facilitated the discussions where necessary. Although each group had been given autonomy to decide the direction of their own discussion through the online forum, the teacher also shared responsibility in providing support and instructional assistance. It was in support of the task (the task-related theme) where I played an important role in facilitating the students' discussion – in particular in their planning and production of the educational courseware (prototype). Besides facilitating the students' discussions online, I met them face-to-face in class. During class, I often reminded the students that the learning strategy that was employed in the online discussion should also be employed in their face-to-face meeting.

This section explores the role of each group member in sharing the assignment workload. What represents an ideal balanced workload is very subjective. It is up to each group to interpret how the workload should be balanced among team members. Referring to the table for blended strategies (table 7.6 and 7.7), the learning strategy 8.1 helped the group to identify the strengths of their members in developing the courseware prototype, while learning strategy 8.2 assigned the students with a task based on their strengths. These strategies guided each group to determine their workload balance. Table 7.11 shows that only groups 1, 5 and 8 employed these strategies.

The aspect of close and strong collaboration in groups is vital. The extent of collaboration shown by each group could be derived from the peer assessment data (table 7.12) and the group leaders' interviews (table 7.13). Peer assessment was used to encourage the students to work as a team. After completing each assignment, each student in the same group individually assessed each other's contribution using the peer assessment form (appendix 1); this was done confidentially. The results were discussed in section 7.2.4. However, the peer assessment marks for some groups did not reflect the real collaboration among group members and the group leader interviews provided some indication of this. The issue was that, in spite of having a learning contract and peer assessment, some groups (2, 3 and 8) did not work well as a team. From the group leaders' interviews (section 7.2.4.1.1), it was learnt that groups 1, 4, 6 and 7 had no difficulties working as a team throughout the three assignments. However, interviews with group leaders from groups 2, 3 and 8 revealed

that, although the group members initially worked together to complete assignment 1, when the groups started to compile the tasks for their members to complete assignment 2, they were faced with problems associated with teamwork, such as members not attending some face-to-face meetings, less participation in the online forums and a lack of commitment to carry out the tasks in completing the assignment. This lack of contribution by some individuals also revealed itself in the students' reflective journals where they were kept. As to whether the group workload really facilitated collaboration among members, it depended on the individual group. Groups 4 and 6 for example, worked collaboratively throughout the three assignments in the module. From the peer assessment on each assignment, all members received full marks (table 7.12) and this was supported by the interview with the group leader.

Thus, the important missing strategy related to the sub-triangle ROLES was that of delegating tasks to group members. The proposed solution was that when the group leader delegated specific tasks among his/her members in the online forum, each member had to be very clear of the tasks. In the face-to-face meeting report, the leader must (1) quote or summarise the tasks that have been assigned to group members in the online forum, and (2) explain why the group members have been assigned different tasks. An effective strategy had to be developed that would gain commitment and consensus for collaborative working from each group, overcoming internal conflicts and delegating responsibility fairly among group members.

7.3 Conclusion

In this research cycle a new coding procedure was developed based on the list of learning strategies derived from the reconnaissance phase. The data analysis on the blended activities was categorised into three different themes: action planning, group development and task-related. Several new techniques, such as specifying a single thread for a specific topic of discussion, introducing synchronous communication through asynchronous online forum, and submitting face-to-face meeting reports were also introduced.

Chapter 8

Research Cycle 2: Plan & Act

8.1 Introduction

The findings from research cycle 1 revealed the importance of learning strategies specifically designed to support blended learning not just strategies for working effectively within each mode, for example, face-to-face and online, but in particular the transition between face-to-face and online modes and vice-versa. Further data was required to reveal how groups could successfully achieve this and this was to be a major focus of research cycle 2. Reflecting on the planning process involved in cycle 1, it was clear that a more systematic approach was needed to explore both pedagogic interventions as well as methodological interventions - both needed to inform the final overall research cycle plan. Two tools were developed to support this planning process for research cycle 2 which was carried out in the same setting. These tools were the pedagogy-interventions-plan (PIP) and the methodology-interventions-plan (MIP). This chapter considers methodology issues related to data collection to inform the MIP, followed by pedagogic issues to inform the PIP taking into account the findings from the research cycle 1.

8.2 Considering pedagogy-interventions-plan (PIP) to develop methodology-interventions-plan (MIP)

Before developing MIP to achieve further effective data capture, the important task was to look at the pedagogy in a blended mode. As discussed in the literature chapter (Chapter 2), the blended learning approach in this context set out to integrate both face-to-face and online learning activities with the aim of maximising students' learning in both settings. However, how they worked in a blended mode depended entirely on the teaching pedagogy. Fitzgibbon and Jones (2004) point out that online learning is not just about the application of the technology to allow students greater access to learning materials but

rather is concerned with the academic teaching and pedagogy, which, in this study, had to be seriously re-evaluated. For Fabry and Higgs (1997), teachers must not only adopt the online technology but must revise their teaching methods. Thus, the aim in research cycle 2 was to ensure the pedagogic interventions were not just informed by the findings of cycle 1 but also by the data collected in cycle 2. However it was important at this stage to check and ensure the pedagogic issues revealed through the analysis in chapter 8 were being addressed fully through a suitable pedagogic interventions plan – the PIP. In the context of this research, the PIP represented the techniques and strategies to facilitate students working in a blended mode, which would encourage the type of collaborative work that in turn would foster active student participation in constructing knowledge.

8.3 Deriving possible pedagogic interventions based on the findings from the sub-triangles

The findings from the first research cycle (Chapter 7) revealed that some learning strategies that supported the blended learning process were missing from the data. The data from table 8.10 and 8.11 showed information about how the learning process was carried out, for example, the learning strategies used to move from the group being set up in the face-to-face meeting to the submission of the assignment, was incomplete – though for some groups this was more complete than others. There were eight groups of respondents in the first research cycle and a particular blended strategy adopted by one group could potentially have been used by another group but there was no record of this. Strategies could be missing due to two different reasons. First, the group did not use the strategies at all; thus, the strategies were neither seen in the online forum nor stated in their face-to-face meeting reports. Second, the group might have used the strategies, but the evidence was either not reflected in the online forum or was not recorded in the face-to-face meetings, resulting in conflicting data between the online forum and the face-to-face meetings. This would be revealed, for example, when the discussions recorded in the transcripts of the online forums did not correspond with the description of the face-to-face meetings. There could also be other strategies that the group had used but these strategies were not captured by the research instruments. For example, they may have used mobile phones to change their plans for working and this information was not captured by any of

the instruments and so not recorded in the table of blended activities. Thus, collecting this data became a focus of research cycle 2.

To begin with, the missing strategies or conflicting data were described based on a consideration of the sub triangles of the activity system for tools, rules and roles.

8.3.1 The Tool sub-triangle

The pedagogic interventions resulting from a consideration of the first sub triangle TOOLS suggested **an efficient use** of the online forum to complement the face-to-face meeting report. This was because the format of the face-to-face meeting report had not supported an understanding of both face-to-face and online learning strategies. In addressing this, the previous meeting report was replaced with a new groupwork report to record in detail how each group worked collaboratively through their learning activities online and face-to-face in completing their assignment.

8.3.2 The Rules sub-triangle

The analysis of the second sub triangle RULES, revealed there was a need to propose efficient strategies in guiding the students on a systematic **transition** between face-to-face to online and vice-versa. The missing strategies that related to sub-triangle RULES were the decisions to agree on the assignment topic and content materials and the discussions on developing the interface designs and the multimedia contents. The use of the groupwork report was suggested to guide the students working in a blended mode.

8.3.3 The Roles sub-triangle

The analysis of the third sub triangle ROLES, suggested that there was a need for further guidance on **how tasks could be effectively divided and delegated** among the group members. The missing strategy was related to delegating tasks to group members. A revised groupwork report was used to address these issues.

The revised groupwork report introduced suggested was part of the PIP. Thus, in understanding of how the students worked in each mode and how they made decisions about the mode in which they chose to work, a detailed PIP was described.

8.4 Developing the pedagogy-interventions-plan (PIP)

PIP represents the techniques and strategies to facilitate students working in a blended mode, which would encourage the type of collaborative work that in turn would foster active student participation in constructing knowledge. The purpose of the PIP was to improve the teaching methods from both the *reconnaissance phase* and the first research cycle so that the MIP could be improved to achieve further data capture. The existing PIPs identified from the first cycle were communicating synchronously using the asynchronous online forum (see 6.3.1.1), uploading materials through the online forum (see 6.3.1.2), specifying a single thread for a specific topic of discussion (see 6.3.1.3) and preparing face-to-face meeting report (6.3.2). These PIPs were further updated in the second cycle.

8.4.1 Communicating synchronously using the asynchronous online forum

Communicating synchronously through an asynchronous online forum had been introduced in the first cycle. In this second cycle, the use of synchronous communication was further refined. In order to communicate effectively in a synchronous mode, the students had to concentrate on a fresh single thread. Through a single thread, the students could concentrate on a specific topic of discussion and then post their ideas or opinions. In a synchronous mode, they could expect immediate responses from other members. It was also advisable to concentrate on one thread in the online forum so that the group members could follow the progress of the discussion.

8.4.2 Uploading materials through the online forum

In the first cycle, I had informed the students that the online forum could be used to upload document and multimedia files. In the second cycle, the students were required to upload their materials according to the specific topic of discussion in a thread they had specified. This allowed the students to discuss systematically the materials for their assignments.

8.4.3 Specifying a single thread for a specific topic of discussion

Using a single thread to discuss a specific topic had been introduced in the first cycle. It guided the students to concentrate on one forum for one specific discussion. The students used the online forum systematically. In the second cycle, the students were reminded that, after a face-to-face meeting, they should not use any previous threads to continue the discussion online. Instead, they had to open a new thread and start communicating from where they had stopped the discussion during their last meeting.

8.4.4 Providing a manual on the efficient use of the online forum

The manual served as a relatively complete guideline on how to use the online forum throughout the module working in a blended mode. This included re-using the existing strategies from the first research cycle – conducting synchronous online communication (see 6.3.1.1), uploading multimedia contents of suitable file size (see 6.3.1.2), concentrating on using one forum for each specific discussion (see 6.3.1.3) and minding their manners in the online discussions by referring to netiquette (see 6.3.3.2).

8.4.5 Introducing instructional video on working in a blended mode

A five-minute instructional video was produced on how to work effectively in a blended mode, presenting the effective blended strategies used by the groups in the first research cycle. Working in a blended mode would mean that the students would be involved in face-to-face meetings to discuss their assignment and would continue their discussions online. On the other hand, the students could initiate discussions through the online forum and continue their discussions during the face-to-face meetings. This video was uploaded to the VLE (Moodle) and could be downloaded and viewed by the students at any time. This video would be helpful in providing a practical insight into how the students should be working in a blended mode. I used a simple digital video camera to do the recording and video editing software to edit the video.

8.4.6 Providing a copy of blended learning strategy map online

I provided a copy of a blended learning strategy map online and the students could download it at any time (appendix 5). The blended strategy map could be used for reference before the groups started their discussions online and face-to-face. The map guided the students on how to work on their assignments through the online forum discussions as well as the face-to-face meeting activities, and listed effective blended learning strategies for each aspect of their work based on the findings of the first research cycle.

8.4.7 Providing scenario from previous class working in a blended mode

Based on the findings from the reconnaissance phase and the first research cycle, I was able to identify the performing and the underperforming groups. In this second cycle, during class in the first week of the semester, I highlighted the groups that had successfully adopted the blended learning strategies informed. I provided the reason why the blended strategies could work so well. I quoted examples from the groups and refined the ideas of the group working as a team so as to make the strategies applicable to them. These examples were able to offer better guidance to the students on how to work effectively in a blended environment.

8.4.8 Using the learning contract

Similar to the first cycle (6.3.3.1), each group was asked to prepare their own personalised group learning contract.

8.4.9 Using netiquettes

The same netiquette from the first cycle (6.3.3.2) was used as guidance for each group to communicate courteously through online.

8.4.10 Using the groupwork report

The groupwork report consists of three sections (appendix 6). The first section (section A) (figure 8.1) had two separate columns. The left column was used to place the summaries of the online discussion while the right column for the summaries of the face-

to-face meeting reports. Each group was fully responsible for summarising their own online forum discussions and their face-to-face meeting reports.



Discussion on Assignment ☐ **no.**

Group leader: _____
Members: _____
_____
_____
_____

Part A: Fill in both columns

Matters that have been discussed online [Please name the title and date of your thread]	Matters that have been discussed face-to-face
Date: _____ **Topic of discussion:** _____ _____ **Numbers of postings:** _____	**Date:** _____ **Topic of discussion:** _____ _____
Date: _____ **Topic of discussion:** _____ _____ **Numbers of postings:** _____	**Date:** _____ **Topic of discussion:** _____ _____

Figure 8.1: Section A of the groupwork report

The second section of the groupwork report (section B) contained the checklists and divided into two parts. The first part concerned the group working as a team to reach a consensus in selecting the topic and determining the content materials for the assignment. The second part of the checklist reviewed each group's learning strategies for working as a team in a blended environment. This could support and strengthen the learning contract adopted by each group (see 8.4.8). Making a checklist was vital as it help the group to use the e-learning to its full potential.

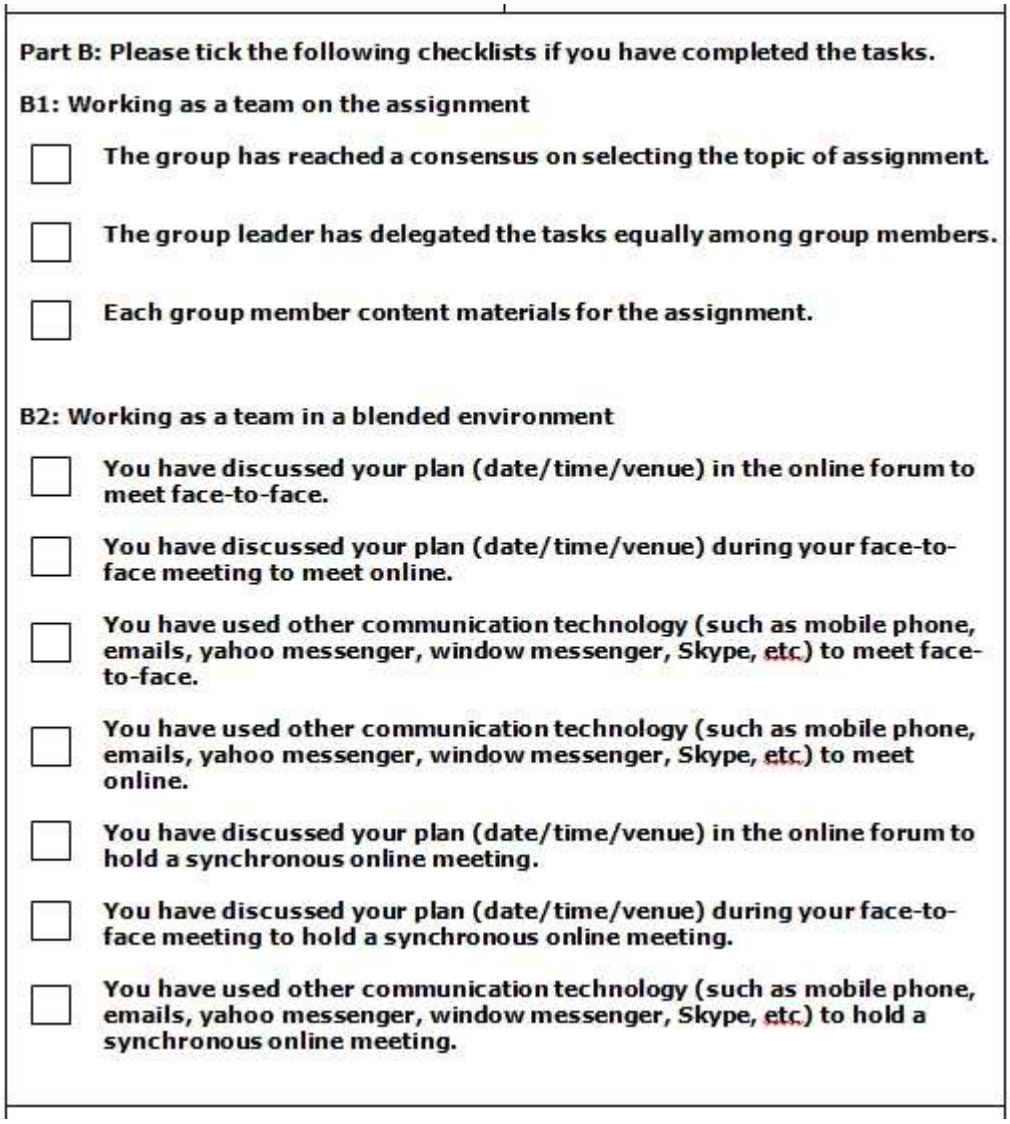
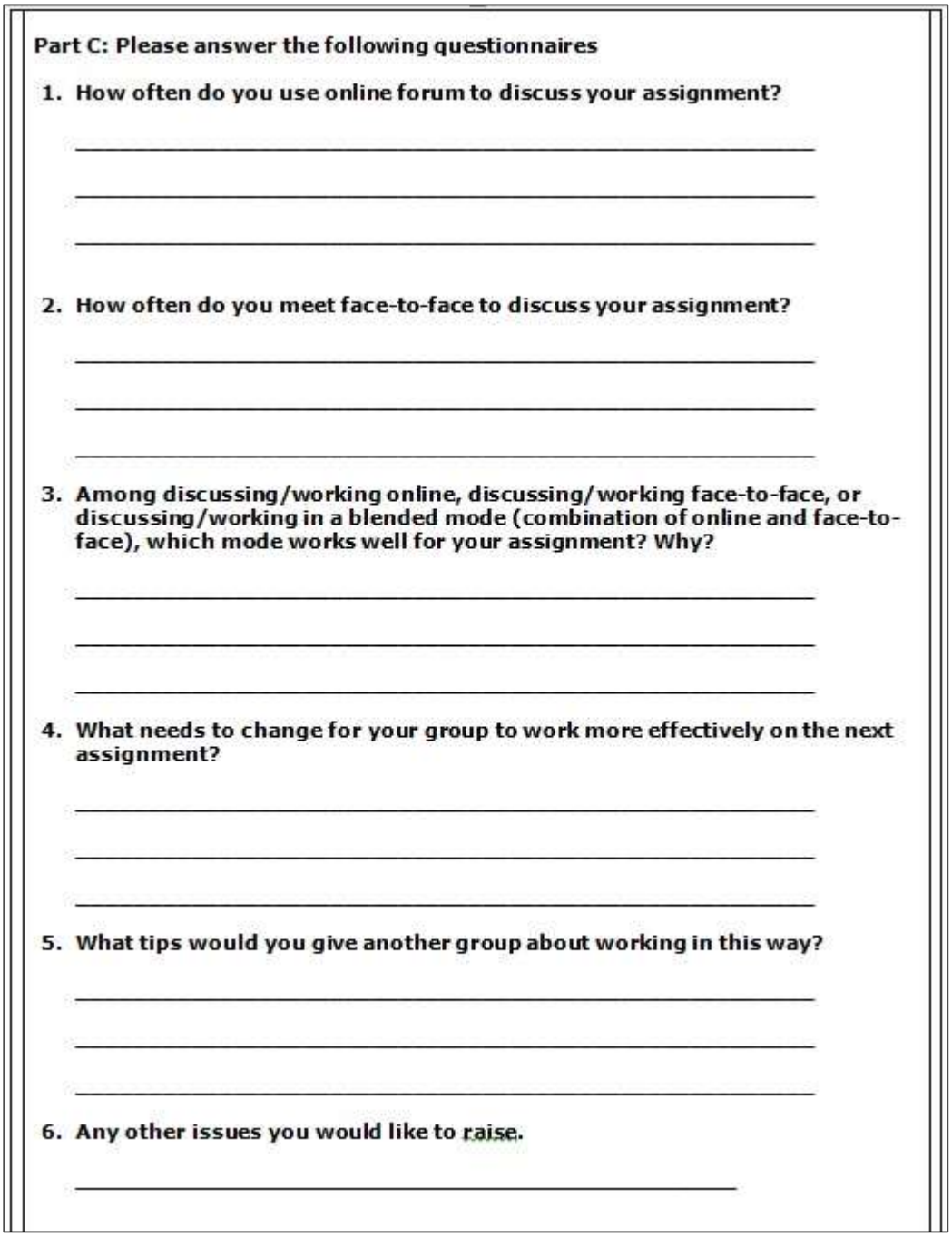


Figure 8.2: Section B of the groupwork report

In the third section (section C), the students were asked to provide their comments to the open-ended questionnaires. This section encouraged the group to become reflective students. It meant the students had to think of how they saw themselves as participants in the blended learning and how these perceptions developed or changed over time as they completed their assignments. Each member in the group had to be honest in their reflections about working in a blended mode and try to think about how they might improve the performance of the group for the next assignment. These included the lessons

the group had learnt about ways of working to complete their assignment using e-learning and which learning strategies worked for the group and which did not.



Part C: Please answer the following questionnaires

1. **How often do you use online forum to discuss your assignment?**

   _____

   _____

   _____

2. **How often do you meet face-to-face to discuss your assignment?**

   _____

   _____

   _____

3. **Among discussing/working online, discussing/working face-to-face, or discussing/working in a blended mode (combination of online and face-to-face), which mode works well for your assignment? Why?**

   _____

   _____

   _____

4. **What needs to change for your group to work more effectively on the next assignment?**

   _____

   _____

   _____

5. **What tips would you give another group about working in this way?**

   _____

   _____

   _____

6. **Any other issues you would like to raise.**

   _____

Figure 8.3: Section C of the groupwork report

8.5 Preparing for the second research cycle

After PIP had been determined, the preparation of the second cycle was planned. It involved (1) planning for MIP, (2) designing the research setting, (3) determining the research sampling, and (4) addressing the research questions.

8.5.1 Planning the methodology-interventions-plan (MIP)

Improving pedagogy provided the students with the formative feedbacks about effective learning strategies. After considering the pedagogic interventions from the three sub-triangles, the methodology used to derive the data from the research setting would have to be examined and improved. This meant building a comprehensive and improved data gathering approach in order to capture specific information from the students working in a blended mode that would reveal the missing strategies. In fact, the existing research instruments from the first cycle - using the online forum transcript (6.3.1), preparing the face-to-face meeting reports (6.3.2), conducting peer assessment (6.3.4) and conducting semi-structured interviews (6.3.6) – were identified as methodology-intervention plan or MIP. However, the face-to-face meeting report was replaced with the groupwork report in this second cycle.

8.5.1.1 Using the groupwork report

The groupwork report developed as the PIP (section 8.4.10) helped the students to plan their learning activities in a blended mode. The report could also be used as MIP. As the summaries of each group's learning activities were already recorded on the left (for the online discussions) and right (for the face-to-face discussions) column, the process of creating the table of blended activities become easier for the students. In this second cycle, the groups had to submit their groupwork reports after they completed each assignment. If the groupwork report was not properly completed such as lack of information on how they use the learning strategies in a blended mode, I could call the group for further explanations and asked them to make corrections.

8.5.1.2 Using the blended learning map and process instrument map

The purpose of the blended strategies map (figure 8.4) was to outline how the three assignments were completed by the students in groups throughout the semester. The process-instrument map (figure 8.5) shows an example how each assignment should be carried out.

