

**Affordances of smartphones and Facebook tools to  
enhance the teaching and learning of English for  
English as a Second Language learners**

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## **Abstract**

The growing field of mobile learning (m-learning) research concerning the use and effectiveness of mobile assisted language learning (MALL) in second and foreign language (L2) education reflects the possibilities of smart mobile technological devices to facilitate students' control over their own learning. This research aims to find the pedagogical affordances of mobile learning in combination with Web 2.0 tools with a particular focus on the use of smartphone and Facebook as tools to enhance teaching and learning of English for English as a Second Language learners. Using Design Based Research (DBR) as an approach to conduct this study, the initial design framework was developed from the literature and the exploratory phase. It was tested and developed through a series of iterations and the impacts of each iteration were evaluated using interviews and qualitative data analysis. 37 participants were involved in this study; 12 in the Exploratory Study, 17 in Iteration 1 and 8 in Iteration 2. One of the most important findings reported in the first iteration is the impact of a sense of social obligation whereby participants felt under pressure from their peers to post and to participate. This social obligation effect can have both positive and negative consequences for learning and was further explored in the second iteration. Based on the findings from both iterations, this study suggested a design framework to be used by future research that explored ways in which pedagogical designs for m-learning with social networking can take this social obligation effect into account in order to avoid its negative consequences and make best use of its positive consequences.

## Table of Contents

<b>Abstract</b> .....	<b>1</b>
<b>Table of Contents</b> .....	<b>3</b>
<b>Acknowledgements</b> .....	<b>10</b>
<b>Chapter 1: Introduction</b> .....	<b>11</b>
<b>1.1 General introduction</b> .....	<b>11</b>
<b>1.2 Why Malaysian ESL learners in the UK</b> .....	<b>19</b>
<b>1.3 Statement of the problem</b> .....	<b>22</b>
<b>1.4 Research aims</b> .....	<b>24</b>
<b>1.5 Research objectives</b> .....	<b>24</b>
<b>1.6 Research questions</b> .....	<b>25</b>
<b>1.7 Significance of this study</b> .....	<b>26</b>
<b>1.8 Organisation of the thesis</b> .....	<b>27</b>
<b>Chapter 2: Literature review</b> .....	<b>30</b>
<b>2.1 Introduction</b> .....	<b>30</b>
<b>2.2 Definition of main research terms used</b> .....	<b>31</b>
2.2.1 Affordances .....	31
2.2.2 Mobile learning (M-learning).....	33
2.2.3 Mobile assisted language learning (MALL).....	35
2.2.4 Smartphones .....	36
2.2.5 Web 2.0 tools.....	37
2.2.6 Facebook.....	39
<b>2.3 Previous research on mobile learning</b> .....	<b>40</b>
<b>2.4 Research on mobile learning in Malaysia</b> .....	<b>45</b>
<b>2.5 Types of mobile learning research</b> .....	<b>47</b>
<b>2.6 Previous research on Facebook</b> .....	<b>49</b>
<b>2.7 Research on Facebook for learning in Malaysia</b> .....	<b>54</b>

<b>2.8 Pedagogical foundations for mobile learning research .....</b>	<b>56</b>
2.8.1 Behaviorism.....	57
2.8.2 Constructivism .....	59
2.8.3 Authentic learning .....	61
2.8.4 Situated learning .....	63
<b>2.9 Theory of mobile learning.....</b>	<b>64</b>
<b>2.10 Gaps in mobile learning research.....</b>	<b>66</b>
<b>2.11 Conceptual framework of this study .....</b>	<b>67</b>
<b>2.12 Conclusion. ....</b>	<b>75</b>
<b>Chapter 3: Methodology .....</b>	<b>77</b>
<b>3.1 Introduction .....</b>	<b>77</b>
<b>3.2 Contextualising Design Based Research (DBR).....</b>	<b>77</b>
<b>3.3 Methodology.....</b>	<b>82</b>
<b>3.4 Design Based Research (DBR).....</b>	<b>84</b>
<b>3.5 Criticisms and challenges of DBR.....</b>	<b>88</b>
<b>3.6 Research procedures.....</b>	<b>92</b>
<b>3.7 Context of the study .....</b>	<b>95</b>
<b>3.8 Participants .....</b>	<b>96</b>
<b>3.9 Teaching sessions and tasks in each iteration.....</b>	<b>97</b>
<b>3.10 Methods used .....</b>	<b>98</b>
3.10.1 Semi-structured interview .....	98
3.10.2 Development of the interview questions .....	101
3.10.3 Online entries .....	109
3.10.4 Research field notes .....	109
<b>3.11 Data analysis.....</b>	<b>112</b>
3.11.1 Process of coding.....	116
<b>3.12 Ethics.....</b>	<b>121</b>
<b>3.13 Conclusion .....</b>	<b>122</b>

<b>Chapter 4: Results and discussion from Exploratory Study .....</b>	<b>124</b>
<b>4.1 Introduction .....</b>	<b>124</b>
<b>4.2 Involvement of practitioners.....</b>	<b>124</b>
<b>4.3 Stage One: English language teachers and a telecommunication engineer....</b>	<b>126</b>
4.3.1 Findings from the teachers .....	127
4.3.2 Findings from the engineer.....	132
4.3.3 Conclusion from Stage One .....	134
<b>4.4 Stage Two: English as a Second Language students .....</b>	<b>135</b>
4.4.1 Findings from the students .....	137
4.4.2 Conclusion from Stage 2.....	143
<b>4.5 Conclusion.....</b>	<b>144</b>
<b>Chapter 5: Results and discussion from Iteration 1 .....</b>	<b>147</b>
<b>5.1 Introduction .....</b>	<b>147</b>
<b>5.2 Context of the iteration.....</b>	<b>147</b>
<b>5.3 Participants of this iteration.....</b>	<b>149</b>
<b>5.4 Procedure of Iteration 1.....</b>	<b>151</b>
5.4.1 Findings of Iteration 1.....	153
<b>5.5 Assessment and discussion to produce a revised design framework .....</b>	<b>195</b>
<b>5.6 Conclusion.....</b>	<b>198</b>
<b>Chapter 6: Results and discussion from Iteration 2 .....</b>	<b>202</b>
<b>6.1 Introduction .....</b>	<b>202</b>
<b>6.2 Revised design framework.....</b>	<b>203</b>
<b>6.3 Context of the iteration.....</b>	<b>203</b>
<b>6.4 Participants of this iteration.....</b>	<b>204</b>
<b>6.5 Ethics.....</b>	<b>205</b>
<b>6.6 Findings for Iteration 2: How Iteration 2 was conducted and its findings.....</b>	<b>206</b>
6.6.1 Collaboration with practitioners to produce a plan for Iteration 2 .....	206
6.6.2 Conjectures tested in this iteration and the findings gathered .....	209

6.7 Conclusion.....	249
<b>Chapter 7: Discussion .....</b>	<b>255</b>
7.1 Introduction .....	255
7.2