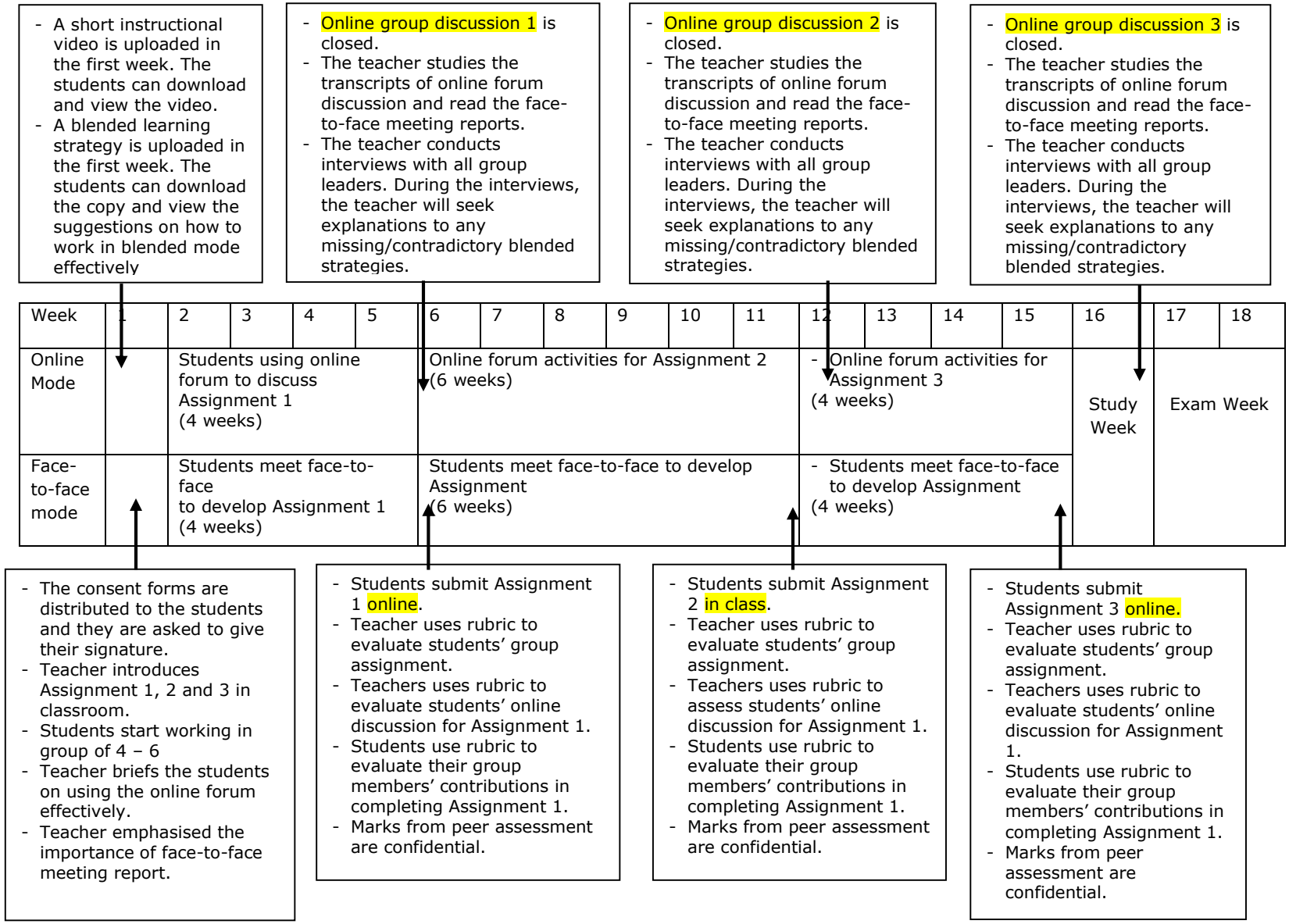


Figure 8.4: The blended learning map

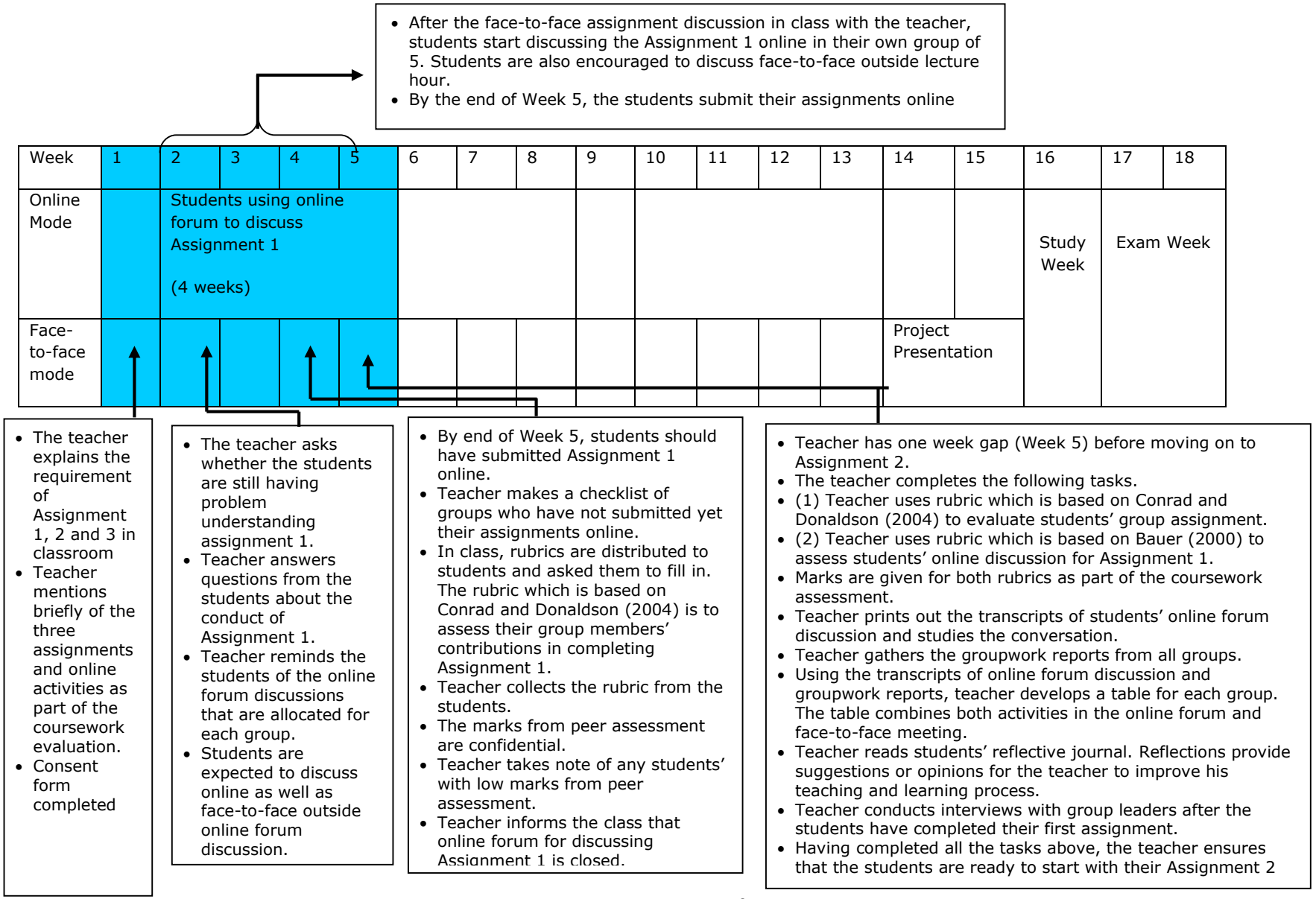


Figure 8.5: The process-instrument map for assignment 1

8.5.1.3 Conducting peer assessment

The peer assessment had already been conducted in the first cycle but it was found not helpful for some groups (section 7.2.4.1). Instead of filling in the form/rubric for assessing peers in class (as it was done in the first cycle), each student was asked to assess his/her group members separately. This could avoid any guilty feelings towards the not-so-collaborative members.

8.5.1.4 Conducting interviews

Conducting interviews with the group leaders was explained in the first cycle (see 6.3.6). However, in the second cycle, the group leaders were interviewed after each assignment had been submitted. The purpose of the interviews was to explore the strategies used and any ambiguous or missing data in the groupwork report and the peer assessment. It was important to obtain in-depth information on how each assignment had been completed. The questions posed were mainly about the groups' self-discipline and motivation working in blended mode, and the groups' schedule in managing their online forum and face-to-face meetings. The problems completing the first assignment could be identified earlier before starting with the next assignment. This interviews could also reveal whether their experiences in blended mode met the educational goal of the module.

8.5.1.5 Re-using online reflective journal

Although in the first cycle, the journal was not completed by all students, it provided some insights on team working among group members (see 8.2.4.2). In this second cycle, I decided to include the journal again as part of the research instruments.

8.5.2 The research setting

Regarding the research setting in the second cycle, the delivery of the module was also the same as in the first cycle (see 6.3.5). The study was conducted in UTM and the module was taught 2 hours weekly over 15 weeks in blended mode.

8.5.3 Research sampling

For the second research cycle, the number of students taking the module was 36. The study used the same sampling technique of the reconnaissance phase (section 5.4.2) and first research cycle (section 6.3.9) and the respondents/students were divided into eight small groups. However, group composition was made heterogeneous. It is refers to the members within the group were from different courses.

8.5.4 Research Procedure

At the start of the class, I explained to the students about the study and asked each student to sign the consent form. By signing the consent form, the students acknowledged that they had voluntarily involved in the study. After the students had formed their own group, I introduced the pedagogy-intervention plan (PIP). They were provided with a manual on how to use the forum for online discussions effectively. The contents of the manual include communicating synchronously through online forum, uploading a file with a reasonable size to share with other group members, and specifying a single thread for a specific topic of discussion. To further enhance their understanding working in blended mode, the students were provided with a copy of blended learning strategies map and instructional video. I also provided tips on working in blended mode from successful groups in previous classes (previous cycles). The groupwork report introduced in this cycle is part of PIP which serves as a guidance for students to work in blended mode. However, it also functions as methodology-intervention plan as it helps to collect data. Other MIPs used were peer assessments and interviews.

8.5.5 Addressing the research questions

With all the data derived from this cycle, the research questions based on three sub-triangles of tool, rules and roles (see 4.20) were addressed.

8.6 Conclusion

This chapter has outlined the second action research cycle that systematically built on the pedagogic and methodology approaches of the first cycle. It has provided a detailed consideration of the research findings and difficulties in gaining a complete data set on which to make informed judgements for the second research cycle. The research designs in the second cycle were developed based on the previous data findings from both the *reconnaissance phase* and the first research cycle. To obtain improved findings, the data collection techniques had to be further improved. This also meant strengthening the research instruments/tools to capture data more effectively.

Chapter 9

Research Cycle 2: Reflect

9.1 Introduction

The purpose of this chapter is to report on the finding of research cycle 2, with the aim of providing more evidence in developing an understanding of the learning process involved in this blended learning setting. The intention was to be able to map the range of learning strategies in use that led to effective working by the groups in completing their assignment with a mix of online and face-to-face modes. A revised strategy of preparing a groupwork report was introduced and the data gathering included analysing the learning strategies from this groupwork report. The groups' reflections from the groupwork report complemented the interview data from the group leaders. In this second cycle, the data were analysed at three points in the course after the completion of each assignment. Later, the research questions were addressed.

9.2 Improving the strategy of summarising the online discussions and gathering face-to-face meeting reports

Similar to the first cycle (see section 7.2.2), the process to identify the learning strategies from online and face-to-face discussions involved summarising the discussions from the online forums and face-to-face meetings.

9.2.1 Gathering postings from the online forums

At the end of the semester, all the transcripts of the online forum from each group were compiled. As shown in table 11.1, there were 534 postings of messages for assignment 1, 637 for assignment 2 and 421 for assignment 3. In total, there were 1592 postings. Figures 9.1 and 9.2 show excerpts of the online forums for groups 7 and 8.

The details of the messages posted in the forum were illustrated in table 9.1.

Table 9.1: The number of message postings for Assignments 1, 2 and 3.

.	Number of messages posted in the online forum discussion for assignment 1	Number of messages posted in the online forum discussion for assignment 2	Number of messages posted in the online forum discussion for assignment 3	TOTAL
Group 8	134	66	70	270
Group 4	88	99	81	268
Group 5	71	113	55	239
Group 3	86	109	25	220
Group 7	63	63	54	180
Group 2	37	82	33	152
Group 1	39	47	58	144
Group 6	16	58	45	119
OVERALL TOTAL	534	637	421	1592

The course had three important assignments to be completed. The first assignment required the groups to develop courseware documentation and a Gantt chart. In completing this assignment, the messages posted were generally about students' brainstorming ideas and proposing the topic for their educational courseware. Group 8 had the highest number of postings, with 134 messages. Besides discussion, the group also posted document files and shared them with members. As most of the document files were small in size, they could easily be uploaded on the forum. However, group 3 had the lowest

number of postings with only 16 messages, and this showed that the group could have met face-to-face more often. The postings for assignment 2 were generally about delegating tasks among group members and developing prototypes. Generally, the number of messages posted for the second assignments by seven groups (group 1, 2, 3, 4, 5, 6 and 7) was higher than their first assignment. Group 5 had the highest number of postings with 113 messages, and was followed by group 3 with 109 messages. The second assignment required the students to develop a courseware prototype which included developing storyboard, interfaces and multimedia content using authoring or programming software. A single multimedia file, such as a simple interface or animation produced in small size, was shared online with other group members for further discussion. The animation with huge file size could not be posted online and the discussion could have been conducted face-to-face. Nevertheless, group 8 would have discussed more face-to-face rather than online as the number of messages posted in the forum was less (66 messages) than they did for the first assignment. As for Assignment 3, the online discussions were also about delegating tasks in preparing students' final reports. Once again, group 8 had the highest number of postings, with 70 messages, as compared to other groups. Similarly to assignment 1, the final report was a document file which could be uploaded online and shared with group members for further discussion. The number of messages for groups 2, 3, 4, 5, 6 and 7 decreased significantly from the second to the third assignment. Group 3 had a sharp decrease of 84 messages, followed by group 5 (58 messages) and group 2 (49 messages). However, groups 1 and 8 had a slight increase of 11 messages and 4 messages respectively. The total number of messages posted by all groups in this second cycle was 1592. The next step was to identify learning strategies from the groups' online discussions.

9.2.2 Preparing groupwork report (section A)

It was expected that the students understood and had successfully worked in blended mode after using a manual on the efficient use of online forum (see 9.4.4), watching an instructional video on working in blended mode (see 9.4.5) and referring to the blended learning strategies map (see 9.4.6). All these are part of the pedagogy-intervention plan (PIP) introduced in chapter 9.

The students were responsible for summarising their own online forum specifically outlining their learning strategies. The learning strategies derived from the summaries were then matched with the learning strategies derived from the face-to-face meeting reports. The task to correspond the learning strategies derived from the summaries of the online forums with those from the summaries of the face-to-face meeting reports was done by each individual group. Section A of the groupwork report required the groups to align the summaries of their online forums with their face-to-face meeting reports. This made them aware of their own learning process and when they had to use the online and face-to-face mode.

Each assignment had its own groupwork report, so there were three groupwork reports for three assignments, and each groupwork report was submitted together with each completed assignment (see section 9.5.1.1).

9.2.3 Identifying learning strategies from the online discussions

The online discussions were also summarised by the same two experienced raters whom I had employed in the previous *reconnaissance phase* (section 5.6.1) and first cycle (section 8.2.2.2) using the coding filter technique by Saldana (2009). The process of summarising required both the raters to grasp the original text better and required adequate understanding of the students' discussions. The raters were advised to focus on the learning activities that were related to working on the assignments.

When the summaries happened to be contradictory, the researcher and the raters returned to the original transcripts of the online discussions. These summaries were checked against the original data of the online discussions in the transcripts in order to verify the accuracy of the summaries. Both the raters and I worked through the summaries again and later reached a compromise regarding which summaries best represented the learning strategies used in completing the assignments.

The summaries of the online discussions of the first assignment prepared by the individual groups in section A of their groupwork report were compared and contrasted with the raters' version. When the summaries from the report were found to be different from the raters' summaries, the report would be returned to the individual group. The group was asked to re-check their summaries. The group then re-submitted their groupwork report. The same process was repeated to verify the accuracy of the online forum summaries for the second and third assignments. The process of verifying the summaries of the online discussions is shown in figure 11.3.

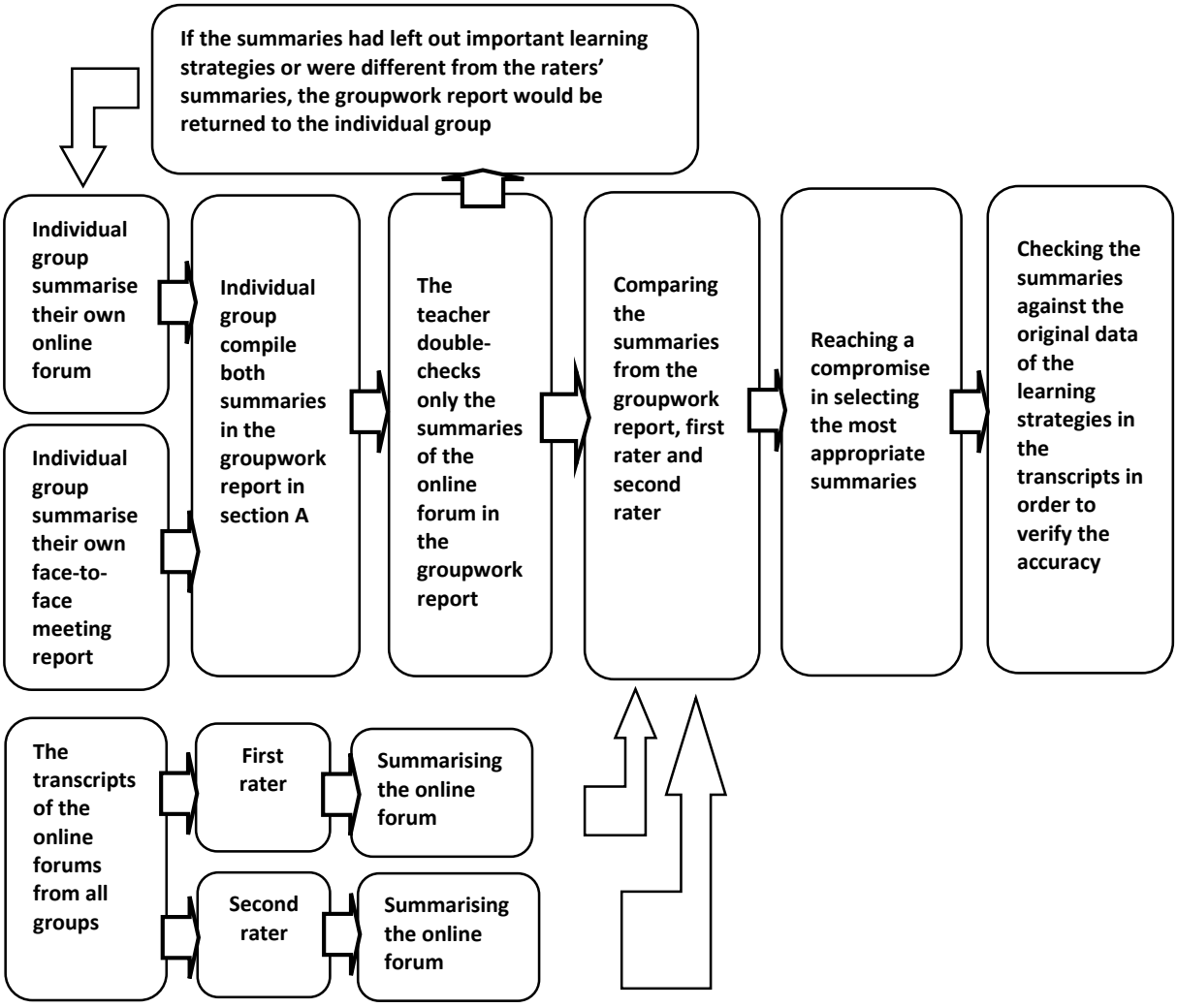


Figure 9.1: The process of summarising the learning strategies from the online forums

9.2.4 Using the groupwork report as a guideline to work in face-to-face mode

Based on the learning strategies which were derived from the online discussions in the groupwork report (section A), each group was able to plan and conduct their learning strategies in face-to-face mode.

9.3 Updating the coding strategy

In determining the presence of new learning strategies, three groups were selected. The final summaries of the online discussions (as derived from section 9.2.1) and the reports of the face-to-face meetings in section A of the groupwork report from the three groups

were placed separately in the table of blended activities. The coding strategy from the first research cycle was used to code the learning strategies in the table for the blended activities for group 1. The previous coding strategy consisted of 11 strategy categories with 31 learning strategies (see table 7.5). This was followed by the second group and later the third group. From these three tables, it was found that some existing strategies needed reviewing, and new strategies could be added to the blended learning strategies map. Two new strategy categories were introduced. The first category was related to compromising on and agreeing with the topic (strategy 10.1), and compromising on and agreeing with the assignment materials being discussed by the group (strategy 10.2). The second category was specifying a thread for a specific purpose or topic of discussion (strategy 9.1). These new categories were in the task-related theme.

A new strategy related to the *action planning* theme was added to the existing strategy category of communication: communicating through mobile devices and instant messaging (strategy 4.3). Examples of the mobile device were mobile phones, smart phones or personal digital assistants (PDA). The instant messaging included *Yahoo! Messenger*, *MSN chat* and *Skype*.

The existing strategy of 12.11 was revised to include the written assignment as well as courseware development. [In the first cycle, this strategy was labelled as 10.11 (see table 8.5)]. Another three existing strategies of 12.8, 12.9 and 12.10 were also revised. [In the first cycle, these strategies were labelled as 10.8, 10.9 and 10.10 (see table 8.5)]. These strategies, which were in the *task-related* theme, extended the flexibility of choosing either an authoring or programming language as a platform to develop a courseware. The two existing strategies in the category of socialisation of the group development theme (6.1 and 6.2) were merged into a single strategy.

Therefore, the new coding strategy comprised 13 strategy categories with 33 learning strategies. The following table shows the new blended learning strategies map.

Table 9.2: The new coding strategy (blended learning strategies map)

Themes	Strategy Category	Strategies
Action Planning [AP]	12. Scheduling [AP]	12.1. Scheduling the date, time and venue for the face-to-face meeting 12.2. Scheduling the date and time for synchronous online meeting
	13. Confirmation [AP]	13.1. Confirming the date, time and venue for the face-to-face meeting 13.2. Confirming the date and time for the synchronous online meeting
	14. Reminders [AP]	14.1. Reminder of the face-to-face meeting 14.2. Reminder of the online meeting 14.3. Reminder of the due date for the assignment
	15. Communication [AP]	15.1. Exchanging mobile phone numbers 15.2. Communicating through asynchronous online forum in a synchronous mode 15.3. Communicating through mobile device and/or instant messaging
Group Development [GD]	16. Motivation [GD]	16.1. Appreciating the group's efforts/work in completing the assignment
	17. Socialisation [GD]	17.1. Greeting the group members [REVISED LEARNING STRATEGY]
	18. Introduction [TR]	18.1. Introducing working procedures for the group members
	19. Organisation [TR]	19.1. Identifying strengths and skills of the group members 19.2. Assigning tasks to/dividing tasks among the group members
	20. Brainstorming [TR]	20.1. Brainstorming for the assignment topic 20.2. Brainstorming for the assignment materials
	21. Compromising [TR]	21.1. Compromising and agreeing on the topic assignment [ADDED LEARNING STRATEGY] 21.2. Compromising and agreeing on the assignment materials [ADDED LEARNING STRATEGY]
	22. Thread Specification [TR]	22.1. Specifying a thread of the online forum for a specific topic of discussion [REVISED LEARNING STRATEGY]
		23.1. Discussing and/or developing the storyboard for the courseware

Task-related [TR]	23. Assignment Engagement [TR]	23.2. Discussing and/or developing the subject content for the courseware 23.3. Discussing and/or developing the multimedia content (audio, video, animation, graphics, etc.) for the courseware 23.4. Discussing and/or developing the courseware interfaces (main menu and sub-menu) 23.5. Posting/sharing the courseware interfaces (main menu, sub-menu, exercises, glossary, etc.) in the forum 23.6. Posting/sharing multimedia files (montage, animation, etc.) 23.7. Posting/sharing document file(s) for discussion/compilation with group members 23.8. Discussing the compatibility of the file formats with the authoring or programming software [REVISED LEARNING STRATEGY]
		23.9. Identifying any compatibility problems of the file formats with the authoring or programming software [REVISED LEARNING STRATEGY] 23.10. Rectifying any compatibility problems of the file formats with the authoring or programming software. [REVISED LEARNING STRATEGY]
		23.11. Checking the overall content materials of the courseware development and/or written assignment [REVISED LEARNING STRATEGY]
	24. Administration [TR]	24.1. Submitting lists of group members' names to the teacher 24.2. Submitting assignments

9.4 Analysing the first assignment

Section A of the groupwork report for the first assignment contains the summaries of the face-to-face meeting reports and the online discussions. It is the most important part in analysing the data on the learning strategies conducted in a blended mode.

9.4.1 Labelling the learning strategies with the new coding strategy

The tables for the blended activities for the three groups (groups 1, 2 and 3) that were used to update the coding strategy were re-visited. Using the new coding strategy, the learning strategies in the tables were tagged once again. An example of the table for blended activities of the first group is shown in table 9.3.

Table 9.3: The table of blended activities for group 1

Week	Meeting/Discussion/ Communication/Event	Mode	Strategies
Week 1 6 – 12 July 2009	• Classroom meeting	• Face-to-face	• Submitting a list of group members in class.
Week 2 13 – 19 July 2009	• Forum discussion 1 (thread dated between 16 – 23 July 2009) [TR-THREAD-11.1]	• Online	• Omar introduced himself to the group as having a different major background. Since he was from the Islamic major, he asked the group which would be the best title to choose for their project [TR-BRAINSTORMING-9.1]. Huda suggested the group choose a title based on Islamic studies, such as *Sirah Nabi* (Prophet's Journey) or *Zakat*. Omar agreed with Huda's suggestion, but he proposed a title of *Doa-doa Harian* (Daily Prayers). Suhaimi agreed with any topic as long as the project could be managed by all group members. [TR-COMPROMISING-10.1] -Dzakiah apologised for joining the discussion a bit late as she had had problems with the Internet access at her hostel. On the topic chosen, she agreed with the group. Suhaimi suggested the group meet face-to-face to confirm the title for their project. Omar asked the group to state their availability within the week before fixing the date of the face-to-face meeting [AP-SCHEDULING-1.1], (12 postings).
	• Communication through mobile device [AP-COMMUNICATION-4.3]	• Communication device	• Suhaimi sent text messages to all group members about the date, time and venue for their face-to-face meeting. [AP-CONFIRMATION-2.1]. Date: 21 July 2009 Time: 9.30pm Venue: Arked K11
Week 3 20 – 26 July	• Meeting for Assignment 1 (21 July 2009)	• Face-to-face	• Three topics had been suggested by the group earlier in the online forum: hukum-hukum asas (basic regulations), doa-doa harian (daily prayers) and sirah nabi (prophet's

2009			journey). In the meeting, the group decided to choose doa-doa harian (daily prayers). [TR-BRAINSTORMING-9.1], [TR-COMPROMISING -10.1]
Week 4 27 July - 2 August 2009	• Forum discussion 1 (thread dated between 27 July – 1 August 2009)	• Online	• Since the group had agreed to develop a courseware on doa-doa harian (daily prayers), they now had to work on the content in detail [TR-BRAINSTORMING-9.2]. Suhaimi suggested doa-doa (prayers) that were related to their daily routines. These doa should be accompanied by suitable graphics so that the courseware would be interesting. Huda agreed with Suhaimi and further suggested adding audio to ensure users knew the correct recitation of the doa. Dzakiah also agreed with Suhaimi. She suggested everyone should start searching for material on the doa (prayers) enclosed with graphics, animation, or video. Omar reminded the group to bring their materials to the face-to-face meeting. [TR-BRAINSTORMING-9.2] The group would decide which materials would be selected. He asked whether the group had decided on which platform to develop their courseware. Huda suggested an authoring software called Authorware. Dzakiah further suggested adding exercises and games in the courseware. Omar stated the date, venue and time for their next face-to-face meeting [AP-SCHEDULING-1.1]. (9 postings). Date: August 1st, 2009 Time: 3 pm Venue: university library [AP-CONFIRMATION-2.1]
	Meeting for Assignment 1 (1 August 2009)	• Face-to-face	• The content of the courseware was the main topic of discussion during the face-to-face meeting. The group also discussed how to make their courseware more interesting. The types of doa-doa harian (daily prayers) that had been chosen were the prayers in house, at school and in the mosque. The group tried to decide which multimedia

			components such as graphics, audio and animation were suitable. Besides the contents of the courseware, the group also looked at the draft of the documentation of their Assignment 1. [TR-BRAINSTORMING-9.2], [TR-ASSIGNMENT-10.3]
	• Forum discussion 1 (thread dated between 2- 3 August 2009)	• Online	• Suhaimi started the thread and asked how the group would divide the tasks for the assignment. Omar suggested the task division as follows:- the subtopic of matters 1 & 2 would be handled by Huda while Kiah would be in charge of matters 3 & 4. Omar would take matters 5, 6 & 7. Finally, Suhaimai would be doing matter 8 & 9. Dzakiah and Suhaimi asked for further explanation from Omar regarding the tasks given to them. Omar replied in detail as to what were matter 1,2 3 and 4 [TR-ORGANISATION-8.1]. Matter 1 was about learning problems and their solutions (Huda). Matter 2 was related to learning objectives for the courseware and the learning approach (Dzakiah). Matter 3 concerned the content materials, flow chart and story boarding (Omar). [TR-ASSIGMENT-12.1] Matter 4 concerned the costing for the courseware development and Gantt chart (Suhaimi). Suhaimi asked the group to explain the Gantt chart. Dzakiah suggested opening the sample of a Gantt chart posted by the teacher if they wanted to know. Dzakiah and Huda had done half of the documentation. [TR-ORGANISATION-8.2] (14 postings)
Week 5 3 - 9 August 2009	• Forum discussion 1 (thread dated between 5 – 7 August 2009)	• Online	• Huda suggested the group members who had completed their parts upload their tasks in this thread. Dzakiah asked Omar and Suhaimi to help her with the final touches before submitting their assignment [TR-ASSIGMENT-12.7]. The rush was due to Huda and Dzakiah who were leaving for Kedah on the Friday. Omar suggested the group hold a last face-to-face meeting on August 6 before they submitted their assignment [AP-SCHEDULING-1.1]. Huda confirmed the meeting as suggested by Omar with the

			following venue and time. (8 postings) Date: 6 August 2009 (Thursday) Time: 11.30 am Venue: C14 [AP-CONFIRMATION-2.1] Dzakiah and Huda uploaded their completed tasks in the thread [TR-ASSIGNMENT-12.7]. Dzakiah reminded the group that they must send their complete names and matrix numbers for the cover page, content materials for the courseware, and the flow chart as well as the storyboard for compilation.
	• Meeting for Assignment 1 (6 August 2009)	• Face-to-face	• During the meeting, each group member updated their work progress on the assignment. Dzakiah and Huda told the group that they would upload their tasks soon. The group reviewed the overall content of the assignment before submitting online. [TR-ASSIGMENT-12.1]
	• Assignment submission	• Online	• The group submitted the assignment online. A hardcopy of the assignment was submitted. [TR-ADMINISTRATION-13.2

The coding process was continued with the rest of groups 3, 4, 5, 6, 7 and 8. The next stage was to develop the *table of blended strategies* based on the coding in the tables for the blended activities.

9.4.2 Using the coding in the tables for blended strategies

From the tables for blended strategies of group 1 (Table 9.3) and group 2, each learning strategy was marked either as a face-to-face or an online mode. If the learning strategies were marked in both modes, it was considered that the strategies were conducted in a blended mode. A table of blended strategies (similar to table 7.6 and 7.7) for groups 1 to 8 were developed.

9.4.3 Analysing the tables for blended strategies

The table for blended strategies developed for groups 1 to 9 were summarised according to the three important themes – action planning, group development and task-related.

The learning strategies from the action planning, group development and the task related themes for the *first assignment* were analysed and rated as online, face-to-face or blended mode. These are shown in following table (Table 9.4).

Table 9.4: The learning strategies from the theme of action planning, group development and task-related were analysed and rated as online, face-to-face or blended mode

Theme	Learning strategies	Analysis
Action Planning	1.1. Scheduling the date, time and venue for the face-to-face meeting	Blended – 3, 4, 6 Online – 1, 2,5,7,8 Face-to-face – none
	1.2. Scheduling the date and time for the synchronous online meeting	None
	2.1. Confirming the date, time and venue for the face-to-face meeting	Blended – 3, 5,6,8 Online – 1, 4, 7 F2F – 2
	2.2. Confirming the date and time for the synchronous online meeting	Blended – none Online – 4 F2F – 7
	3.1. Reminder of the face-to-face meeting	Blended – none Online – 8 F2F – none
	3.2. Reminder of the online meeting	Blended – none Online – none F2F – 4
	3.3. Reminder of the due date for the assignment	Blended – 3, 7 Online – 4, 8 F2F – none
	4.1. Exchanging mobile phone numbers	None
	4.2. Communicating through the asynchronous online forum in a synchronous mode	Blended – not related Online – 2, 8 F2F - not related
	4.3. Communicating through mobile devices and/or instant messaging	Blended – not related Online – 1, 2, 3, 4, 5, 6, 7, 8 F2F - not related
	5.1. Appreciating the group's efforts/work in completing the assignment	Blended – none Online – 3

		F2F – 4
Group Development	6.2. Greeting the group members	Blended – 3, 4 Online – 2, 8 F2F – none
Task-related	7.1. Introducing working procedures for the group members	Blended – 2, 3 Online – none F2F – none
	8.1. Identifying strengths and skills of the group members	Blended – none Online – none F2F – 2, 3
	8.2. Assigning tasks to /dividing tasks among the group members	Blended – 2, 3, 6, 8 Online – 4, 7 F2F – none
	9.1.Brainstorming for the assignment topic	Blended – 1, 2, 3, 4, 5 Online – 6, 7, 8 F2F – none
	9.2.Brainstorming for the assignment materials	Blended – 1, 2, 4, 7 Online – none F2F – 3, 5, 6
	10.1. Compromising and agreeing on the topic assignment	Blended – 1, 2 Online – 3, 8 F2F – 5, 6, 7
	10.2. Compromising and agreeing on the assignment materials	Blended – none Online – 4, 5 F2F – 3, 6
	11.1. Specifying a thread of the online forum for a specific topic of discussion	Blended – none Online – 1, 2, 3, 4, 5, 6, 7 F2F – none
	12.1. Discussing and/or developing the storyboard for the courseware	Blended – 3 Online – 1, 2 F2F – 4, 7, 8
	12.2. Discussing and/or developing the subject content for the courseware	Blended – none Online – none F2F – 1, 3, 8
	12.3. Discussing and/or developing the multimedia content (audio, video, animation, graphics, etc.) for the courseware	Blended – none Online – none F2F – none
	12.4. Discussing and/or developing the courseware interfaces (main menu and sub-menu)	Blended – none Online – none F2F – none
	12.5. Posting/sharing multimedia files (montage, animation, etc.)	Blended – none Online – none F2F – none
	12.6. Posting/sharing document file(s) for discussion/compilation with group members	Blended – none Online – 1 3 8 F2F – 5 6 7

	12.7. Discussing the compatibility of the file formats with the authoring or programming software	Blended – none Online – none F2F – 2 3 4
	12.8. Identifying any compatibility problems of the file formats with the authoring or programming software	Blended – none Online – none F2F – none
	12.9. Rectifying any compatibility problems of the file formats with the authoring or programming software	Blended – none Online – none F2F – none
	12.10. Checking the overall content materials of the courseware development and/or written assignment	Blended – none Online – none F2F – 1 2 5 6 7 8
	12.11. Checking the overall content materials of the courseware development and/or written assignment	Blended – none Online – none F2F – 1 2 5 6 7 8
	13.1. Submitting lists of group members' names to the teacher	Blended – none Online – none F2F – none
	13.2. Submitting assignments	Blended – 1 2 3 4 5 6 7 8 Online – none F2F – none

Based on table 11.5, the analysis of the blended strategies for the first assignment reveals key differences between the learning strategy modes in producing a documentation plan (for assignment 1). For the action planning theme, only a few groups used a blended mode. Group 3 and group 6 worked in a blended mode for the same learning strategies 1.1 and 2.1. The learning strategy 2.1 was the strategy most used in the action planning theme by groups 3, 5, 6 and 8. From the group development theme, only learning strategy 6.1 was conducted in a blended mode by groups 4 and 6. It was in the task-related theme where blended learning predominated. .

Table 9.5: The learning strategies used by the groups in a blended mode across the three themes for Assignment 1

Group	The types of learning strategies conducted in a blended mode			Number of blended strategies
	Action Planning [AP]	Group Development [GD]	Task-related [TR]	
1			9.1, 9.2, 10.1, 12.11	4
2			7.1, 8.2, 9.1, 9.2, 10.1, 12.11	6
3	1.1, 2.1		7.1, 8.2, 9.1	5
4	1.1	6.1	9.1, 9.2	4
5	2.1		9.1, 12.11	3
6	1.1, 2.1	6.1	8.2, 12.11	5
7			9.2, 12.11	2
8	2.1		8.2, 12.11	3

The number of groups that used blended learning varied in the first assignment. With the combination of the three themes, group 2 appeared to be the group that conducted the most blended strategies (6 blended strategies). This was followed by two groups (3 and 6) with five blended strategies. Another two groups with the same number of blended strategies were groups 1 and 4 (four blended strategies). Groups 1, 2 and 7 did not use any blended strategies in the *action planning* and *group development* theme. They could have worked either online or face-to-face only.

9.5 Analysing the second assignment

The process of analysing the second assignment was the same as in the first one.

9.5.1 Using the new coding strategy to code the learning strategies in the tables for blended activities

The data in section A of the groupwork report for the second assignment from each group were placed in the tables for blended activities. The new coding was used to code the learning strategies in the tables in all groups.

9.5.2 Marking the coding in the tables for blended strategies

From the table for blended activities for grousp 1 to 8, each learning strategy was marked either as a face-to-face mode or online mode. If the learning strategies were marked in both modes, it meant that the strategies were conducted in a blended mode.

9.5.3 Analysing the coding in the tables for blended strategies

A table of blended strategies for groups 1 to 8 were summarised according to the three themes – action planning, group development and task-related (table 9.6).

Table 9.6: The learning strategies from the action planning, group development and task-related theme of the second assignment were analysed and rated as online, face-to-face or blended mode.

Theme	Learning strategies	Analysis
Action Planning	1.1. Scheduling the date, time and venue for the face-to-face meeting	Blended – 3 8 Online – 1 2 4 7 Face-to-face - none
	1.2. Scheduling the date and time for the synchronous online meeting	Blended – none Online – 3 4 7 8 Face-to-face – 2
	2.1. Confirming the date, time and venue for the face-to-face meeting	Blended – 3 8 Online – 1 4 6 7 F2F – 2 5
	2.2. Confirming the date and time for the synchronous online meeting	Blended – none Online – 1 4 7 F2F – none
	3.1. Reminder of the face-to-face meeting	Blended – none Online – none F2F – none
	3.2. Reminder of the online meeting	Blended – none Online – none F2F – none
	3.3. Reminder of the due date for the assignment	Blended – none Online – 1 F2F – none
	4.1. Exchanging mobile phone numbers	None
	4.2. Communicating through the asynchronous online forum in a synchronous mode	Blended – none Online – 1 2 4 5 6 8 F2F - none
	4.3. Communicating through mobile devices and/or instant messaging	Blended – none Online – 1 2 4 6 7 F2F – none

Group Development	5.1. Appreciating the group's efforts/work in completing the assignment	Blended – 3 Online – 1 2 6 7 F2F – none
	6.1. Greeting the group members	Blended – 2 Online – 5 F2F – 3 4
Task-related	7.1. Introducing working procedures for the group members	Blended – none Online – 2 3 6 7 F2F – none
	8.1. Identifying strengths and skills of the group members	Blended – none Online – none F2F – none
	8.2. Assigning tasks to/dividing tasks among the group members	Blended – 1 7 Online – none F2F – 3 4 5 6 8
	9.1. Brainstorming for the assignment topic	Blended – none Online – none F2F – none
	9.2. Brainstorming for the assignment materials	Blended – none Online – none F2F – none
	10.1. Compromising and agreeing on the topic assignment	Blended – none Online – none F2F – none
	10.2. Compromising and agreeing on the assignment materials	Blended – none Online – none F2F – none
	11.1. Specifying a thread of the online forum for a specific topic of discussion	Blended – none Online – 1 2 3 4 5 6 F2F – none
	12.1. Discussing and/or developing the storyboard for the courseware	Blended – none Online – none F2F – none
	12.2. Discussing and/or developing the subject content for the courseware	Blended – 1 2 3 4 5 6 7 8 Online – none F2F – none
	12.3. Discussing and/or developing the multimedia content (audio, video, animation, graphics, etc.) for the courseware	Blended – 1 2 3 5 6 7 8 Online – 4 F2F – none
	12.4. Discussing and/or developing the courseware interfaces (main menu and sub-menu)	Blended – 1 2 3 4 5 6 7 8 Online – none F2F – none
	12.5. Posting/sharing multimedia files (montage, animation, etc.)	Blended – 1 2 3 4 5 6 7 Online – none F2F – none

	12.6. Posting/sharing document file(s) for discussion/compilation with group members	Blended – 2 3 4 5 Online – none F2F – 1 6
	12.7. Discussing the compatibility of the file formats with the authoring or programming software	Blended – none Online – none F2F – none
	12.8. Identifying any compatibility problems of the file formats with the authoring or programming software	Blended – 1 4 7 Online – 2 F2F – 3 8
	12.9. Rectifying any compatibility problems of the file formats with the authoring or programming software.	Blended – 1 2 7 Online – 4 F2F – 3 5 8
	12.10. Checking the overall content materials of the courseware development and/or written assignment	Blended – 1 2 3 4 Online – 7 F2F – 5
	12.11. Checking the overall content materials of the courseware development and/or written assignment	Blended – 1 2 3 Online – none F2F – 4
	13.1. Submitting lists of group members' names to the teacher	Blended – none Online – none F2F – none
	13.2. Submitting assignments	Blended – none Online – none F2F – 1 2 3 4 5 6 7 8

9.5.4 The summary of the groups that employed blended strategies in the second assignment

Table 9.7 illustrates in detail the learning strategies used by the groups in a blended mode across the three themes.

Table 9.7: The learning strategies used by the groups in a blended mode across the three themes for Assignment 2

Group	The types of learning strategies conducted in a blended mode			Number of blended strategies
	Action Planning [AP]	Group Development [GD]	Task-related [TR]	
3	1.1, 2.1	5.1	12.2, 12.3, 12.4, 12.5, 12.6, 12.10, 12.11	10
2		6.1	12.2, 12.3, 12.4, 12.5, 12.6, 12.9, 12.10, 12.11	9
1			12.2, 12.3, 12.4, 12.5, 12.8, 12.9, 12.10, 12.11	8
4			12.2, 12.4, 12.5, 12.6, 12.8, 12.10	6

7			12.2, 12.3, 12.4, 12.5, 12.8, 12.9	6
8	1.1, 2.1		12.2, 12.3, 12.4	5
5			12.2, 12.3, 12.4, 12.5, 12.6	5
6			12.2, 12.3, 12.4, 12.5	4

The second assignment was the core content of the module, as each group was required to develop educational courseware. This involved more strategies in the task-related theme. In general, all the groups used blended strategies in completing the assignment. Group 3 appeared to be the group that conducted the most learning strategies in a blended mode with ten blended strategies. This was followed by group 2 (nine blended strategies) and group 1 (eight blended strategies). Group 4 and 7 used six blended strategies. Another two groups with the same number of blended strategies were groups 8 and 5 (five blended strategies). Group 6 was the group with least blended strategies (four strategies).

9.6 Analysing the Third Assignment

The process of analysing the third assignment was the same as in the first and second assignment.

9.6.1 Using the new coding strategy to code the learning strategies in the tables for blended activities

The data in the section of the groupwork report for the third assignment from each group were placed in the tables for blended activities. The new coding was used to tag the learning strategies in the tables in all groups.

9.6.2 Marking the coding in the tables for blended strategies

From the the table for blended activities for grousp 1 to 8, each learning strategy was marked either as a face-to-face mode or online mode. If the learning strategies were marked in both modes, it meant that the strategies were conducted in a blended mode.

9.6.3 Analysing the coding in the tables for blended strategies

The tables for blended strategies for groups 1 to 8 were summarised according to the three important themes – action planning, group development and task-related (table 9.8).

Table 9.8: The learning strategies from the action planning, group development and task-related theme of the third assignment were analysed and rated as online, face-to-face or blended mode.

Theme	Learning strategies	Analysis
Action Planning	1.1. Scheduling the date, time and venue for the face-to-face meeting	Blended – none Online – 1, 3, 5 F2F – none
	1.2. Scheduling the date and time for the synchronous online meeting	Blended – none Online – 2 F2F – none
	2.1. Confirming the date, time and venue for the face-to-face meeting	Blended – none Online – none F2F – none
	2.2. Confirming the date and time for the synchronous online meeting	Blended – none Online – none F2F – 1, 2, 7
	3.1. Reminder of the face-to-face meeting	Blended – none Online – 4, 5 F2F – none
	3.2. Reminder of the online meeting	Blended – none Online – none F2F – none
	3.3. Reminder of the due date for the assignment	Blended – none Online – 1, 2, 3, 6, 7 F2F – none
	4.1. Exchanging mobile phone numbers	None
	4.2. Communicating through asynchronous online forum in a synchronous mode	Blended – none Online – 1, 2, 4, 5, 6, 7, 8 F2F – none
	4.3. Communicating through mobile devices and/or instant messaging	Blended – none Online – 1, 2, 5, 6 F2F – none

Group Development	5.1. Appreciating the group's efforts/work in completing the assignment	Blended – none Online – 2, 3 F2F – none
	6.1. Greeting the group members	Blended – 4 Online – 2 F2F – 3
Task-related	7.1. Introducing working procedures for the group members	Blended – none Online – 1 F2F – none
	8.1. Identifying strengths and skills of the group members	Blended – none Online – none F2F – 2, 3
	8.2. Assigning tasks to/dividing tasks among the group members	Blended – 1 Online – 4, 5, 8 F2F – 3
	9.1. Brainstorming for the assignment topic	Blended – none Online – none F2F – none
	9.2. Brainstorming for the assignment materials	Blended – none Online – none F2F – none
	10.1. Compromising and agreeing on the topic assignment	Blended – none Online – none F2F – none
	10.2. Compromising and agreeing on the assignment materials	Blended – none Online – none F2F – none
	11.1. Specifying a thread of online forum for a specific topic of discussion	Blended – 6 Online – 2, 4, 5, 7 F2F – none
	12.1. Discussing and/or developing the storyboard for the courseware	Blended – none Online – none F2F – 1
	12.2. Discussing and/or developing the subject content for the courseware	Blended – 1 Online – 3, 4, 5 F2F – none
	12.3. Discussing and/or developing the multimedia content (audio, video, animation, graphics, etc.) for the courseware	Blended – none Online – 3, 5, 8 F2F – none
	12.4. Discussing and/or developing the courseware interfaces (main menu and sub-menu)	Blended – none Online – 2 F2F – none

	12.5. Posting/sharing multimedia files (montage, animation, etc.)	Blended – none Online – 4 F2F – none
	12.6. Posting/sharing document file(s) for discussion/compilation with group members	Blended – none Online – none F2F – none
	12.7. Discussing the compatibility of the file formats with the authoring or programming software	Blended – 2 Online – 1, 5 F2F – none
	12.8. Identifying any compatibility problems of the file formats with the authoring or programming software	Blended – none Online – 2, 8 F2F – none
	12.9. Rectifying any compatibility problems of the file formats with the authoring or programming software.	Blended – none Online – 8 F2F – none
	12.10. Checking the overall content materials of the courseware development and/or written assignment	Blended – none Online – 8 F2F – none
	12.11. Checking the overall content materials of the courseware development and/or written assignment	Blended – 5, 6, 7, 8 Online – 1, 2, 3, 4 F2F – none
	13.1. Submitting lists of group members' names to the teacher	Blended – none Online – none F2F – none
	13.2. Submitting assignments	Blended – 1, 2, 3, 4, 5, 6, 7, 8 Online – none F2F – none

9.6.4 The summary of the groups that employed blended strategies in the third assignment

In general, the number of blended strategies used by all the groups was somewhat disappointing. As most of the groups were rushing to complete their assignments and to start preparing for their final exam, the members had little time to meet face-to-face. Instead, they communicated more online. Table 9.9 shows the learning strategies used by the groups in a blended mode across the three themes.

Table 9.9: The learning strategies used by the groups in a blended mode across the three themes for Assignment 3

Group	The types of learning strategies conducted in a blended mode			Number of blended strategies
	Action Planning [AP]	Group Development [GD]	Task-related [TR]	
6			11.1, 12.11, 13.2	3
1			8.2, 12.2, 13.2	3
2			12.7, 13.2	2
5			12.11, 13.2	2
7			12.11, 13.2	2
8			12.11, 13.2	2
4		6.1	13.2	2
3			13.2	1

9.6.5 The learning strategies employed in a blended mode

Table 9.10 shows that most of the learning strategies from the task-related theme were carried out in the blended mode

Table 9.10: The total numbers of learning strategies employed in blended mode

Group	The types of learning strategies conducted in a blended mode									Number of blended strategies
	Action Planning [AP]			Group Development [GD]			Task-related [TR]			
	Assignment 1	**Assignment 2**	**Assignment 3**	**Assignment 1**	**Assignment 2**	**Assignment 3**	**Assignment 1**	**Assignment 2**	**Assignment 3**	
1		2			1		4	8	3	18
2					1		6	8	2	17
3	2	2			1		3	7	1	16
4	1			1		1	2	6	1	12

6	2			1			2	4	3	12
8	1	2					3	3	2	11
5	1						2	5	2	10
7							2	6	2	10

Group 1 used the most learning strategies in a blended mode (18 learning strategies). This was followed by group 2 (17 strategies) and group 3 (16 strategies). Groups 4 and 6 used 12 learning strategies in the blended mode. Group 7 used the fewest learning strategies in the blended mode.

9.7 Deriving the transition strategies

Although group 1 appeared to conduct the most learning strategies in blended mode, it did not cover all strategies. Instead, it was referred to other groups who conducted the strategies that were not covered by group 1 in blended mode. Table 9.11 illustrates the learning strategies conducted in blended mode across the three assignments.

Table 9.11: The learning strategies conducted in blended mode across the three assignments

Learning Strategies			Groups		
Theme	Strategy Category	Strategies	Assignment 1	Assignment 2	Assignment 3
Action Planning [AP]	Scheduling	1.1. Scheduling the date, time and venue for the face-to-face meeting	3,4,5	3,8	0
		1.2. Scheduling the date and time for synchronous online meeting	0	0	2
	Confirmation	2.1. Confirming the date, time and venue for the face-to-face meeting	3,5,6,8	3,8	0
		2.2. Confirming the date and time for the synchronous online meeting	0	0	2
	Reminders	3.1. Reminder of the face-to-face meeting	1	0	0
		3.2. Reminder of the online meeting	0	1	0
		3.3. Reminder of the due date for the assignment	3,7	0	0
	Communication	4.1. Exchanging mobile phone numbers	0	0	0
		4.2. Communicating through asynchronous online forum in a synchronous mode	(not blended)	(not blended)	(not blended)
		4.3. Communicating through mobile device and/or instant messaging	(not blended)	(not blended)	(not blended)

Group Development [GD]	Motivation	5.1. Appreciating the group's efforts/work in completing the assignment	0	3	0
	Socialisation	6.1. Greeting the group members [REVISED LEARNING STRATEGY]	3,4	2	4
Task-related [TR]	Introduction	7.1. Introducing working procedures for the group members	2,3	0	0
	Organisation	8.1. Identifying strengths and skills of the group members	0	0	0
		8.2. Assigning tasks to/dividing tasks among the group members	2,3,6,8	1,7	1
	Brainstorming	9.1. Brainstorming for the assignment topic	1,2,3,4,5	0	0
		9.2. Brainstorming for the assignment materials	1,2,4,7	0	0
	Compromising	10.1. Compromising and agreeing on the topic assignment [ADDED LEARNING STRATEGY]	1,2	0	0
		10.2. Compromising and agreeing on the assignment materials [ADDED LEARNING STRATEGY]	0	0	0
	Thread specification	11.1. Specifying a thread of the online forum for a specific topic of discussion [REVISED LEARNING STRATEGY]	0	0	6
	Assignment engagement	12.1. Discussing and/or developing the storyboard for the courseware	3	0	0
		12.2. Discussing and/or developing the subject content for the courseware	0	1,2,3,4,5,6,7,8	1
		12.3. Discussing and/or developing the multimedia content (audio, video, animation, graphics, etc.) for the courseware	0	1,2,3,4,5,6,7,8	0
		12.4. Discussing and/or developing the courseware interfaces (main menu and sub-menu)	0	1,2,3,4,5,6,7,8	0
		12.5. Posting/sharing the courseware interfaces (main menu, sub-menu, exercises, glossary, etc.) in the forum	0	1,2,3,4,5,6,7	0
		12.6. Posting/sharing multimedia files (montage, animation, etc.)	0	2,3,4,5	0
		12.7. Posting/sharing document file(s) for discussion/compilation with group members	0	0	2

		12.8. Discussing the compatibility of the file formats with the authoring or programming software [REVISED LEARNING STRATEGY]	0	1,4,7	0
		12.9. Identifying any compatibility problems of the file formats with the authoring or programming software [REVISED LEARNING STRATEGY]	0	1,2,7	0
		12.10. Rectifying any compatibility problems of the file formats with the authoring or programming software. [REVISED LEARNING STRATEGY]	0	1,2,3,4	0
		12.11. Checking the overall content materials of the courseware development and/or written assignment [REVISED LEARNING STRATEGY]	0	1,2,3	5,6,7,8
	Administration	13.1. Submitting lists of group members' names to the teacher	0	0	0
		13.2. Submitting assignments	1,2,3,4,5,6,7,8	0	1,2,3,4,5,6,7,8

There are three important strategies the groups used in moving from online to face-to-face and vice versa in completing their assignments. First, a group starts discussing or completing a task through online forum and then continues discussing the same task when they meet face-to-face, or vice versa. Second, a group starts discussing or completing the first task through online forum and it continues with the second task when they meet face-to-face or vice versa. Third, a group could also complete two or more tasks in one mode and continue with other two or more tasks in another mode. All groups had been using these strategies to complete their assignments.

Unlike cycle 1, analysing each assignment from each group in cycle 2 provided detailed explanations on how students moved from online to face-to-face and vice-versa. Based on table 11.11, the following description illustrates the transition between working online and face-to-face by providing specific examples from all groups of how each learning strategy was conducted in blended mode.

9.7.1 Learning strategies from Action Planning

Scheduling [1.1] and confirming face-to-face meeting [2.1] from group 3. The group leader scheduled their first meeting on July 19th for a discussion on the first assignment through online forum where the threaded discussions dated from 15th to 21st July. The face-to-face meeting was held on July 19th. At the end of the meeting, the leader reminded the group to continue their discussions online and scheduled another face-to-face meeting to be held in the following week date July 27th.

Scheduling [1.2] and confirming synchronous meeting [2.2] from group 2. Through online discussion dated from 9th to 14th October, the group had scheduled the date and time for synchronous discussion (to discuss their third assignment) through online forum which was on October 16th. Later, on October 18th, the group met briefly face-to-face to confirm the new date for their synchronous online discussion scheduled on October 18th.

Reminder of the face-to-face meeting [3.1] from group 1. Through online discussion from 27th July to 1st August, the group leader had confirmed the date of their face-to-face meeting (for discussion on the first assignment) and reminded them of the meeting which was on August 1st. When the group met face-to-face on August 1st, another face-to-face meeting was scheduled and confirmed on August 6th. The members were reminded to attend the meeting.

Reminder of the online meeting [3.2] from group 1. Through online discussion on 17th and 18th August, the leader reminded the group to continue discussing online about their second assignment as he opened a new thread. The date of the threaded discussion was from August 24th to 30th. At the end of the face-to-face meeting dated August 31st, all group members were also reminded to continue their discussion through online forum. The group leader opened a thread on September 7th.

Reminder of the due date for the assignment [3.3] from group 3. During the face-to-face meeting on July 27th, the group leader reminded her members of the due date of their first assignment. In the online discussion from August 4th to 9th, the group leader had also reminded his or her members of the due date of their first assignment.

9.7.2 Learning strategies from Group Development

Appreciating group members' effort [5.1] from group 3. In the threaded discussion dated from July 15th to 21st, a group member complimented the leader in managing the group. In another thread (July 28th to August 4th), the leader complimented the group's commitment in completing their first assignment. During their face-to-face meeting (August 1st), the group leader congratulated his members once again for their contributions.

Greeting group members [6.1] from group 4. The group leader created an online thread to discuss their first assignment and started with a greeting welcoming the group members. During the face-to-face meeting dated on July 27th, the group leader greeted her members before explaining the objective of their meeting.

9.7.3 Learning strategies from Task-related

Introducing working procedures [7.1] from group 2. In a threaded online discussion dated from July 27th to August 4th, several members had suggested their different approaches of how the first assignment should be completed. However, the group leader suggested members meet face-to-face first on August 5th to finalise the best approach. During the face-to-face meeting on August 8th, the group had discussed and selected a suitable procedure in solving the problem with their prototype.

Assigning tasks to/dividing tasks among the group members [8.2] from group 6. In a threaded online discussion dated from July 27th to 31st, the group leader had suggested a specific task to each member in completing their first assignment. When the group met face-to-face on August 2nd, the tasks were delegated to the members. The tasks were :- considering the best content and multimedia design, utilising the programming or authoring software, and selecting the learning theories.

Brainstorming for the assignment topic [9.1] from group 5. In a threaded online discussion dated from July 15th to 24th, the group leader had suggested members propose a topic for their prototype. She suggested the group meet face-to-face on July 24th. During the meeting a topic of Probability from Mathematics was selected and agreed by the group.

Brainstorming for the assignment materials [9.2] from group 7. During a face-to-face meeting dated July 28th, the group started discussing the content materials of their prototype on the topic of Physics. The leader suggested the group further discuss this through synchronous online discussion. The thread was created on July 28th and the discussion on the content materials took place.

Compromising and agreeing on the topic assignment [10.1] from group 1. In a threaded online discussion dated from July 16th to 23rd, two group members had proposed different topics for their assignment and the leader therefore suggested the group meet face-to-face on July 21st. After some negotiations, the members finally agreed on a single topic

Specifying a thread of the online forum [11.1] from group 6. During the face-to-face meeting dated on October 7th, the leader asked the members to think of the contents for their third assignment. She also informed the group that an online thread would be created to specifically discuss the contents of the third assignment. The threaded online discussion was used from October 9th to 16th.

Discussing and/or developing the storyboard [12.1] from group 3. In a threaded online discussion dated from July 28th to August 4th, one member asked the group of the progress of the storyboard as she was absent in the previous face-to-face meeting. As the group had not yet discussing in detail the storyboard, the leader suggested the group to meet face-to-face. On August 1st, the group met face-to-face and discussed the storyboard as well as the flowchart of their work.

Discussing and/or developing the subject content [12.2] from group 7. During the group's face-to-face meeting on August 14th, one member shared a Physics textbook that could be used as a reference for the content of their prototype with the group. In a threaded online discussion dated from September 8th to 14th, another member suggested turning the exercises in the textbook into an assessment using the tutorial approach

Discussing and/or developing the multimedia content [12.3] from group 4. In a threaded synchronous online discussion dated August 17th, the group discussed the

multimedia content, including the text size, font, glossary button, animation and interface designs, for their prototype on Polygon (Mathematics). The discussion on the content, especially the main menu, the exercises and the tutorial results, also continued in another thread dated from August 27th to September 8th. The group met face-to-face on August 31st to finalise the multimedia content of their prototype and started to discuss the coding.

Discussing and/or developing the courseware interfaces [12.4] from 3. In a face-to-face meeting dated July 21st, the group members discussed appropriate graphics background for their prototype. One member suggested the group use a button generator to create a nice interface. The discussion on interfaces continued once again face-to-face on August 17th, as one member wanted to show a sample of the main menu interface which he had developed. Other members viewed the interface and provided several constructive comments. Through threaded online discussion dated from August 19th to 29th, a new revised main menu interface was uploaded and was viewed by the group.

Posting/sharing the courseware interfaces [12.5] from group 5. During a face-to-face meeting dated August 15th, a fascinating main menu prepared by one member was shared with the group. The group complemented the menu and provided constructive suggestions. The leader asked him to upload on the forum so that every member could have a copy of it. In a threaded synchronous online discussion dated August 17th, the menu was uploaded on the forum.

Posting/sharing multimedia files [12.6] from group 5. Through online forum dated from August 10th to 15th, a member had creatively developed a fascinating graphics of dice and marbles for the main menu of their prototype and posted/uploaded it online. During their face-to-face meeting on August 15th, the graphics were viewed by the members and upgraded, based on the suggestions made by the group.

Posting/sharing document file(s) [12.7] from group 2. After revising the third assignment (in Word format) based on suggestions from members, the group leader uploaded the file in the threaded online forum dated from October 20th to 21st. The

group met face-to-face to finalise the content before submitting the hardcopy to the teacher.

Discussing the compatibility of the file formats [12.8] from group 7. In the face-to-face meeting dated August 31st, one member suggested the group use Visual Basics programming software to develop their prototype. However, the members responded with mixed feelings. Another member highlighted the problem of coding to embed videos and games using Visual Basics. The group leader recommended the group use authoring language, and this was agreed to by members. The discussion on the authoring language continued online (threaded discussion dated from September 8th to 14th) as members asked about the features of the software.

Identifying any compatibility problems of the file formats [12.9] from group 2. During a face-to-face meeting (August 31st), a graphic designed for a menu background and developed by one member was presented to the group. However, when the file was integrated with the authoring software, some graphics designs were placed wrongly on the screen. The group leader offered to re-design the graphics for the menu background. The discussion on the graphics continued through synchronous online discussion dated August 17th. The group leader informed the group that the graphics had already been modified. One member suggested the group meet again face-to-face to settle the compatibility problems of the graphics for the menu background. The face-to-face meeting was conducted on the same day, after the synchronous discussion (August 17th).

Rectifying any compatibility problems of the file formats [12.10] from group 3. In the face-to-face meeting dated August 28th, the group members agreed that the graphics for the background should be edited before they could be synched with the authoring software. Besides graphics, another problem discussed (through online forum dated from September 4th to October 3rd) was the need to convert video file into swf. or mpeg format before it could be imported into the authoring software.

Checking the overall content materials for courseware or written assignment [12.11] from group 2. In the face-to-face meeting dated September 12th, the group leader reminded members to upload their content materials so that she could compile them

and conduct a test on the prototype. In the threaded online discussion dated September 17th, the group leader reminded one member, who was in charge of the modification of the graphics background, to upload it on the forum before she could finalising their prototype.

Submitting assignments [13.2] – All groups submitted their first and third assignment in class and online.

9.8 Peer assessment

The peer assessment for this second cycle was 3%. The following table (Table 9.12) indicates the *marks* generated *through peer assessment* for all groups.

Table 9.12: The peer assessment marks for the three assignments

Group	Group members	Peer assessment mark (3%)		
		Assignment 1	Assignment 2	Assignment 3
4	4A	3	3	3
	4B	3	3	3
	4C	3	3	3
	4D	3	3	3
5	5A	3	3	3
	5B	3	3	3
	5C	3	3	3
	5D	3	3	3
	5E	3	2.7	3
1	1A	3.0	3	3
	1B	2.9	3	3
	1C	2.7	3	3
	1D	3.0	3	3
3	3A	2.9	3	3
	3B	2.9	3	3
	3C	2.9	3	3
	3D	3.0	3	3
	3E	2.9	3	3
7	7A	3	3	3
	7B	3	3	3
	7C	3	2.9	3
	7D	3	3	3
	7E	3	2.9	3
	8A	3	2.9	3

8	8B	3	1.5	3
	8C	3	3	3
	8D	3	3	3
	8E	3	3	3
2	2A	3	2.4	2.7
	2B	3	2.4	2.7
	2C	3	2.7	2.7
6	6A	2.3	3	3.0
	6B	2.3	3	3.0
	6C	2.7	2.6	2.9
	6D	2.7	2.3	2.9
	6E	2.7	2.6	2.9

Throughout the three assignments, the members in group 4 awarded full marks for each other's contributions. The members from group 5 also had similar full marks with the exception of one member, who scored only 2.7 in the second assignment. The marks of individuals' contributions in groups 1, 3, 7 and 8 varied. In groups 7 and 8, all members received full marks for the first assignment, but the peer assessment mark for the second assignment was poor for some members. Surprisingly, for the third assignment, all members were awarded full marks again.

However, for group 1 and group 3, the initial marks for some members were poor in the first assignment, but the teamwork improved, as all members scored full marks for the second and third assignments. As for group 2, in the first assignment, all members were assessed with full marks, but group co-operation in the second and third assignment was not good. Group 6 had the lowest scores across all three assignments – the peer assessment marks among its members reflected poor teamwork throughout the three assignments.

The result of the peer assessment in this second cycle was slightly better than the first cycle, as there was only one problematic group. Even so, the group was aware of their misunderstandings. A further discussion of the peer assessment marks is provided during the discussion of the interview data (see 9.9).

9.9 The interviews and groupwork report (section C)

In this second cycle, the interviews were conducted with the group leader right after each assignment and groupwork report were submitted. The same two important

questions regarding their experiences - working in a blended mode and working as a team in a group to complete the assignments - were posed. However, the interviews were analysed together with the section C from the groupwork report.

9.9.1 Working in a blended mode

Based on the interviews with the group leaders, the key point mentioned was the advantage of the online mode in complementing face-to-face discussions and in keeping in constant contact with group members through the online forum. The summaries of the interview responses from the group leaders on working in a blended mode are provided in Table 9.13.

Table 9.13: The summaries of the interview responses from the group leaders on working in a blended mode

	How did the groups work in a blended mode?		
	Assignment 1	Assignment 2	Assignment 3
Group 1	Balanced use of face-to-face and online mode	Balanced use of face-to-face and online mode for discussion AND more face-to-face with the hands-on practical work developing the prototype	Balanced use of face-to-face and online mode
Group 2	As in group 1	More online than face-to-face mode for discussion but more face-to-face with the hands-on practical work developing the prototype	More online than face-to-face mode
Group 3	As in group 1	More face-to-face than online mode for discussion and hands-on practical work developing the prototype	As in group 2
Group 4	As in group 1	As in group 1	As in group 1
Group 5	More face-to-face than online mode	As in group 1	As in group 1
Group 6	As in group 5	As in group 1	As in group 1
Group 7	As in group 5	As in group 2	As in group 1
Group 8	As in group 1	As in group 1	As in group 1

In general, the leader of group 8 stressed that the combination of online and face-to-face communication was an effective way to keep in constant contact with group members in completing the assignments. For groups 1, 2 and 4, both the online and face-to-face mode were significantly important and should complement each other. However, group 2 suggested that face-to-face was a better mode and that the online mode was meant to complement face-to-face discussion. For groups 5 and 7, working

in both modes was an important learning strategy but they felt that more face-to-face mode for discussion and hands-on practical work in completing the assignment was needed. Group 3 provided a more in-depth response by suggesting that, although the online mode and face-to-face mode complemented each other, it depended on the nature of the assignment whether it required more face-to-face, online or the combination of both modes. Only group 6 preferred to work on the assignment more in the face-to-face mode than in the online mode.

Mobile phones were personal tools used by most students mainly for scheduling the dates for the face-to-face meetings, reminding members to post materials on the online forum, and scheduling the dates and times to communicate synchronously through the online forum. The following are some excerpts from the interviews with the group leaders on the use of mobile phones (as a personal tool).

". . . sometimes we didn't have enough credit (to make a long call to discuss the assignment), so we (used the mobile phone to) inform (group members) to communicate through the online forum" (group 3).

". . . (face-to-face meeting was set through) online and also (by sending) text messages" (group 5).

". . . . sometimes some members could not come to a face-to-face meeting because they had a class or they had to go back to their hometown for some reason; thus, the meeting was conducted online as all members were informed through text messages" (group 4)

Group 4 further explained how the meeting was scheduled.

"First, we set the time and date for the online meeting with members who were present in the face-to-face meeting; then we sent text messages to the members who were absent so they could respond; later, the meeting was conducted successfully" (group 4).

The advantage of a face-to-face meeting is that every member can see each other engaging in verbal and non-verbal communication. However, a face-to-face meeting cannot be expected to be effective at all times, especially when some members are absent. So, while meeting face-to-face, the group communicated with the absent members through a course tool and/or a personal tool. Group 8 was the only group that used this strategy.

In completing the three assignments in the second cycle, the pattern of communication through the online forum and face-to-face mode was not much different from the first cycle. Some contradictions were identified between the group leaders' interview responses and their reflections in the groupwork report (section C).

The first assignment

From section C of the groupwork report, groups 1, 4, 5, 6 and 7 emphasised the importance of working face-to-face in the first assignment. However, referring to the table of the interview responses with the group leaders (table 11.15), groups 5, 6 and 7 worked more in the face-to-face mode in completing the first assignment. Despite the face-to-face preferences highlighted by groups 1 and 4 in their groupwork reports (section C), they still worked in a blended mode.

The second assignment

For the second assignment, the use of the online forum was limited to discussion, while the hands-on practical work in the face-to-face mode was the only way to develop the prototype due to the present limited capacity of the e-learning platform to upload the huge size of a single multimedia file. The groupwork report from groups 1, 3, 5, 7 and 8 claimed that they had been working in a blended mode. However, based on the interview response with the group leaders (table 9.15), group 7 worked more online in completing their second assignment. Apart from group 7, group 2 also worked more online. In contrast, group 3 decided to carry out more of their discussions face-to-face. Group 8 was very concerned about the log-in problem with the e-learning. As for groups 4 and 6, their groupwork reports suggested they preferred to work in the face-to-face mode. In contrast, the interview from the leader of group 4 (table 9.15) revealed that the groups worked in a blended mode.

The third assignment

There were many contradictions in the groups' reflections in the groupwork reports on completing their third assignment. From the reports, groups 1, 2 and 3 stated that they worked in a blended mode but instead, the interview responses from the leaders of groups 2 and 3 revealed that they worked more online. The reports also stated that groups 1 and 4 worked in a blended mode. In spite of the claims made by groups 5, 6, 7 and 8 of the reflections in their reports that they worked on their third assignment more in a face-to-face mode, the data from the interview (table 9.15) showed the opposite. These groups worked in a blended mode.

Regarding which data to believe as a result of the contradictions that arose from the interviews and the groupwork reports, I turned to the reports. The interviews revealed only the point of view of an individual group leader. Thus, the groupwork reports were more reliable than the interviews, as each member had an equal opportunity to contribute their opinions.

This strategy of uploading materials on the forum had already been introduced in the first cycle (section 6.3.1.2) but was not used by all groups. Unlike the first cycle, all groups in this second cycle had uploaded their documents (word format) and multimedia files on the forum throughout the three assignments for further online discussions.

Figures 9.4 and 9.5 show excerpts of threaded discussions from group 8 where they uploaded the word files and courseware interfaces in the online forum.



Figure 9.2: An excerpt of an online forum that shows a member uploaded a Word file.



Figure 9.3: An excerpt of an online forum that shows a member from group 8 uploaded courseware interface.

Throughout the three assignments, there were some groups who used the online forum to communicate synchronously with their group members. Both strategies (uploading materials on the forum and communicating synchronously) had already been listed in the *blended learning strategies map* (table 9.2). Apart from the online forum, all groups agreed that the use of the mobile phone as an important tool was essential to communicate faster with their members.

9.9.2 Working as a team in completing the assignments

In analysing the interviews on the teamwork in this second cycle, the peer assessment marks (see Table 9.2) from each group and groupwork reports were referred to. The key points mentioned were: choosing a topic, delegating tasks, maintaining co-operation among members and showing commitment in completing the assignments. The summaries of the interview responses from the group leaders on teamwork are provided in Table 9.14.

Table 9.14: The summaries of the group leaders' perceptions on the level of collaboration across the assignments

Question / The interview responses from each group		Level of Collaboration							
		Group 4	Group 5	Group 1	Group 3	Group 7	Group 8	Group 2	Group 6
		Teamwork Category 1		Teamwork Category 2				Teamwork Category 3	
How did the groups work as a team in completing their assignments?	Assignment 1	High	Medium	High	Medium	High	Medium	Low	High
	Assignment 2	High	High	High	Low	High	High	High	High
	Assignment 3	High	High	High	Low	High	Medium	Low	High

The same key points of "high", "medium" and "low" collaboration from the first cycle were used (see 7.2.4.1.2). The data from the interviews which were used to support the peer assessment marks in the first assignment were mainly regarding the aspects of choosing a topic and delegating tasks. For the second assignment, the interviews provided the data on how the delegated tasks were carried out by the members in order to develop a prototype of the multimedia courseware. The aspect of the discussion on

the evaluation of the prototype among the group members in the third assignment was the main focus. It was indeed a challenge for some groups to maintain good collaboration among members. Regarding teamwork, the discussion on the groups could be divided into three main categories.

Teamwork category 1

The first category consisted of groups 4 and 5. According to the leaders of both groups, their members committed themselves to a high level of collaboration throughout the three assignments, and the delegation of tasks to the members was viewed as fair. The suggestion on selecting the topic of mathematics for the courseware was not rejected by the members in group 4. They agreed in principle to choose the topic despite some members being from a science background.

Teamwork category 2

Groups 1, 3, 7 and 8 comprised the second category of teamworking. The data from the peer assessment showed that groups 1 and 3 experienced low collaboration between their group members in completing Assignment 1, while groups 7 and 8 had the same problem in Assignment 2. During the interview with the leader of group 1, it transpired that there was no problem with choosing the topic and delegating the tasks. However, the peer assessment marks for assignment 1 reflected otherwise.

As for group 3, the leader initially said that there were no arguments about choosing the topic for their first assignment. However, as the interview went on, it was revealed that there were conflicting ideas among members about whether to select a scientific or a religious topic for the assignment. Furthermore, this group faced the problem of absent group members.

There were no specific tasks delegated to the members of group 7; all were required to do all the same tasks. Though the thinking behind this strategy was that there would be an even distribution of the workload among the members, it ended up with more problems. The situation worsened when some members showed a lack of commitment to attending the face-to-face meetings. As a result, the prototype development was postponed several times.

In group 8, there was less commitment from two particular members to developing the prototype, although the leader tried to cover for these members. In fact, I had been informed about this problem earlier by other members through the reflective online journal even though it was glossed over by the group leader. Later, a member from this group reported the matter to me.

Teamwork category 3

Groups 2 and 6, the groups in the third category, faced serious teamwork problems. According to the leader of group 2, the group initially worked well with the first assignment, but problems started in the second assignment when some members were not committed to attending the face-to-face meetings. They had also procrastinated on submitting their assignments, which led to the delegated tasks being submitted at the very last minute. Group 6 was the worst group for teamwork in all three assignments. According to the group leader, starting with the first assignment, there was already a great deal of misunderstanding between members. The problems in group 6 were not related to the instructions of the assignments or the group composition, but were rather a variety of personality problems among the group members.

The peer assessment marks (table 9.14), where members within a group evaluate each other's contributions in completing the assignments by using a rubric, reflected the sequence of the groups from the highest to the least collaboration, in similar vein to the interview analysis on teamworking.

9.10 Addressing the research questions

Based on the data analysis, the research questions derived from the theoretical framework of the third generation of an aligned activity system were addressed.

9.10.1 The TOOL sub-triangle

This section discusses the use of instruments in guiding the students on how to plan their learning strategies in blended mode.

1. How did the blend of communication tools (discussion/text/forum etc.) used affect the blended learning context?

Reflections from the tool sub-triangle in the first cycle (section 7.2.5.1) revealed some issues on decision to meet face-to-face after the students had discussed online and decision to discuss synchronously through online forum.

The tools identified to have helped students to work in a blended mode effectively are mobile phones and the groupwork report. Mobile phones remained the most significant additional instruments for planning the dates and venues for the face-to-face meetings and for reminding the group members to communicate online for both the first and second cycle. Based on the tables of blended strategies from all 8 groups and the interviews with the group leaders (section 9.9), the mobile phone was the personal tool used most by the students, mainly for scheduling the dates for the face-to-face meetings, reminding members to post materials on the online forum, and scheduling the dates and times to communicate synchronously through the online forum.

The online and face-to-face modes were used to complement each other in the students' learning activities to complete their assignments. In the first cycle, some groups were found to lack organisation and co-ordination in moving from one mode to the other. In the second cycle, this problem was overcome by using the groupwork report (section 9.2.2). A groupwork report, which is part of the pedagogy-intervention plan (PIP) was introduced as a tool to ensure that each group knew how to conduct the learning strategies both face-to-face and online. Section A of the groupwork report required the groups to align the summaries of their online forums with their face-to-face meeting reports and thus, this had made them aware of when they had to use the online and face-to-face mode.

To provide a clearer explanation to the students of how to work in a blended mode, the PIP included showing them the instructional video on working online and face-to-face (section 9.4.5), providing a copy of a blended strategy map (section 9.4.6), providing scenarios of effective working by students in the first cycle (9.4.7) and distributing a manual on using online threads strategically (9.4.4). However, the accuracy of the summaries of the learning strategies through online discussions in the section A of the groupwork report was checked by the two raters and researcher by comparing and contrasting with their versions (section 9.2.3).

9.10.2 The RULES sub-triangle

In completing the group assignments, the important rule was that the students had to work as a team and in a blended mode. The issue derived from the first cycle was how to strategically change from one mode to another and vice-versa.

2. How does the nature of the regulations (assignment) affect the blended learning context?

The important rule set by the researcher in completing the assignment was that the students must work in blended mode. The module required the students to use online forums and online discussions.

The learning strategies identified in the first and second cycle were classified into three important categories: *action planning*, *group development* and *task-related*. However, not all learning strategies were conducted in blended mode by every group. Some learning strategies were used in blended mode while others were used only online or face-to-face. A comprehensive analysis of the learning strategies from three categories is given in Tables 11.9, 11.10 and 11.11. On knowing how these learning strategies had been conducted in blended mode, they could be viewed from the section A of the groupwork report and the tables of blended activities (table 9.3).

Reflections from the rules sub-triangle in the first cycle (see 7.2.5.2) highlighted some missing strategies, such as decision on the assignment topic, selection of the assignment content materials, development of courseware interface designs, and development of multimedia content when the students worked in blended mode. These strategies were related to the task-related category. A number of solutions were suggested to address the issues, which were mainly about the transition of the learning strategies from online to face-to-face and vice-versa.

Besides using the groupwork report as a tool to guide the students to work in blended mode, it could also be used as a reference for the students to follow the rule in planning their learning strategies online and face-to-face. The groupwork report helped the students to understand when to change mode strategically from face-to-face to online and vice-versa. As a result, the students were able to plan their learning strategies more

clearly. The transition of some learning strategies from action planning (see 9.7.1), group development (see 9.7.2), and task-related category (see 9.7.3) could be derived from all groups.

3. How does online assignment submission affect the teacher and the students in a blended learning mode?

The rule clearly stated that assignments 1 and 3 in the first and second cycle had to be submitted online, while assignment 2 (a courseware prototype) had to be submitted in class due to the limitation of the e-learning system in transferring huge amounts of data of a prototype size. In the second cycle, the assignment submission was placed under the learning strategy of 13.2. All groups abided by the rule and submitted their first and third assignments online. However, incomplete assignments that had to be revised were returned to the groups during class. As the online submission was closed, the groups submitted their revised assignments personally to me.

4. How does the teacher conduct the assessment and grading of students' assignments and online forum discussion in the blended learning mode?

The assessments on the assignments were similar for both cycle 1 and cycle 2. There were two important assessments: first, the assessments on the three assignments submitted by the groups as the final products and second, the assessment of the online discussions conducted by each group through online forums.

However, the online forums from cycle 1 were assessed differently from those from cycle 2. Cycle 1 assessed only the students' online discussions, while cycle 2 assessed both the online and the face-to-face discussions, which were documented in section A of the groupwork report. In cycle 2, the assessment emphasised the relationship between the face-to-face meeting reports and the summaries of the online discussions. It looked at whether the same learning strategies could be derived from the two discussion modes.

The online forum discussions and the groupwork report were assessed and marks were given as part of the course assessment.

5. To what extent does the group assignment facilitate students' learning?

On whether the group assignment had facilitated the students' learning, tables 7.10 and 7.11 refer. Overall, table 7.10 showed that the group assignment had made the students work in a blended mode in completing assignments. However, not all learning strategies were conducted in blended mode. Table 7.11 detailed several learning strategies from the task-related theme that were conducted both online and face-to-face. Some learning strategies were conducted either only online or face-to-face. From my observations, there could be two reasons. Firstly, some groups may in fact not be competent at changing mode (from online to face-to-face and vice-versa). There needed to be a strategy in organisation and co-ordination when moving from one mode to another. Secondly, the groups could have possibly employed learning strategies in blended mode but the strategies were not available in the data.

Similar to cycle 1, the purpose of preparing the group assignment in cycle 2 was to develop educational courseware, apply the instructional design (ID) and most importantly, work in a blended mode. As important, the group assignment was to inculcate generic skills (mainly team working and problem solving). In order to see how the group assignment facilitated students' learning, two analyses were carried out. The first analysis is related to working in a blended mode and the second analysis is concerned with generic skills. The discussion on generic skills is discussed in the role sub-triangle.

The first analysis was based on the summaries of all the groups employing learning strategies in a blended mode. Section 9.4 summarised the learning strategies that were employed by each group in completing their first assignment, while section 9.5 summarised the learning strategies for the second assignment. As for the third assignment, the learning strategies were summarised in section 9.6. Overall, the tables showed that the group assignment had made the students working in a blended mode in completing their assignments. Table 9.18 detailed several learning strategies from the task-related theme that were conducted both online and face-to-face. Some learning strategies were conducted either only online or face-to-face. The pedagogy-

intervention plan, namely the groupwork report, had been very helpful in guiding the students to plan their learning strategies in blended mode.

Table 9.15: The analysis of how each group worked through the three assignments.

Group	Assignment	The interviews with the group leaders on working in a blended mode (Table 9.3)	The students' reflections on blended mode (section C of the groupwork report)	The teacher's/researcher's observations and comments on groups working in a blended mode throughout the three assignments	Did the group assignment facilitate students' learning?
1	1	The group worked in a blended mode	The group felt it would be better to work more in a face-to-face mode	In the first and the third assignment, the group leader felt that the group had been working in a blended mode whereas other group members had regarded the group as working more in a face-to-face mode. It was only in the second assignment that both the group leader and group members agreed that they had been working in a blended mode.	All three assignments had been completed and had facilitated their learning.
	2	The group worked in a blended mode	The group felt it was effective to work in a blended mode		
	3	The group worked in a blended mode	The group felt it would be better to work more in a face-to-face mode		
2	1	The group worked in a blended mode	The group felt it would be better to work more in a face-to-face mode	Group 2 was the only group that featured contradictions between the group leader's interview and the group reflections in all three assignments. In the first assignment, the group leader felt that the group had been working in a blended mode whereas other group members had regarded the group as working more in a face-to-face mode. In the second assignment, the group leader felt that the group had been working more in a face-to-face mode whereas other group members had regarded the group as working more in an online mode. In the third assignment, the group leader felt that the group had been working in a blended mode	All three assignments had been completed and had facilitated their learning.
	2	The group worked more in an online than in a face-to-face mode	The group felt it would be better to work more in an online mode		
	3	The group worked in a blended mode	The group felt it would be better to work more in an online mode		

				whereas other group members had regarded the group as working more in an online mode.	
3	1	The group worked in a blended mode	The group felt it was effective working in a blended mode	Both the group leader and group members agreed that they had been working in a blended mode to complete the first assignment. In the second assignment, the group leader felt that the group had been working more in a face-to-face mode whereas other group members had regarded the group as working in a blended mode. In the third assignment, both the group leader and group members agreed that they had been working more in a face-to-face mode.	All three assignments had been completed and had facilitated their learning.
	2	The group worked more in a face-to-face than an online mode	The group felt it was effective working in a blended mode		
	3	The group worked more in a face-to-face than an online mode	The group felt it would be better to work more in a face-to-face mode		
4	1	The group worked in a blended mode	The group felt it was effective to work in a blended mode	Both the group leader and group members agreed that they had been working in a blended mode to complete the first assignment. However, for both the second and third assignment, the group leader felt that the group had been working in a blended mode whereas other group members had regarded the group as working more in a face-to-face mode.	All three assignments had been completed and had facilitated their learning.
	2	The group worked in a blended mode	The group felt it would be better to work more in a face-to-face mode		
	3	The group worked in a blended mode	The group felt it would be better to work more in a face-to-face mode		
5	1	The group worked more face-to-face than online mode	The group felt it would be better to work more in face-to-face mode	Both the group leader and group members agreed that they had been working more in a face-to-face mode to complete the first assignment and working in a blended mode for the second assignment.	All three assignments had been completed and had facilitated their learning.
	2	The group worked in a blended mode	The group felt it was effective to work in a blended mode		

	3	The group worked in a blended mode	The group felt it would be better to work more in a face-to-face mode	Regarding Assignment 3, the group leader felt that the group had been working in a blended mode whereas other group members had regarded the group as working more in a face-to-face mode.	
6	1	The group worked more face-to-face than online mode	The group felt it would be better to work more in a face-to-face mode	Both the group leader and group members agreed that they had been working in a face-to-face mode to complete the first assignment. Regarding Assignment 2, the group leader felt that the group had been working in a blended mode whereas other group members had regarded the group as working more in a face-to-face mode. Both the group leader and group members agreed they had been working in a blended mode to complete Assignment 3.	All three assignments had been completed and had facilitated their learning.
	2	The group worked in a blended mode	The group felt it would be better to work more in a face-to-face mode		
	3	The group worked in a blended mode	The group felt it was effective to work in a blended mode		
7	1	The group worked more in a face-to-face than an online mode	The group felt it would be better to work more in a face-to-face mode	In the first assignment, both the group leader and group members agreed that Assignment 1 was completed using more a face-to-face mode. As for Assignment 2, the group leader felt that the group had been working more online whereas the group had regarded themselves as working in a blended mode. Both the group leader and group members agreed they had been working in a blended mode to complete Assignment 3.	All three assignments had been completed and had facilitated their learning.
	2	The group worked more online than in a face-to-face mode	The group felt it was effective to work in a blended mode		
	3	The group worked in a blended mode	The group felt it was effective to work in a blended mode		
8	1	The group worked in a blended mode	The group felt it was effective to work in a blended mode	Group 8 had been consistently working in a blended mode throughout the three assignments.	All three assignments had been completed

	2	The group worked in a blended mode	The group felt it was effective to work in a blended mode	The group's reflections complement the group leader's interviews.	and had facilitated their learning.
	3	The group worked in a blended mode	The group felt it was effective to work in a blended mode		

From Table 9.15, it can be seen that there was a discrepancy between some group leaders' interviews and their groups' reflections, as derived from section C of the groupwork report on whether or not the group had been working in a blended mode.

In response to these discrepancies, a new instrument had to be developed as part of the blended learning study to collect further data. The detailed procedures in developing the instrument and the evaluation of the collected data will be clearly described. The focus was on discovering new features in the data. Most importantly, the findings derived from the group leaders' interviews had to be consistent with the findings from with the groups' reflections. I contemplated reserving this for further research in the next cycle. The discussion chapter (chapter 10) will further discuss this matter.

Despite these contradictions, all the groups had successfully completed the three assignments.

9.10.3 The ROLES sub-triangle

Besides completing assignments in blended mode, the students must work as a team. This section shows how each group divided the tasks among the members to complete the assignment and demonstrates that task division was different for each group. In this cycle, each group was made heterogeneous. The discussion of the various ways each heterogeneous group carried out their tasks was based on the analyses of the groups' interviews, the peer assessment marks, the students' reflections on teamwork (section C of the groupwork report) and my observations. A heterogeneous group is used to refer to members not from the same course (see 9.5.3).

Learning contract section 6.3.3.1 and 8.4.8) was introduced to guide students to work in groups while netiquette (section 6.3.3.2 and 8.4.9) guided them how to discuss politely online. These regulations had made the students employ the learning strategies effectively in blended mode.

6. What are the roles (division of labour) taken by the learners?

a. Do students distribute the workload of completing the assignments equally among group members?

In order to see whether the groups had delegated the workload equally among members, it is important to study table 9.13. The table was analysed in section 9.9.1. The patterns of the peer assessment marks varied across the three assignments. It could be divided into three categories.

The first category included groups 4 and 5, who had distributed the workload fairly in all three assignments. The second category was groups 1, 3, 7 and 8, who had problems with one assignment. However, the groups managed to resolve their differences and their teamwork improved in the other two assignments. Both group 2 and group 6 were in the third category. There were two assignments in group 2 that had not been organised well. Regarding group 6, the peer assessment marks reflected problems in their teamwork throughout the three assignments.

Besides peer assessment, the analysis was also based on the students' reflections from section C of the groupwork report (section 9.2.5.4). However, there were some discrepancies between the students' peer assessments and the groups' reflections. This was further analysed in 6 (d).

b. Do students distribute the workload of contributing to online forum discussions equally among group members?

The number of postings shown in Table 11.1 demonstrated that all groups had communicated regularly through online forums. In order to see whether group members had contributed equally to their online forum, the original transcripts of the online discussions were referred to. All the students had participated in their online discussions

by posting messages in the online forum. Each individual contributed in different ways to the group's online forum about their ideas and opinions on the assignments.

c. What is the appropriate balance of assignment workload among group members?

There was no standard balance on how the workload should be delegated (distributed?) among group members. It depended entirely on how each assignment was completed in a blended mode. However, the students were guided to balance their work online and face-to-face

d. To what extent does the group workload facilitate collaboration among group members in the blended learning mode?

Generally, the findings showed that some groups had successfully collaborated while others had teamwork problems. The analyses of the group teamwork are discussed extensively in three important sections – section 9.8 (peer assessment marks) as well as interview data from the group leaders on teamwork, and summaries of the groups' reflections on teamwork from section C of the groupwork report in section 9.19.

The second analysis looked at the findings regarding whether the group assignments that brought the group members to work in a blended mode had facilitated students' learning. The findings were based on the following data analysis: first, the personal interviews with the group leaders on working in a blended mode; second, the students' reflections from section C of the groupwork report; and third, my personal observations, which were based on the first and second data. All data were placed in table 9.16, which describes in detail how each group worked in each assignment.

In determining the collaboration of each group, the assessment had to be based on the following analysed data: first, the personal interviews from the group leaders on working in a blended mode (section 9.9.1) and working as a team (section 9.9.2); second, the peer assessment marks (table 9.12); third, the students' reflections from section C of the

groupwork report; and fourth, my personal observations or comments on each group's teamwork.

Table 9.16: The analysis of teamwork in each group through the three assignments.

Group	Assignment	The interviews with the group leaders on teamwork (Table 11.4)	The peer assessment marks (Table 11.2)	The students' reflections on teamwork (section C of the groupwork report)	The teacher's/researcher's observations and comments on groups working as a team in a blended mode throughout the three assignments	Did group workload facilitate co-operation among group members?
1	1	Facing heavy problems in teamwork	The marks did not reflect good teamwork.	The group felt that working with members from the same course was effective	Group 1 had problems completing the first assignment. However, they were able to solve their differences and worked as a good team in the second and third assignment. There were data contradictions between the group leader's interview and the peer evaluation marks with the group's reflections in the first assignment.	The members in group 1 had co-operated better in completing the second and third assignment
	2	Working as a team	The marks reflected good teamwork.	The group felt that they had been using good teamwork.		
	3	Working as a team	The marks reflected good teamwork.	The group felt that they had been using good teamwork.		
2	1	Working as a team	The marks reflected good teamwork.	The group felt that working with members from the same course was effective	Group 7 worked as a team only in the first assignment. The group had problems completing the second and third assignments. There were data contradictions among the group leader's interview, the peer evaluation marks and the group's reflections in the second and third assignment.	The members in group 3 had co-operated better in completing the first assignment
	2	Facing heavy problems in teamwork	The marks did not reflect good teamwork.	The group felt that they had been using good teamwork.		
	3	Facing heavy problems in teamwork	The marks did not reflect	The group felt that they had been using good teamwork.		

			good teamwork.			
3	1	Facing heavy problems in teamwork	The marks did not reflect good teamwork.	The group felt that they had been using good teamwork.	Group 3 had problems completing the first assignment. However, they were able to resolve their differences and worked well as a team in the second and third assignments. There were data contradictions between the group leader's interview and the peer assessment marks with the group's reflections in the first assignment.	The members in group 3 had co-operated better in completing the second and third assignment.
	2	Working as a team	The marks reflected good teamwork.	The group felt that they had been using good teamwork.		
	3	Working as a team	The marks reflected good teamwork.	The group felt that they had been using good teamwork.		
4	1	Working as a team	The marks reflected good teamwork.	The group felt that working with members from the same course was effective	Group 4 had worked as a team in all the assignments. However, the group's reflection in the second assignment revealed that the group felt it would be better to have members from the same course.	The members in group 4 had co-operated better in completing all assignments
	2	Working as a team	The marks reflected good teamwork.	The group felt that working with members from the same course was effective		
	3	Working as a team	The marks reflected good teamwork.	The group felt that they had been using good teamwork.		
5	1	Working as a team	The marks reflected a good teamwork.	The group felt that they had been using good teamwork.	Group 5 had been working as a team in all assignments.	The members in Group 5 had co-operated better in

	2	Working as a team	The marks reflected slightly good teamwork.	The group felt that they had been using good teamwork.	However, the group's reflection in the second assignment revealed that the group felt it would be better to have members from the same course.	completing all assignments
	3	Working as a team	The marks reflected good teamwork.	The group felt that they had been using good teamwork.		
6	1	Facing heavy problems in teamwork	The marks did not reflect good teamwork.	The group felt that they had been using good teamwork.	Based on the peer evaluation marks, group 6 was a very problematic group as regards working as a team in all three assignments. The group's reflection in the second assignment revealed that the group felt it would be better to have members from the same course. There were data contradictions among the group leader's interview, the peer assessment marks and the group's reflections in the first and third assignment.	The members in group 6 had co-operated in completing the second assignment.
	2	Facing heavy problems in teamwork	The marks did not reflect good teamwork.	The group felt that working with members from the same course was effective		
	3	Facing heavy problems in teamwork	The marks did not reflect good teamwork.	The group felt that they had been using good teamwork.		
7	1	Working as a team	The marks reflected good teamwork.	The group felt that they had been using good teamwork.	Group 7 worked as a team in the first assignment. However, the team had problems completing the second assignment. In the third assignment, they were able to resolve their differences and worked as a good team. There were data contradictions among the group leader's interview,	The members in group 7 had co-operated better in completing the first and third assignment.
	2	Facing heavy problems in teamwork	The marks reflected good teamwork.	The group felt that they had been using good teamwork.		
	3	Working as a team	The marks reflected good teamwork.	The group felt that they had been using good teamwork.		

					the peer assessment marks and the group's reflections in the second assignment.	
8	1	Working as a team	The marks reflected good teamwork.	The group felt that they had been using good teamwork.	Group 8 worked as a team in the first assignment. However, the team had problems completing the second assignment. In the third assignment, they were able to resolve their differences and worked as a good team. There were data contradictions among the group leader's interview, the peer assessment marks and the group's reflections in the second assignment.	The members in group 8 had co-operated better in completing the first and third assignment
	2	Facing heavy problems in teamwork	The marks reflected good teamwork.	The group felt that they had been using good teamwork.		
	3	Working as a team	The marks reflected good teamwork.	The group felt that they had been using good teamwork.		

Some data derived from the interviews with the group leaders (Table 9.13), the peer assessment marks (table 9.12) and the students' reflections on teamwork (section C of the groupwork reports) supported each other.

For example, from the interview data, groups 4 and 5 said that they had worked as a team. These claims were reflected in the peer assessment marks and section C of their groupwork report.

However, some data were found to contradict each other. There were discrepancies among the data in groups 1, 2, 3, 6, 7 and 8. In some cases, the peer assessment marks did not reflect good teamwork, but the data from the interviews and section C of the groupwork reports suggested that the groups had worked as a team.

The apparently contradictory statements in the interviews and in the reflections in the groupwork report indicate two possibilities.

First, the group leaders did not critically reflect on how they applied collaboration principles among members. During the interviews, some group leaders could have mistakenly perceived and interpreted the co-operation in their groups as good teamwork. Second, it was compulsory to submit the groupwork reports, which were being counted as part of the course assessment. Every member in the group was afraid that if the groupwork report showed uncooperative attitudes and failed to reflect good teamwork, they would lose marks. Thus, the group wanted to present a positive impression that working in groups was productive.

Certain areas in the field of blended environments have still to be explored. Had the learning contract that was introduced and agreed to by each member helped the group to work together as a team? Was there dominance in the relationships within each group? These data are not available and thus have to be investigated further,and a new research instrument has to be developed. This was the same case as in research question 6.

7. How does the blended learning context affect the roles taken by the learners?

a. How often did students initiate discussion in their online group?

Section 7.2.2.1 and 9.2.1 extensively examined the students' message postings. The students initiated online discussions regularly in all the online forums for the three assignments. They were not just simply initiating discussion through the online forum but reminding themselves that every online discussion had to correspond closely to the face-to-face discussions as required by section A of the groupwork report. The students were informed at the beginning of the semester that there should be a continuation between the online and face-to-face discussion. However, the number of messages that were posted in the online forum did not necessarily reflect the meaningful quality of the discussions.

b. How often do teachers contribute to the discussions initiated by the students?

Similar to cycle 1, as a teacher and researcher, the aim of my participation was not to dominate but to facilitate the students' learning at regular intervals. The students had demonstrated some degree of autonomy in determining their own discussion while the teacher's participation was not to dominate but to facilitate their learning by providing, demonstrating the relevance of course topics to their assignments and monitoring the progress of the students' interactions over time.

8. How does the students' group formation facilitate students' learning in a blended mode?

a. What is the teacher's perspective in deciding on the members for the students' groups?

Similar to cycle 1 (section 6.3.9), each group was made heterogeneous (section 8.5.3). Although there was dissatisfaction among the students, the findings showed that the group members had still worked as a team.

b. What are the students' perspectives in the selection of members for the students' groups?

Despite the positive responses from the interviews with the group leaders (section 11.9), the groups' reflections derived from section C of the groupwork report revealed that groups 1, 2, 4 and 6 disagreed with the idea of forming a heterogeneous group. Other groups did not face any problems working with student members from other majors.

c. To what extent did the selection of members for the students' group facilitate students' learning in a blended mode?

The aspect of close and strong co-operation in groups is vital. In the first cycle, the extent of cooperation shown by each group could be derived from the peer assessment data (table 7.12) and the group leaders' interviews (table 7.13). From the group leaders' interviews, it was learnt that group 1, group 4, and group 6 did not have any difficulties working as a team throughout the three assignments. However, interviews with group 3, 7 and 8 revealed that the group members were initially working together to complete assignment 1. However, when the groups started to compile the tasks from their members to complete assignment 2, they were faced with problems associated with teamwork such as not attending face-to-face meeting several times, less participation in the online forums and not committed in carrying out the tasks in completing the assignment.

In the second cycle, based on the reflections derived from the groupwork report, both groups 1 and 2 felt it was better to work with members from the same major while preparing their first assignment. For group 4, the same view was expressed when they were completing assignments 1 and 2. Group 6 felt the same way while working on their second assignment.

Table 9.17 provides reflections from the groups who thought working with members from the same major field of study was better rather than being heterogeneous groups.

Table 9.17: The groups' reflections on the selection of group members.

Group	Assignment	Reflections
1	Assignment 1	The group felt it was better to work with members from the same course
2	Assignment 1	The group felt it was better to work with members from the same course
4	Assignments 1 & 2	The group felt it was better to work with members from the same course
6	Assignment 2	The group felt it was better to work with members from the same course

There were two reasons for assigning students to work in heterogeneous groups. First, it was hoped that the students would learn to compromise in working on their assignments and second, it was hoped that the students would be encouraged to work in a blended mode whenever they were not meeting each other.

In seeking answers to the students' reflections on working in a heterogeneous group, several questions could be posed. Could teamwork be problematic due to the formation of heterogeneous groups? Had the teacher made the right decision in choosing to create heterogeneous groups based on students' with different majors?

Despite the students' reflections, other heterogeneous groups had worked well in cooperating with team members and had no problems in completing the assignments. What made these heterogeneous groups successful in completing their assignments? It is important to study how these heterogeneous groups arrived at consensual views while working in a blended mode.

9.11 Describing group 1 and 2

Group 1 (1st assignment)

Starting with online discussion dated from July 16th to 23rd, the group leader suggested that the group propose a title for their prototype. Three different topics were suggested by the members and a compromise was reached amongst members. In order to confirm the title agreed by members, the leader asked the group to meet face-to-face. However, no specific time was scheduled. Later, through mobile phone contact, the group leader informed members of their face-to-face meeting on July 21st. When the group met face-to-face, a specific topic was chosen and agreed on by members. After the topic

was chosen, the group continued discussing content details online. The forum was dated from July 27th to August 2nd. The discussion of the contents included choosing suitable graphics for the menus and the background, adding audio files, searching for animation or video that could relate to the topic and selecting the platform for the prototype. The group leader reminded his members to bring the multimedia files to their face-to-face meeting on August 1st, where the time and venue were fixed. During the face-to-face meeting, the contents of the prototype were further discussed and detailed. Through online forum dated from August 2nd to 3rd, the group leader delegated the tasks to members. Without any objections, the members required further explanations from the leader of what they were supposed to do. The group continued their discussions on the contents of their first assignment on another thread dated from August 5th to 7th. One member had asked the group to upload the completed works so that she could compile and combine them into a single document file, which was the first draft of their first assignment. A confirmed face to face meeting was scheduled on August 6th to review the document file and finalise it before submitting it to the teacher. Later, the assignment was submitted online and a hardcopy was also submitted to the teacher during class.

Group 1 (2nd assignment)

The group started discussing their second assignment online (dated from August 10th to 14th). One member reminded the group that assignment 2 was about developing a prototype (courseware) and thus required much work and a high level of commitment from each member. Another member suggested the group to meet face-to-face as he was not sure how to start the assignment – he asked each member to state their availability in the forum.

Group 2 (1st assignment)

Group 2 started discussing their first assignment through online forum dated July 16th to 21st. As most of the members were Science majors, the group leader suggested a topic from a Science subject for their prototype. However, one member urged the group to meet face-to-face first before making any decisions on the topic. Through mobile phone, the group leader reminded members to meet face-to-face on July 23rd. In the this meeting, members finally agreed with the selection of Science as the topic for their prototype. Each member agreed on the tasks of finding content material.

9.12 Conclusion

A new instrument, groupwork report, was created in this second cycle that had two important functions. First, it taught the students to learn how to employ learning strategies in a blended mode and second, it guided them how to change mode from online to face-to-face and vice-versa as well as to move from one blended learning strategy to another strategy. However, there are still some concerns over different opinions on teamwork derived from the interviews and the section C of the groupwork report.

Chapter 10
Discussions, Conclusions and Recommendations

10.1 Introduction

This chapter provides discussions, conclusions and recommendations concludes the findings of research on blended learning that was conducted in two cycles. The findings suggested the best way of how learning activities should be carried out both online and face-to-face in a campus-based university. It also described how the second cycle was known as an action research intervention plan (ARIP). This chapter states the contributions of this study to the field of online learning research. Finally, the research limitations were highlighted and further research was suggested.

10.2 The formation of the structural research cycle

As a result of the evaluation of teaching an authoring language module over three (3) consecutive semesters (chapter 4) and the interventions introduced in the reconnaissance phase (chapter 5), there was evidence of the students working more effectively in a blended mode. However, the reconnaissance phase showed that some groups were working more effectively than others and thus it became clear that a more systematic approach to the research was needed. This resulted in the first action research cycle to explore and reflect on the findings, based on the three sub-triangles of tool, rules and roles. Thus, the intervention plans derived from the first cycle were introduced in the second cycle. Based on these cycles (first and second cycle), an adapted Kemmis and McTaggart's model (1998) was adopted in this research. The model outlines four main steps within a series of cycles that move forward as a spiral, for example, plan, act, observe and reflect. Thus, this model has been adapted to a framework within the thesis for the first and second research cycles, which identifies the three main stages of planning, acting (including observing) and reflecting within two action research cycles. The 'observe' stage, which involves some on-going analysis of the data as it collected, is incorporated within 'act', whereas more detailed final analysis and interpretation of the data occurs in 'reflect'. This structure is the result of the learning design within the course that involved three collaborative projects

and these provided opportunities to review the work of each group (figure 12.1). A review of action research and its justification for use within the thesis within a paradigm of praxis is discussed extensively in chapter 3 (see 4.8).

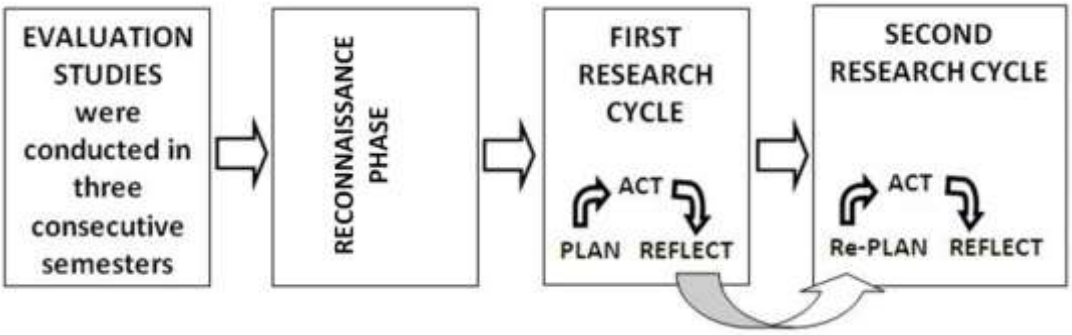


Figure 10.1: The research stages that started with the evaluation studies, progressed with reconnaissance phase, and continued with the first and second cycle.

10.3 The evaluation studies and reconnaissance phase

Prior to the actual research, evaluation studies were conducted in three consecutive semesters (chapter 4). The discussions of the studies were based on the reflections of classes conducted in blended mode. Based on the theoretical framework of the third generation of the aligned activity system (section 2.18.8), the interventions derived proposed several research instruments, including online discussions (transcripts of online discussions), face-to-face meeting reports and the use of rubric for peer assessment and interviews. However, the use of online forum and face-to-face meeting reports was the main focus in the *reconnaissance phase* as it was important to test these instruments in capturing and analysing data of students working in blended mode before starting the actual research.

In the reconnaissance phase, the students were required to work online and face-to-face in completing their multimedia assignment. As this was research on blended learning, online forum and meeting reports were the two instruments used to capture data on students working in blended mode. The transcripts of the online discussions provided data on online discussions while the meeting reports submitted at the end of semester provided face-to-face discussions.

In order to analyse the data, two significant instruments related to online and face-to-face discussions were developed. The instruments were a table for blended activities (see 5.3.1) and a blended learning strategies map (see 5.3.2). Firstly, the online and face-to-face discussions had to be summarised. The summaries were placed in the table for blended activities where learning strategies were identified. Next, these learning strategies were listed in the blended learning strategies map. From the table, these learning strategies were marked, showing whether they had been conducted online, face-to-face or both.

Although the findings showed that the students had worked in blended mode, there were some drawbacks on the use of online discussions (see 5.7) and how they should be effectively integrated with face-to-face discussions. This required the teacher's involvement in guiding students to use online discussions systematically and effectively, and to create an effective learning environment in blended mode.

Two significant weaknesses were identified. Firstly, the students' discussions threads could not be followed smoothly and secondly, some of the groups' face-to-face meeting reports were incomplete. This posed a challenge for the researcher to match the learning strategies derived from online discussions. To overcome this problem, the intervention suggested was that the students should use a single thread for a specific discussion. Another suggestion was for the students to plan a strategy to get the group working as a team.

10.4 The aims of research cycle 1

The reconnaissance phase conducted prior to the first cycle confirmed that the research instruments for data analysis (table for blended activities and blended learning strategies map) could be used in this blended learning research. Based on the three sub-triangles derived from the theoretical framework of the third generation of aligned activity system (section 2.18.8), three main important research questions were derived (table 4.3). The tool sub-triangle investigated how online learning was used as a tool to complement classroom learning. The rule sub-triangle explored how students worked in a blended environment. The role sub-triangle explored how the students delegated tasks in completing their assignments. Besides using online forum and

meeting reports to capture online and face-to-face discussions, peer assessment and interviews were also included in this first cycle.

In getting the students to work in a blended mode, the module assessment allocated marks for the students to use the online forum for discussion in completing their assignments. There were three assignments to be completed throughout the semester.

The interventions derived from the reconnaissance phase and introduced in the first cycle were related to using the online forum effectively. The students were found to have conducted synchronous communication, using a single thread to discuss a specific topic of discussion and using the online forum to upload materials to share with the group members.

The table of blended activities developed in the reconnaissance phase was still used in this first cycle. An additional table for blended strategies was also developed for data analysis (table 7.6 and 7.7). Data derived from the peers' assessment and interviews with the group leaders further supported the research findings.

Generally, the majority of groups involved in the study benefited positively from working in a blended mode. The findings showed that the students' participation in the online forum was very encouraging. To know whether the students had been discussing or working in blended mode, the face-to-face meeting reports submitted by the groups were referred to.

However, there were some issues raised (see 7.2.5). The discussions of the issues were based on the three sub-triangles. From the aspect of the tool sub-triangle (see 7.2.5.1), online forum was not the only tool the students used to plan their face-to-face meeting. The students also did not wait for the face-to-face meeting to remind each member to continue their discussions online. In fact, the mobile phone had become a regular feature in the reconnaissance phase and was also used by the students to plan both meeting online or face-to-face in the first cycle. The rule sub-triangle (see 7.2.5.2) revealed that some groups were still having problems related to the transition of moving from online to face-to-face mode and vice-versa. The role sub-triangle (see 7.2.5.3), which is related to team working, revealed some conflicting issues in some

groups as completing group assignments came with specific teamwork challenges. In the following cycle, these types of interventions had to be re-visited.

10.5 The aims of research cycle 2

In order to prepare students to work effectively in blended mode, the teacher played an important role in planning their work. A good preparation of teaching in the blended mode would result in a better outcome in students' learning. This would help researchers to gather much better data for analysis. Realising that the intervention plans from the first cycle were related to both the teaching and learning process and data capture, these two had to be separated. Thus, when the second cycle was conducted, the interventions were classified into two important categories.

The intervention to enhance teaching and learning related to pedagogy is termed as the pedagogy-intervention plan or PIP (section 8.4). The intervention to collect data related to methodology is called the methodology-intervention plan or (MIP) (section 8.5.1). This second cycle is also termed as action research intervention plans (ARIP).

Thus, PIPs include communicating synchronously using the asynchronous online forum (see 8.4.1), uploading materials through the online forum (section A) (see 8.4.2), specifying a single thread for a specific topic of discussion (see 8.4.3), providing a manual on the efficient use of the online forum (see 8.4.4), introducing an instructional video on working in a blended mode (see 8.4.5), providing a copy of the blended learning strategy map online (see 8.4.6), providing a scenario from a previous class working in a blended mode (see 8.4.7), using the learning contract (see 8.4.8), using netiquettes (see 8.4.9) and using the groupwork report (see 8.4.10). MIPs consist of using the groupwork report (section B and C) (figure 8.2 and 8.3), using the blended learning map and process instrument map (see 8.5.1.2), conducting peer assessment (see 8.5.1.3), conducting interviews (see 8.5.1.4) and re-using an online reflective journal (see 8.5.1.5)

To collect productive data, the strategies using the online forum as well as preparing the face-to-face discussions needed to be further strengthened. It was not only providing advice but showing how the online forum should be used by showing examples. The new instrument introduced was the groupwork report (see 8.4.10)

which could guide the students in planning their learning strategies in a blended environment. Instead of submitting a face-to-face meeting report at the end of the semester, the groups were required to submit their groupwork reports after they completed each assignment.

The findings showed more positive results than the first cycle. Although the teacher provided guidance on working in blended mode though PIPs, students also played their part in planning their learning strategies. Teachers had structured the assignment tasks into manageable parts and made sure instructions were clearly delivered. Using the groupwork report, students became self-aware and took more responsibility for their own learning, as each groupwork report was submitted immediately after each assignment was completed. They constructed their learning through relevant learning strategies activities and tracked their own progress in completing the assignments. The students were aware of ways of incorporating both online and face-to-face modes and they had demonstrated the ability to manage their learning strategies in blended mode. As team working is a crucial component in problem-solving, members had to help the group to work as an effective team. Team working skills showed by the students was slightly better than the first cycle.

10.6 Discussions based on the Three Sub-triangles of activity system

In the following discussion section, the findings of this study which integrated online and face to face interaction in a blended mode are discussed from the perspective of the theoretical framework of the third generation of an aligned activity systems which is based on three sub-triangles.

10.6.1 The TOOL sub-triangle

The tool sub-triangle refers mainly to the use of group discussions through online and face to face. Online forum is a main communication and collaboration tool to provide the ability for asynchronous and synchronous discussion to occur over a period of time.

In the study, the students were taught to plan and use the online forum in an organised and systematic way. Through the forums, the students took responsibility for their own learning as they were encouraged to make decisions about how they should complete the assignments. In a way, it supported students in self-regulation where they provided

feedback for the group, monitored their own work and were aware of their progress. It had created opportunities for the students to pursue their own interests in selecting the assignment topic and learning materials which means letting them to decide when to meet face-to-face and then, continue discussing online. This online discussion forum is a practical tool to facilitate collaborative learning among students and to complement their face-to-face contacts (McNamara & Brown, 2008).

Another important tool is online and face to face group work report (developed in the second research cycle) where it pedagogically integrates online with face-to-face learning activities in a planned manner. Both components complement each other as integrated activities in each setting in a blended environment. The group work report also guided the students and connected the online and face to face learning activities for the purpose of deeper learning. This is reason as to why De Leng, et. al. (2010) suggest education researchers to develop two separate instruments to analyse online and face-to-face interactions due to the complexity of interactions in blended learning.

10.6.2 The RULES sub-triangle

The sub-triangle rules relate mainly to the instructions given by the teacher to students on how to work online and face to face in completing group assignments.

From the studies, one mode complemented the other and every area in each mode has the potential to enhance learning activities. Depending on which mode one should start, a blended learning course in this study could be regarded as a face to face learning that enhanced by online instructions and simultaneously, it is online learning enhanced by face to face instructions. Online instructions were developed with greater and detail planning as it requires more extensive resources, more formal interaction and more systematic arrangements than do face to face instructions. Scherer Bassani (2011) further points out that there is a need to actively enhance participation in discussion forum. Through online discussions, the students were trained to articulate their views on course topics. The students were taught to specify a single thread for a specific topic of discussion when discussing online. This is strongly supported by McNamara and Brown (2008) who emphasise the systematic use of forum for online discussion. The emphasis is on the structure of the discussion forum (Vonderwell, et. al., 2007) where online discussions should be organised into discussion topics and each topic has its

own thread (Brooks & Jeong, 2005). Thus, this had prevented unnecessary repetitive discussions.

Although the amount of times spent varied according to each individual group, with online instructions, this had improved the face to face approach even better in many ways. However, a thorough planning and implementation of this study had been carefully developed to ensure the students did not regard the two different modes as separate contexts or less important to each other. A much clear purpose was provided to the students before conducting the study so that they understood the relevance of both modes. This is so important for the students to have for more control over their learning environment (Murray, et. al, 2013)

Besides teacher's instructions, the sub-triangle rules is also related to the obligation of the students to work in group with good communication and problem solving skill

10.6.3 The ROLES sub-triangle

The sub-triangle roles relate to the role of a teacher who is not only an expert in subject-matter but a mentor or facilitator. In fact, the role of the teacher has moved from whole-class directive teaching to more of a coaching approach who provides students with opportunities for collaborative work in blended learning environments.

Integrating online learning with the existing face to face course requires more than just learning to use the technology to download learning materials. The teacher who is also the instructor provided practical advice for the students going from face to face to online mode and vice versa. The teacher provided an extensive syllabus that contains detailed information about the assignments where the students could continue their progress both online and face to face. The teacher also provided the students with guidelines on using online forum and students led the discussions systematically themselves. The teacher explained to the students the use of a tool called group work report introduced in the second cycle. The tool coached the students to conduct discussions both online and face to face.

However, not all teaching strategies that work in the face to face classroom would work online. Some strategies were structured and re-structured by the teacher to fit the

learning according to the goals and objectives that the teacher had set for him and the students. This is very important to ensure those learning goals and objectives of the course in this study had realistic expectations.

The teacher did not only teach the students to interact naturally online as they did in face to face, but also guided them to communicating well in a team. Simply grouping the students in a group and assigning them a task did not guarantee them to work together toward a common goal and collaborate as a successful team. As there is no "one right way" to allocate students into groups, the students were allowed to form their own groups. One of the goals of group work is to collaborate with members they knew better rather than member they didn't know.

The well-functioning groups in the study indicated that group members had demonstrated a sense of cohesion. Every group member was assigned a role and those roles were rotated to help others learned. They were considered as positive individuals who supported and helped other group members. They ensured that all members understood and settled on plans and actions they had chosen. O'Leary (2005) suggests each student should be assigned with different roles both through online interaction and face to face meeting.

The teacher had taken great caution when intervening each group's online discussion. There were times when the teacher only intervened to keep the discussion on track and helped to keep the group focused. He avoided any authoritative postings as they may tend to shut down group conversation. Summarising the discussion too soon even before the group decided to choose the topic of their assignment could also shut down the discussion. This is warned by Mazzolini and Maddison (2007) who caution that the timing of teacher intervention in the students' online discussions is critical. For some groups, they required the least intervention in the discussion boards.

The ability to take responsibility for students' own learning is generally an intended outcome of the study where the students were encouraged to reflect on the process of their own learning. The findings show that working online and face to face provided an optimal environment for enhancing interactions with the students' peers and their teacher. Through interactions and participation, this had motivated the students to

construct their knowledge in learning. Chan and Chan (2011) support the idea of establishing an environment that leads the students to work collaboratively with peers and become proactive and independent learners

The analysis of peer interaction also suggest that active participants from all group members led to well-functioning or performing learning teams who actively engaged in both online and face to face discussions. It was obvious that the group members had encouraged each other to pose questions, question ideas, elaborate and justify their ideas, suggest modification, and reflect upon their discussions or even reflect how well one's own work is compared with others. Peer review effectively allows group members to construct knowledge through social sharing. Wallace (2003) agrees that the group who developed common ground based on their understandings through written feedbacks, would provide support to their peers. (Wallace, 2003)

There are various advantages using forum for online discussions including developing students' social presence (Dixson, 2010), students' discussions are more structured through online rather than face to face (Wallace, 2003), and students perceived online discussions as more democratic (Swan, 2001). By connecting the online and face to face learning, the students were moving towards deeper learning.

Thus, the students' success working online and face to face in a blended environment was ultimately determined by the teacher or instructor in developing the course contents and course assessment which included group assignments and peer reviews. The environments of the blended learning created in this study had strongly developed positive relationship between teachers and students and fostered students' self-regulation.

10.7 The contributions

Four significant contributions to the field of blended learning derived from this study include the blended learning definition, the instruments to analyse online and face-to-face students' discussions, the coding and re-coding process of content analysis, the relationship of the coding strategies to the existing content analysis and the development of learning strategies in three themes.

10.7.1 Defining blended learning

The definition of and literature on blended learning has been extensively discussed in chapter 1 and 2. But first, we need to look at the definition of blended learning as related to this study. Allen and Seaman (2010) divide face--to-face instruction into two categories. The first category is where all course content is delivered through face-to-face only and with no involvement of technology. The second category is where only 1% to 29% of the course content is delivered online. For online learning, it is estimated that 80% of content is delivered online. As for blended learning, Allen and Seaman (2010) refer to Graham's (2006) definition – he proposed blended learning as the combination of online and face-to-face instruction. The delivery of content online is between 30 and 79% (Allen and Seaman, 2010)

In blended learning, the online portion not only helps to achieve the goals of classroom learning, but also enhances its pedagogical approach (Wingard, 2004). The adoption of a blended learning approach provides better opportunities for improving the course delivery, enhancing students' learning experience and extending their learning beyond classroom learning (Thorne, 2003). Clarks (1984) emphasises the importance of instructional methods to obtain better learning gains, rather than the delivery. According to Williams (2002), students should be involved in active and diverse learning as they would gain better understanding.

Kanuka et al. (2007) state that the purpose of developing instructional methods is to move learners from a low level to the higher level of learning. Examples of low level learning include rote learning or memorisation of facts. Understanding complex and abstract phenomena through critical and creative thinking is an example of higher level of learning. These instructional methods must be derived from peer and teacher communication. Tenenbaum et al.(2001) list several communicative activities that could lead to higher thinking, including "arguments, discussions and debates; conceptual conflicts and dilemmas; sharing ideas with others; materials and measures targeted towards solutions; reflections and concept investigation; meeting student needs and making meaningful, real-life examples" (p. 262).

The benefits of communicative activities within a learning situation are widely discussed from the perspective of learning theory in educational literature. Vygotsky (1978) introduced a social constructivist theory, where learners enhance their learning in a situation guided by the instructor and through interactions with peers. Lave and Wenger (1998) developed a community of practice concept where members of the group or community shared the same interest and enhanced their learning through social interaction. Laurillard (1993) developed a conversational framework to assess the role of technology in enhancing student learning within the higher learning environment.

In achieving successful learning activities within online and face-to-face modes, the learning module must be guided by the teacher. The modules used in the *reconnaissance phase*, first and second cycle were a structured learning programme. There are various advantages of having a well-structured learning module. According to Hoyle (2003), students could actively engage other students in their learning process, while the instructor could track student progress in completing their works, and conduct peer assessment. Zenger and Uehlein (2001) suggest there are benefits in a structured module or programme for students, as it allows them to learn on their own rather than in the classroom.

Developing successful combinations of online and classroom learning requires teacher's personal experience of best practices, knowledge on instructional design and literature reading. Through blended learning, teachers are able to extend their teaching beyond classroom learning. After conducting this study, I proposed that blended learning should focus on optimising the achievement of student learning through the organised/systematic online and face-to-face learning instructions. This is similar to Allen and Seaman's (2010) definition of blended learning with reference to Graham (2006). However, the allocation of time and learning activities online and in classroom depends on the teacher's instructions and the design of the module.

Thus, my position is to view blended learning as a pedagogical approach rather than considering it as a division of delivery modalities. The instructional method of blended learning should include a systematic guidance on the transition between online and

face-to-face learning and must be supported by genuine teamwork amongst the student groups.

10.7.2 Developing new research instruments

Two important instruments were introduced in this study used to analyse both online and face-to-face discussions. The instruments are a table for blended activities (see 5.4.1) and a blended learning strategies map (see 5.4.2). Groupwork report introduced in the second cycle was also considered a new research instrument. It captured data from both online and face-to-face mode. It was originally a summary of face-to-face group's meeting report from the first cycle but was extended to include the summary of their online discussions as well.

10.7.3 Reflections on the content analysis

According to Lapadat (2004), discourse analysis is a qualitative approach derived from linguistics and communication studies, where spoken or written interactive language is analysed explicitly in order to examine the content, structure, and processes of human communication. In blended learning research, the students' communications and interactions were recorded in online forum and face-to-face meeting reports which needed to be examined through content analysis.

The process of coding and re-coding the contents of online and face-to-face discussions was conducted by the researcher/teacher, raters and the students themselves. Lincoln and Guba (1985) suggested that the coding and re-coding process is ended when all of the incidents have been classified into categories and similarities of the incidents are identified.

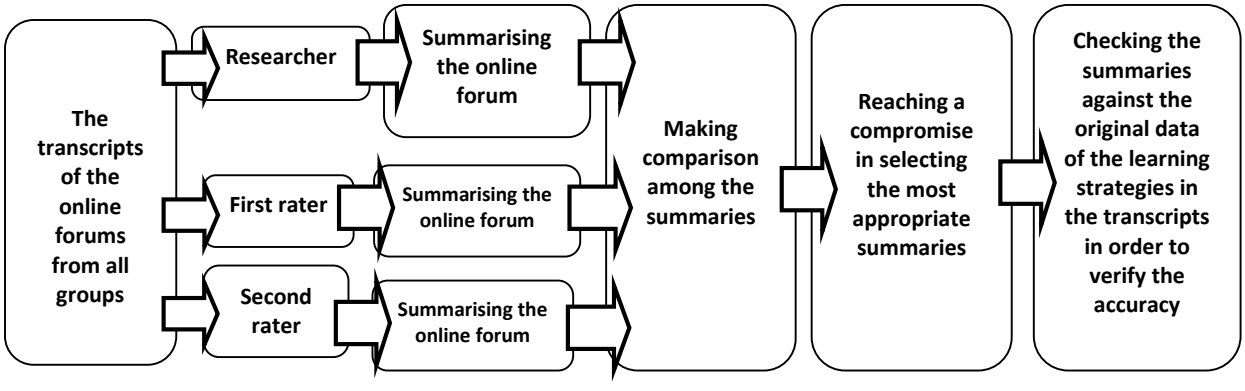
Gerbic and Stacey (2005) suggest researchers discuss substantively the analytic frameworks in transcript analysis in the literature (p. 46). Transcript analysis should be considered as a method that provides comprehensive interpretation and convergence (Sunal et al., 2003). It is important to ensure clarity in the coding scheme and the language when describing the categories and indicators (Garrison, et al., 2006). However, Sunal et. al. (2006) also warned of using multiple coding, stating that although increased complexity could result in deeper learning, it may also develop inconsistency. According to Miles and Huberman (1984), attempting to understand

interactions through transcript analysis is categorised as interpretivist which falls under the qualitative perspective. Garrison et al. (2000), who developed the community of inquiry framework, suggested the use of this framework when analysing the transcripts. The framework comprises three important aspects of social, cognitive and teaching presence which are grounded in the higher education literature.

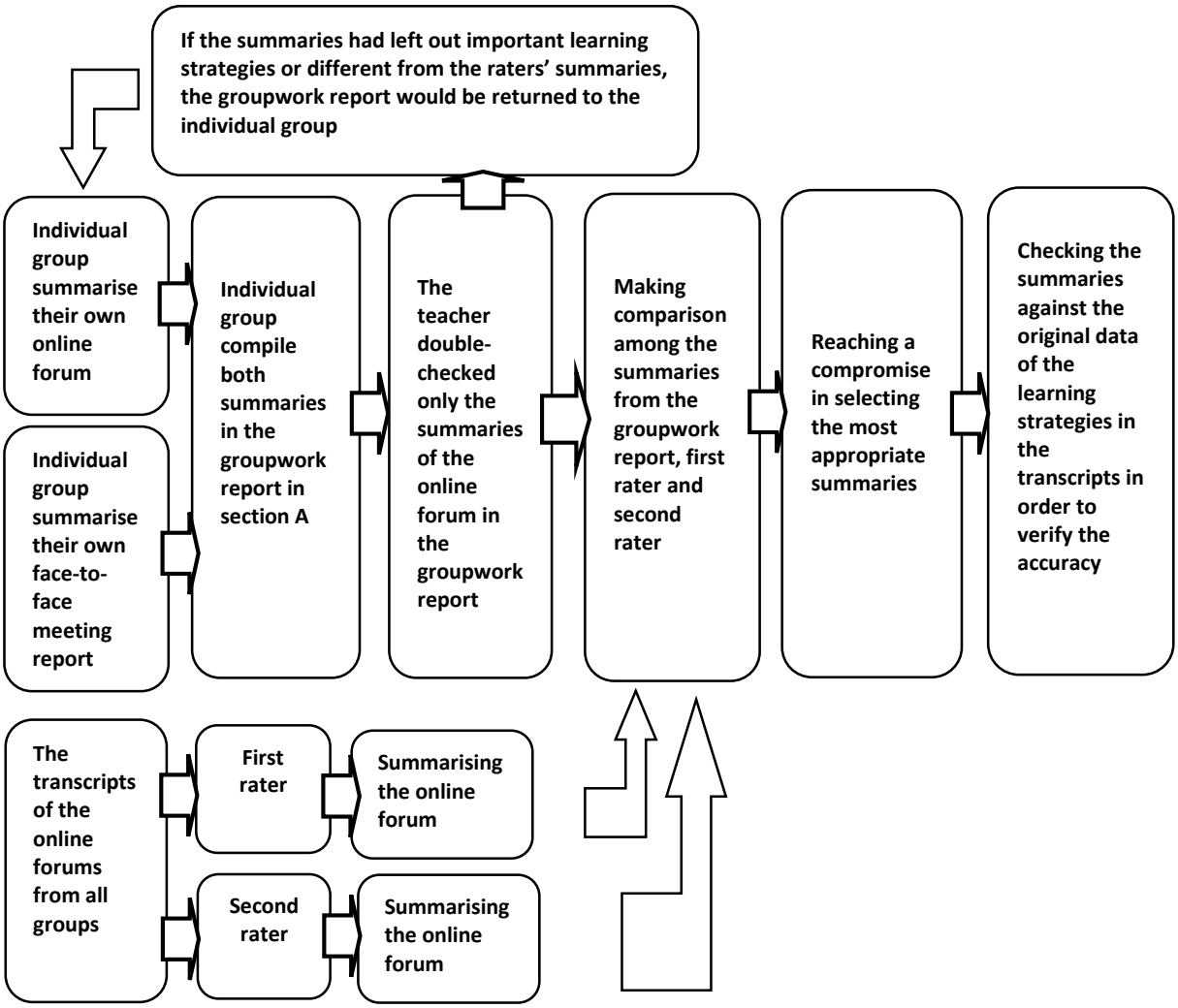
Sunal et al. (2003) and Garrison et al. (2006) suggested a negotiated approach, where coding procedure is not conducted by a lone researcher. Instead, it involves more than one researcher to examine and code the transcripts, discuss extensively their respective codes, and arrive at a final acceptable version of the coded messages. In the *reconnaissance phase* and first cycle of this blended study, the coding procedure was conducted not only by the researcher but was also examined by the two raters (see 5.7.1 and 8.2.2.2). However, the coding process to derive learning strategies was quite challenging, and it became more even complex to match the learning strategies in the face-to-face mode.

Achieving reliability in the data collection and analysis process is vital when conducting research. Raters or coders and researchers apply codes to these discussions based on their interpretation. However, interpreting students' online discussions was difficult due to the variation between them. Gidden (1984) refers to the subjective interpretation of the qualitative textual data as double hermeneutics. Sunal et al. (2003) suggest that each researcher and rater discusses, presents and debates their interpretation to determine whether agreement can be reached. This is a measure of inter-rater reliability, where the amount of agreement among different raters is achieved.

The process of summarising the students' online discussions to derive their learning strategies in the *reconnaissance phase* and first cycle was different from the second cycle (see 5.7.1 and 11.2.2).



The process of summarising online discussions from the reconnaissance phase and first cycle



The process of summarising online discussions from the second cycle

In making the interpretation in the second cycle more accurate, a groupwork report was introduced (see 9.4.10 and 9.5.1.1). As each group derived their learning strategies from their own online discussions and at the same time, identified their strategies in the face-to-face mode, the coding process became much easier for the researcher and raters. These raters in the second cycle were the same persons used in the *reconnaissance phase* and first cycle.

Thus, in this study, content analysis has become the important or main research tool, complemented by interviews, peer assessment and researcher's observations, to derive productive data analysis.

10.7.4 The relationship of the coding strategies to the existing content analysis

The coding strategy developed in this study was based on the blended learning strategies map (table 8.4 and table 11.2). It was used to identify online and face-to-face learning activities of the same learning strategy from a table of blended activities. In understanding how the coding used to analyse the content of blended activities significantly reveals students' understanding in their learning process, I refer to the existing content analysis from the literature which is used only to analyse online discussions.

Corich et al. (2005) review the literature in analysing an online discussion and highlight Spatariu et al. (2004) who used four categories for the online discussion analysis – the levels of disagreement, argument structure analysis, interaction-based, and content analysis. According to Hara et al. (2000), content analysis has been the popular approach used by many researchers analysing online discussions (Henri, 1991; Gunawardena et al., 1998, Garrison et. al., 2000). Corich et al. (2005) state that the category of content analysis developed by Henri (1992) and Garrison et al. (2001) was the one most referred to by researchers (see also 2.13.2). (Is this what you mean?)

Henri (1992) referred to the analysis of online discussion as having five dimensions – participative, social, interactive, cognitive and metacognitive. Henri's coding strategy was later modified by Hara et. al. (2000) who further refined the cognitive and metacognitive dimensions (figure 12.2).

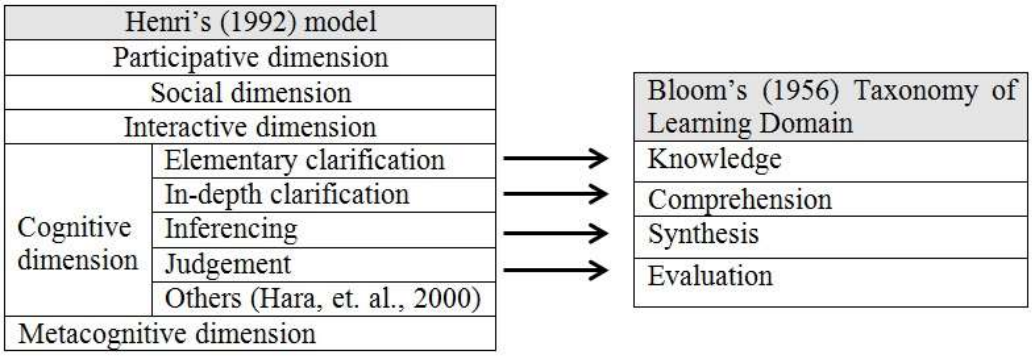


Figure 10.2: Hara et al. (2000) extend the cognitive dimensions of Henri's (1992) model and related it to Bloom's (1956) taxonomy of learning domains

Based on figure 12.2, Hara et al. (2000) relate each element in cognitive skill (elementary clarification, in-depth clarification, inference and judgment) from Henri's model to Bloom's taxonomy of educational objectives for cognitive domain (Bloom, 1956), where elementary clarification is related to the knowledge level, in-depth clarification is related to the comprehension level, inference is related to the synthesis level, and judgment is related to the evaluation level. However, analysis level is not provided in Henri's model (Hara et. al. 2000).

Garrison et al. (2001) developed a 'community of learning' model which suggested that the learning process must involve cognitive presence, teaching presence, and social presence (figure 12.3).

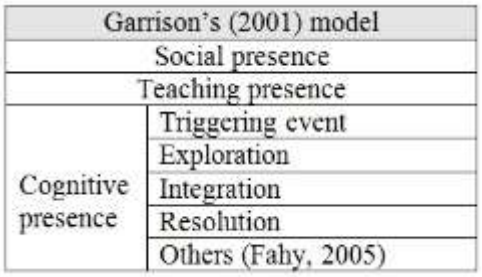


Figure 10.3: Extending the cognitive presence to four stages by Garrison et al (2001), with an additional stage by Fahy (2005)

Garrison et al. (2001) extended the cognitive concept and created a four-stage cognitive-processing model – "triggering event" (identifying or focusing on problems), "exploration" (brainstorming, questioning and free exchange of information), "integration" (constructing ideas from previous phase) and "resolution"

(appearance of direct action). Fahy (2005) adds a fifth category to Garrison's model known as "others" which accommodates messages that do not(?) belong elsewhere. Garrison's cognitive skill is also referred to as critical thinking skill.

The coding of the learning strategies in the online forum developed in this cycle could be related to the coding of Henri's and Garrison's model (table 12.1).

Table 10.1: Matching the coding with Henri's (1992) and Garrison's model (2001)

	Henri's model (1992)	Garrison, et. al.'s model (2001)
Action Planning (AP) AP-Reminder-1.1 AP-Reminder-1.2 AP-Reminder-1.3 AP-Scheduling-2.1 AP-Scheduling-2.2 AP-Confirmation-3.1 AP-Confirmation-3.2 AP-Confirmation-3.3 AP-Communication-4.1 AP-Communication-4.2 AP-Communication-4.3	Participative dimension	---
Group Development (GD) GD-Motivation-5.1 GD-Socialistion-6.1	Social and interactive dimension	Social presence
Task-related (TR) TR-Brainstorming-9.1 TR-Brainstorming-9.2 TR-Compromising-10.1 TR-Compromising-10.2 TR-Assignment-12.1 TR-Assignment-12.2 TR-Assignment-12.3 TR-Assignment-12.4 TR-Assignment-12.5	Cognitive dimension • elementary clarification • in-depth clarification • inference • judgement	Cognitive-processing • triggering event • exploration • integration • resolution

TR-Assignment-12.6 TR-Assignment-12.7 TR-Assignment-12.8 TR-Assignment-12.9 TR-Assignment-12.10 TR-Assignment-12.11		

In my coding, there were three important themes of learning strategies – action planning, group development and task-related. Action planning (reminder, scheduling, confirmation and communication) relates to the *participative* dimension of Henri's model. It mainly studied the students' participations and interaction in online discussions through message postings. Group development (motivation and socialisation) relates to the social and *interactive* dimensions of Henri's model and the social presence of Garrison's model. The important coding was the task-related category (namely brainstorming and assignment engagement) which could relate to the *cognitive* and *metacognitive skills* of Henri's (1992) model and the cognitive-processing of Garrison's (2001) critical thinking model.

The strategy categories of brainstorming and assignment engagement in task-related could be used to describe the cognitive process of how the group completed their assignments (figure 12.3).

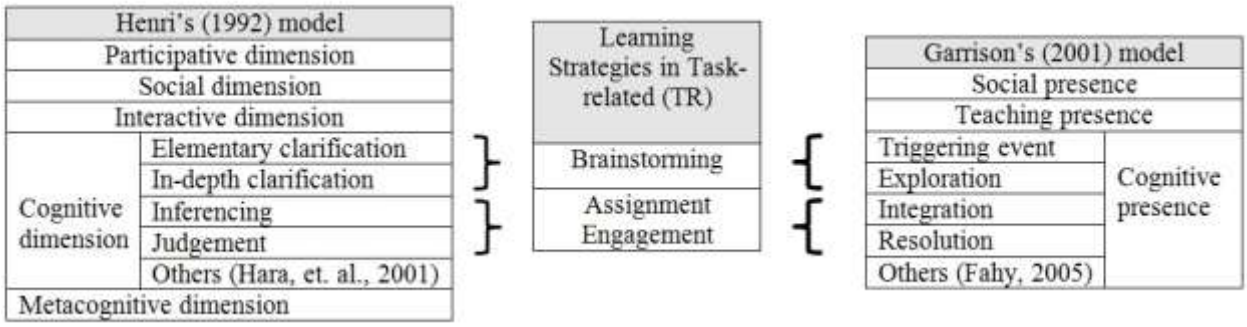


Figure 10.4: Relating the cognitive perspective from Henri's (1992) and Garrison's model (2001) to the learning strategies in task-related (TR)

Based on figure 12.4, the strategy category of brain storming in task-related was similar to the two phases in Garrison et al. (2001) – *triggering event* (identifying ideas/opinions for the assignment) and *exploration* (brainstorming/questioning ideas/opinions). In Henri's (1992) model, the strategy category could be referred to the

elementary clarification (identifying problems) and *in-depth clarification* (analysing problems). The strategy of assignment engagement was similar to the Garrison et al. (2001) phases of *integration* (admitting an idea that is related to an idea already admitted as true) and *resolution* (completing the task based on the improved ideas/opinions). In Henri's (1992) model, the strategy category could be referred to as *inferencing* (identifying problems) and *judgement* (making decisions).

Based on a learning concept by Entwistle and Waterston (1988), Henri divides the information processing level into surface and in-depth learning. Surface learning refers to sharing ideas/opinions already stated, while in-depth learning refers to offering further ideas or information on the opinions. These could be seen in the learning strategy of brainstorming (9.1 and 9.2). The coding from Henri's (1992) and Garrison's (2001) model was helpful to describe the learning strategies in the online mode. In the case of a blended environment, the coding could be extended to face-to-face mode.

10.7.5 The learning strategies in three themes

From the *reconnaissance phase*, 18 learning strategies conducted in blended mode were identified, using the table of blended activities (table 5.10). The number of learning strategies in the first cycle was increased to 23 (table 8.4). In the second cycle, 31 learning strategies to complete the assignments were identified (table 11.2). The process to determine the learning strategies was based on the students' online and face-to-face discussions completing the assignments of a computer module over the *reconnaissance phase*, first and second cycle.

These learning strategies were categorised into three significant themes – action-planning, group development and task-related. The action planning theme is generally about preparing to arrange meetings online and face-to-face, and to start planning the structure and content of the assignment. The group development theme concerns strategies such as forming a functioning group, motivating group members to work as a team and supporting each other.

The task-related is the most significant theme, where the actual work is delegated among group members. Because this studies using a multimedia module in its research

setting, the students' assignments were to develop an educational prototype or courseware. So, the learning strategies derived were related to an assignment such as developing courseware interfaces (TR-12.4) and identifying compatibility problems with the authoring/programming software (TR-12.9). The students' threaded online discussions served as a reference whenever they needed to return to the discussions to check if the workflow or contents had been properly planned and agreed upon by group members.

Above all, teamwork has always been central to the success of the group completing their assignments or projects; this includes good communication skills among group members that help them to solve problems. There are various benefits of teamwork cited in the literature. For example, well-designed team work can facilitate learning and enhance student learning (McInnis and Devlin, 2002). Teamwork also promotes development of communication, collaboration and social skills (Fåhræus et al., 1999). According to Rovai (2002), with better communication skills, students could achieve a positive outcome in teamwork and establish trust among group members.

The task-related theme could be extended to the other course modules. This is because different course modules will have a different list of learning strategies within task-related themes to complete the assignments, projects or fieldwork. For example, students of chemical engineering have to develop an engineering project and they are engaged in learning strategies including developing process flowsheets, designing efficient utilities and energy, designing process simulation and making decisions on materials of constructions. Biology students are required to conduct fieldwork research on a plant and they might have the following learning strategies – identifying different plant form, identifying vegetative plant development and discussing plant transport and nutrition.

Therefore, this study is transferable. A concept of trustworthiness by Lincoln and Guba from the literature on transferability was discussed extensively in the methodology chapter (chapter 3) and in chapter 8 (section 8.2.1).

10.8 Recommendations

Based on the limitations of the study, some suggestions were presented in this section.

10.8.1 A focus group interview

First, through the first and second research cycle, only group leaders were interviewed on whether they had worked in a blended mode and whether they had worked as a team in completing their assignments. The data were gathered through the group leaders' interviews and the group's reflection in the groupwork report and the findings revealed that the interviews from certain group leaders contradicted with the groups' reflections. The data on the teamwork also contradicted the peer assessment marks in some groups.

To overcome this, it would be better to interview all group members using focus group approach. The research should consider a focus group interview where every single member in the group has the opportunity to exchange their ideas and opinions through focus group. A focus group interview that involved all members should be conducted instead of interviewing just the group leader. The potential of focus group is widely discussed in the literature. According to Kitzinger (1995), the crucial feature of focus group is the interaction among the group members. Each member has the opportunity to view his opinions and thoughts that could highlight their values and beliefs about team working. Race et al (1994) emphasise the significant advantage of the focus group interview as a forum of change.

10.8.2 The sampling

Focus group interview may not be the only best option as this method might not always provide sincere feedback about co-operation or they might not be open in providing their feedbacks. However, if individual interview from each group member is to be conducted, a massive data will be gathered and it will take longer to analyse. The simple solution is perhaps to reduce the number of samplings in the research and focus on a single group. This method will provide an opportunity to gain insight into each individual member on how the group work online and face-to-face.

Thus, the respondents involved in the study should be reduced to 2 or 3 groups so that it is manageable and the researcher can focus deeply in each group. There may be

possible to look at the aspect of surface and deeper learning when students interact with members through online and face-to-face discussions.

10.8.3 The peer assessment

Peer assessment used in this study could be both an important contribuitons to develop effective teamwork. However, it could also be serious pitfalls as the students feel reluctant to assess their peers truthfully. Researcher conducting belended learning study should be aware of this.

10.8.4 Group cognition

Within the field of Computer-Supported Collaborative Learning (CSCL), the aspect of what makes group discussions productive for learning should be explored through group cognition. According to Stahl (2006), group cognition is considered as a theory and could be used to support the studies of CSCL. It looks at how groups of students work as a team collaboratively to achieve cognitive accomplishments. Group cognition could also be adapted in creating new knowledge through cognitive activities such as prolems solving (Stahl, 2006). The theoretical foundations of small groups of students working together in cognitive activities in CSCL are largely influenced by Vygotsky and Piaget. Leadership is another important aspect of collaborative learning widely discussed in group cognition. Pozzi (2011) and Schellens et al. (2007) suggest that a teacher could appoint a student from the small-group as a leader to push the group forward in completing their tasks while other members could be assigned with different roles. The aspect of group cognition could be introduced in the study of blended learning as it also involves students working in small-group to complete tasks throughout the semester.

10.9 Conclusion

Blended learning that incorporates classroom and online mode does not bring a new concept in education. Instead, it mainly derived the theoretical principles both from classroom learning and distance education. The blended learning research in this study had gone through three important cycles. It started with the *reconnaissance phase* study and then continued with the first cycle. Later, the research was conducted again

in the second cycle. Based on the theoretical framework called the third generation of an aligned activity system, the interventions were derived from the first cycle with reference to the aspect of tool, rules and roles. In the second cycle, these interventions were further categorised into pedagogy-intervention plan (PIP) and methodology-intervention plan (MIP). The positive findings revealed that the cooperative groups had worked productively as a team and worked effectively in a blended mode.

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Appendix 1: Peer assessment form [based on Conrad and Donaldson (2004)]

Peer Assessment (15 points)

Evaluator name: _____
Assignment number: _____

List each team member, and rate them on a scale from 1 to 3 in each of the areas listed.

3 = above average
2 = average
1 = below average

Quality (3 points): Completed all assignments at the level of quality expected by the group.
Responsibility (3 points): Completed all assignments in a timely manner
Teamwork (3 points): Worked well with other team members
Contribution (3 points): Contributed to the group in an equitable fashion
Attitude (3 points): Projected positive attitude throughout module

Member Name	Quality	Responsibility	Teamwork	Contribution	Attitude

Additional comments:

Appendix 2: Rubrics based on Bauer (2000) for assessing student postings on the bulletin board

Skills	Skills
9-10	Demonstrate excellence in grasping key concepts; critiques work of others; stimulates discussion; provide ample citations for support of opinions; readily offer new interpretations of discussion materials. Ideas are expressed clearly, concisely; uses appropriate vocabulary.
7-8	Shows evidence of understanding most major concepts; will offer an occasional divergent viewpoint or challenge; shows some skills in support for opinions. Some signs of disorganisation with expression; transition wording may be faulty.
5-6	Has mostly shallow grasp of material; rarely takes a stand in issues offer inadequate levels of support. Poor language use garbles much of the message; only an occasional idea surfaces clearly; expression seems disjointed; overuse of simple sentience and redundancy with words and commentary; paragraphs often appear unrelated to each other. This student requires constant prompting for contributions.
1-4	A minimal posting of materials. Shows no significant understanding of material. Language is mostly incoherent. Does not respond readily to prompting.

Appendix 3: Netiquettes (online etiquettes)
Source: http://www.ehow.com/how_2106033_use-proper-forum-etiquette.html

Step1

Lurk a little before you dive right in. Read a number of posts, or check out the group's archives. Get a feel for the tone of the forum so you can participate accordingly.

Step2

Remember your face doesn't show. Words alone can convey sentiment, but without benefit of inflection or facial expression, they can be misconstrued. Use descriptive wording, emoticons or .gifs to ensure your meaning is clear. By the same token, don't jump to conclusions about another person's intent in posting an unclear comment. When in doubt, ask for clarification.

Step3

Type in lowercase or standard case, not in all caps. By the rules of netiquette, all caps equates to shouting. If you type with all caps, you will annoy and possibly offend other forum members.

Step4

Say online exactly what you would say in person. In other words, if you wouldn't say it to the person's face in front of your Grandmother, you shouldn't type it into a forum.

Step5

Be respectful. Internet etiquette is similar to standard etiquette in this area. Appreciate that your opinion is one of many. You can disagree with another person without being disrespectful or rude online.

Appendix 4: The table for blended activities for group 1

Group 1
No. Of Group Members: 4
Course: CDROM-Based Multimedia Development

Week	Meeting/Discussion/ Communication/Event	Mode	Strategies
Week 1 7 July - 13 July 2008	• Classroom Meeting • Brief meeting after the class • Meeting for Assignment 1 (10 July 2008)	• Face-to-face • Face-to-face • Face-to-face	• During the class, the teacher made two important announcements. First, all the students must sit for an English cloze test. Second, the proposed group leader must submit the list of their group members to the teacher and through online. • Getting to know group members from other courses for the first time. The group also exchanged mobile phone numbers among members. [AP-COMMUNICATION-4.1] Junainah scheduled the time, date and venue for the first meeting to start discussing their assignments. [AP-SCHEDULING-2.1]. Junainah informed the group that she would be sending the list of the group members to the teacher by hand and through online forum [TR-ADMINISTRATION-11.1]. • In the first meeting, the group got to know each other further especially identifying the members' expertise in developing the courseware using authoring or programming software [TR-ORGANISATION-8.1]. They discussed the coursework requirement (completing 3 assignments) throughout the semester. At this point, the group leader would be appointed based on their English cloze test. Junainah acted as a temporary group leader. Junainah led the discussion and began assigning tasks to each member [TR-ORGANISATION- 8.2]. For the first task in this meeting, all members contributed their draft ideas on thinking the most suitable topic for their assignments [TR-BRAINSTORMING-9.1]. For each topic the group proposed, they also provided ideas as to where the sources were easily available [TR-BRAINSTORMING-9.2]. As a start, the group planned to develop an interface for credit ending for Assignment 1, 2 and 3. This credit ending would include the photos and profiles of the group members as developers.
Week 2 14 July - 20 July 2008	• Classroom Meeting • E-learning announcement (July 16th, 2008)	• Face-to-face • Online	• The teacher announced that the result of the English cloze test would be released soon. However, no specific date was stated. • The teacher announced in the elearning that the appointment of the group leader would be based on the result of English cloze test.

Week 3 21 July - 27 July 2008	• Forum discussion 1 (thread dated 23 – 29 July 2008) • E-learning announcement & Classroom Meeting	• Online • Online & face-to-face	• Junainah was wondering whether she was the group leader and she welcomed any ideas from the group. For this inquiry, the teacher made a passing remark that group leader would be appointed based on the English cloze test marks. One member expressed her hope that the group would give co-operation to complete their assignment. Another member paraphrased the assignment instructions. Rohayati came with an idea of a topic of chemistry. The title suggested was Matter [TR-BRAINSTORMING-9.1]. She provided with detailed reason stating that intangible concept such as atom movement was hard to visualise but could be shown through multimedia courseware [TR-BRAINSTORMING-9.2]. One member suggested adopting Bloom's Taxonomy concept in their courseware development. A table of contents for the courseware was suggested. [TR-BRAINSTORMING-9.2] Rohayati uploaded a file of the beginning chapter of their assignment 1 (proposal documentation) in the forum and asked the group to review. Junainah concluded that the topic was accepted and agreed by all members. The group started drafting the storyboard ADDED STRATEGY [TR-ASSIGMENT ENGAGEMENT-10.1]. (16 postings) • The teacher announced the name of the student who scored highest mark in his English cloze test. Overall, the students' results were satisfactory. Thus, the teacher informed the class that the temporary-elected group leaders were now officially group leaders.
Week 4 28 July - 3 August 2008	• Forum discussion 1 (thread dated 29 July – 4 August 2008) • Communication through mobile device • Meeting for Assignment 1 (30 July 2008)	• Online • Calls or Text messaging • Face-to-face	• Junainah suggested week 4 to hold another group meeting. The meeting was to finalise their assignment 1 (proposal documentation). One member suggested the group to confirm the date. Another member suggested on Wednesday (30 July 2008) at 2 pm. (6 postings) [AP-SCHEDULING-2.1] • Junainah reminded the group of the meeting either by giving a call or sending text messaging [AP-REMINDERS-1.1]. • All completed tasks for assignment 1 from each member were gathered and compiled by Junainah as the group leader. Junainah checked the

			compilation and the content flow. Junainah reminded the group that the assignment must be finalised in the meeting to meet the due date which was by Week 4 [AP-REMINDER-1.3].
Week 5 4 - 10 August 2008	• E-learning announcement (August 7th, 2008) • E-learning announcement (August 7th, 2008) • Communication through mobile device	• Online • Online • Call or text messaging	• The teacher announced that the due date for Assignment 1 was extended to Week 7. • The teacher reminded the students that the online forum discussion for assignment 1 would be closed by August 7th. After the date, a new online forum discussion will be opened for assignment 2 • Junainah informed the group that the due date for assignment 1 had been postponed. There were still times if the group wanted to modify any parts of the proposal documentation.
Week 6 11 - 17 August 2008	• Assignment submission	• Online	• Junainah submitted assignment through e-learning [TR-ADMINISTRATION-11.2].
Week 7 18 - 24 August 2008	•	•	•
Week 8 25 - 31 August 2008	• Forum discussion 2 (thread dated 25 August – 23 September 2008)	•	• Junainah welcomed the group from semester break ADDED STRATEGY [GD-SOCIALISATION-6.2]. One member suggested the second assignment to be focussed in 3 main parts – planning for the content, using flash and using authorware ADDED STRATEGY [ASSIGMENT ENGAGEMENT-10.3]. Each part would be handled by each sub-group [TR-ORGANISATION-8.2]. Other members responded and agreed. Rohayati elaborated what each sub-group should do. Norida asked Yati to pass the questions to her so she could copy them into authorware. Norida then asked members whom were responsible for creating the montage in flash. She wanted to compile them in authorware. Junainah was in charge of the video and informed the group that her work was in progress [TR-ORGANISATION-8.2]. Junainah also requested a storyboard from Norida for her reference. However, Norida told Junainah that she had tried uploading through e-learning but on that particular day, the server was being maintained by the ICT centre. Thus, Norida sent the file to Junainah through email. Junainah reminded the

			group to discuss online regularly as marks were allocated by the teacher. (14 postings)
Week 9 1 - 7 September 2008	•	•	•
Week 10 8 - 14 September 2008	• Meeting for Assignment 2 (13 September 2008) • Forum discussion 2 (thread dated 10 - 25 September 2008) • Communication through mobile device	• Face-to-face • Online • Call or text messaging	• In this meeting, the group discussed the design of the interfaces for laboratory activity. Two members designed the same interface for laboratory activity which included the contents, buttons and graphics [TR-ASSIGNMENT ENGAGEMENT-10.4]. Junainah scheduled the time with the group to continue discussing the interface design online but in synchronous mode [AP-SCHEDULING-2.2]. The date chosen was 13 September 2009. • Junainah informed the group that this particular forum was meant for flash discussion ADDED STRATEGY[TR-BRAINSTORMIG-9.3]. She asked Yati to upload the montage in flash file in the forum so that the group could download and give their comment ADDED STRATEGY[TR-ASSIGNMENT ENGAGEMENT-10.6]. Yati informed Junainah that the server was still being maintained and no uploading activity could be made for the time being. While waiting for the server to be fully working, Zaidah suggested the group to discuss the content. Junainah asked Yati whether she knew how to create particle motion for solid, liquid and gas using flash ADDED STRATEGY[TR-ASSIGNMENT ENGAGEMENT-10.2]. Zaidah reminded the group of the text character used in the courseware. She also commented on the use of colour in the interfaces. Other members then responded to the comments. Some preferred red while others preferred blue for the menu interfaces. Norida reminded the group to standardise the colour of the menu with the montage ADDED STRATEGY [TR-ASSIGNMENT ENGAGEMENT-10.4]. Junainah asked Yati to upload the main menu so that the group could give their comment. However, Norida informed the group that the main menu had been uploaded in the other threaded forum ADDED STRATEGY[TR-ASSIGNMENT ENGAGEMENT-10.5]. (15 postings) • Junainah reminded the group of the date to communicate synchronously through online forum. The date was 13

	• Forum discussion 2 (thread dated 10 - 26 September 2008) (communicating synchronously) [AP-COMMUNICATION-4.2]	• Online	September 2008 [AP-CONFIRMATION-3.2]. • Junainah reminded the group that this forum was for authorware discussion [TR-BRAINSTORMING-9.3]. Norida informed the group that she had uploaded the main menu but Junainah replied that the menu did not appear in the forum. Finally, Norida managed to upload the main menu but it was incomplete. The group started to comment on the background colour. Junainah related the numbers of colours used in the main menu with the theory of short-term memory. (13 postings)
	• Forum discussion 2 (thread dated 10 - 26 September 2008) (communicating synchronously) [AP-COMMUNICATION-4.2]	• Online	• Junainah informed the group that this forum was for content discussion [TR-BRAINSTORMING-9.3]. Junainah suggested additional content from other textbooks to be included into their existing content ADDED STRATEGY [TR-ASSIGNMENT ENGAGEMENT-10.2]. According to her, the multimedia elements such as videos, audios, and graphics could easily be found on the internet. Zaidah uploaded 3 different sub-menus in the forum and asked the group to comment. She also uploaded the menu for the test ADDED STRATEGY [TR-ASSIGNMENT ENGAGEMENT-10.5]. The group discussed the background colours, interactive buttons, graphics and interfaces ADDED STRATEGY [TR-ASSIGNMENT ENGAGEMENT-10.4]. Junainah reminded the group that each layout must considered the concept of consistency. (17 postings)
Week 11 15 - 21 September 2008	• Brief meeting after the class	• Face-to-face	• The group did a brief follow-up from each member to identify the different formats of multimedia files. They had to ensure the format s meet the compatibility of the authoring language. [TR-ASSIGNMENT ENGAGEMENT-10.7] Scheduling the time, date and venue to work on assignment 2 [AP-SCHEDULING-2.1].
	• Meeting for Assignment 2 (20 September 2009)	• Face-to-face	• Finalising the appropriateness of the subject content. All multimedia files were collected from the members and checked for the file format. [TR-ASSIGNMENT ENGAGEMENT-10.8]. Any formats which were incompatible with the authoring language would be changed. For example, file format for video was .avi. [TR-ASSIGNMENT ENGAGEMENT-10.9]. Finally, running the courseware in order to check for the final flow of the content and multimedia files. [TR-ASSIGNMENT ENGAGEMENT-10.10]. Junainah reminded that the courseware must be ready soon.

Week 12 22 - 28 September 2008	• Assignment submission	• Face-to-face	• Submitting assignment 2 to the teacher during the class [TR-ADMINISTRATION-11.2]
Week 13 29 September - 5 October 2008	• Brief meeting after the class • Meeting for Assignment 3 (30 September 2009) • Presentation of assignment 2	• Face-to-face • Face-to-face • Face-to-face	• Scheduling the time, date and venue to work on assignment 3 [AP-SCHEDULING-2.1]. • The focus of the meeting was to prepare a final report after they had completed the courseware. Among the contents of the final reports were the formative and summative evaluations of the courseware. • All groups were required to present their assignment in front of the teacher during the classroom meeting.
Week 14 6 - 12 October 2008	•	•	•
Week 15 13 - 19 October 2008	• Forum discussion 3 (thread dated 14 – 15 October 2008) • Assignment submission	• Online • Online	• Junainah reminded her group to prepare and finalise the final report that related to the courseware development. She asked the group to describe the concept of constructivism which was applied in the courseware. (5 postings) • Submitting assignment 3 online [TR-ADMINISTRATION-11.2]

Appendix 5: Blended Learning Strategies Map: Students' copy

Themes	Strategy Category	Strategies
Action Planning [AP]	1. Reminders [AP]	1.1.Reminder of the face-to-face meeting 1.2.Reminder of the online meeting 1.3.Reminder of the due date for the assignment
	2. Scheduling [AP]	2.1.Scheduling the date, time and venue for the face-to-face meeting 2.2.Scheduling the date and time for synchronous online me
	3. Confirmation [AP]	3.1.Confirming the date, time and venue for the face-to-face meeting 3.2.Confirming the date and time for synchronous online me
	4. Communication [AP]	4.1.Exchanging mobile phone numbers
		4.2.Communicating through asynchronous online forum in a synchronous mode
Group Development [GD]	5. Motivation [GD]	Appreciating the group' efforts/works in completing the assignment
	6. Socialisation [GD]	6.1.Welcoming new members to the group 6.2.Welcoming the existing members back to the group for discussion and/or working on the assignment
Task-related [TR]	7. Introduction [TR]	7.1.Introducing working procedures for the group members
	8. Organisation [TR]	8.1.Identifying strengths and skills of the group members 8.2.Assigning/dividing tasks to the group members
	9. Brainstorming [TR]	9.1.Brainstorming for the assignment topic 9.2.Brainstorming for the assignment materials 9.3.Specifying one thread of online forum for specific topic o discussion
	10. Assignment Engagement [TR]	10.1. Developing the storyboard for the courseware 10.2. Developing the subject content for the courseware 10.3. Developing the multimedia content (audio, video, animation, graphics, etc) for the courseware 10.4. Developing the courseware interfaces (main menu, sul menu, exercises, glossary, etc) 10.5. Uploading/posting the courseware interfaces (main me sub-menu, exercises, glossary, etc) in the forum 10.6. Uploading/posting multimedia files (montage, animatio etc) in the forum 10.7. Posting/sharing document file(s) for discussion/compil with group members

		10.8. Discussing the compatibility of the file formats with the authoring software
		10.9. Identifying any compatibility problems of the file forma with the authoring software 10.10. Rectifying any compatibility problems of the file form with the authoring software. 10.11. Checking the flow of the content materials of the assignment
	11. Administration [TR]	11.1. Submitting lists of group members' names to the teach 11.2. Submitting assignments

Appendix 6: Online and face-to-face group work report

Discussion on Assignment no. ☐

Group leader: _____
Members: _____
_____
_____
_____

Part A: Fill in both columns

Matters that have been discussed online [Please name the title and date of your thread]	Matters that have been discussed face-to-face
Date: _____ Topic of discussion: _____ _____ Numbers of postings: _____	Date: _____ Topic of discussion: _____ _____
Date: _____ Topic of discussion: _____ _____ Numbers of postings: _____	Date: _____ Topic of discussion: _____ _____
Part B: Please tick the following checklists if you have completed the tasks. B1: Working as a team on the assignment	

☐ The group has reached a consensus on selecting the topic of assignment.

☐ The group leader has delegated the tasks equally among group members.

☐ Each group member content materials for the assignment.

B2: Working as a team in a blended environment

☐ You have discussed your plan (date/time/venue) in the online forum to meet face-to-face.

☐ You have discussed your plan (date/time/venue) during your face-to-face meeting to meet online.

☐ You have used other communication technology (such as mobile phone, emails, yahoo messenger, window messenger, Skype, etc) to meet face-to-face.

☐ You have used other communication technology (such as mobile phone, emails, yahoo messenger, window messenger, Skype, etc) to meet online.

☐ You have discussed your plan (date/time/venue) in the online forum to hold a synchronous online meeting.

☐ You have discussed your plan (date/time/venue) during your face-to-face meeting to hold a synchronous online meeting.

☐ You have used other communication technology (such as mobile phone, emails, yahoo messenger, window messenger, Skype, etc) to hold a synchronous online meeting.

Part C: Please answer the following questionnaires

1. How often do you use online forum to discuss your assignment?

   _____

   _____

   _____

2. How often do you meet face-to-face to discuss your assignment?

   _____

_____

_____

3. Among discussing/working online, discussing/working face-to-face, or discussing/working in a blended mode (combination of online and face-to-face), which mode works well for your assignment? Why?

   _____

   _____

   _____

4. What needs to change for your group to work more effectively on the next assignment?

   _____

   _____

   _____

5. What tips would you give another group about working in this way?

   _____

   _____

   _____

6. Any other issues you would like to raise.

   _____

   _____

   _____

Appendix 7

Consent Form for Project Participants

Project Title: The Study of Blended Learning at University Technology Malaysia (UTM)
Institution: The University of Nottingham (Malaysia Campus)

I agree to take part in the above research project. I have had the project explained to me, and I have read the Information Sheet statement, which I may keep for my records. I understand that agreeing to take part means that I am willing to:

- be interviewed by the researcher
- make myself available for a further interview should that be required
- allow the interview to be videotaped/audiotaped
- complete questionnaires asking me about my reflections on the online subject of Authoring Language
- participate in all the online activities such as forum discussion and reflective journal
- participate in all classroom activities
- allow my online forum discussion from the Moodle to be used for the data gathering
- allow my reflective journal from the Moodle to be used for the data gathering

Data Protection Policy

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed in any reports on the project, or to any other party. No identifiable personal data will be published. The identifiable data will not be shared with any other organisation.

Withdrawal from study policy

I understand that my participation is voluntary, that I can choose not to participate in part or all of the project, and that I can withdraw at any stage of the project without being penalised or disadvantaged in any way.

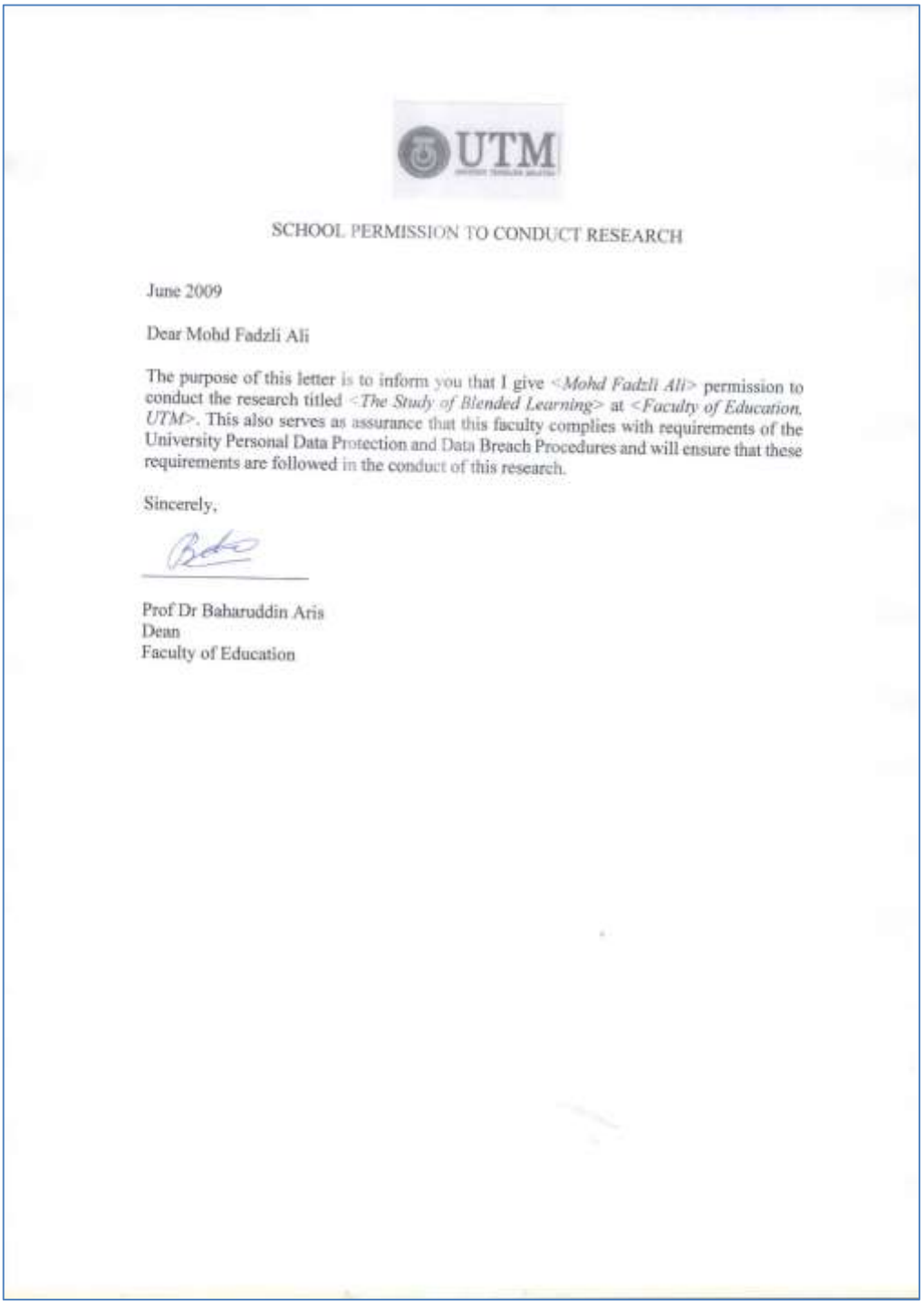
Name: .....

Signature: .....…

Date: .....

Appendix 8

Faculty permission to conduct research



UTM

SCHOOL PERMISSION TO CONDUCT RESEARCH

June 2009

Dear Mohd Fadzli Ali

The purpose of this letter is to inform you that I give <*Mohd Fadzli Ali*> permission to conduct the research titled <*The Study of Blended Learning*> at <*Faculty of Education, UTM*>. This also serves as assurance that this faculty complies with requirements of the University Personal Data Protection and Data Breach Procedures and will ensure that these requirements are followed in the conduct of this research.

Sincerely,

Prof Dr Baharuddin Aris
Dean
Faculty of Education

Appendix 9

Open-ended interviews on Blended Learning

1. What do you understand about blended learning?
2. How do work on your assignment through online discussion and face-to-face? Explain based on your experience.
3. Working together with other people for an assignment can be a challenging task in some ways. What are your experience working as a team to complete group assignment?

Lists of Abbreviations

ACCI	The Australian Chamber of Commerce and Industry
BCA	The Business Council of Australia
BERA	British Educational Research Association
CICT	The Centre for Information and Co mmunication Technology
CMS	Course Management System
CSCL	Computer-Supported Collaborative Learning
HCI	Human-Computer Interactions
ICT	Information and Communication Technology
LMS	Learning Management System
MOHE	Ministry of Higher Education Malaysia
NITC	National Information Technology Council
OPP3	Third Outline Perspective Plan
OUM	Open University Malaysia
TESL	Teaching English as a Second Language
UNITAR	Universiti Tun Abdul Razak
UTM	Universiti Teknologi Malaysia
VLE	Virtual Learning Environment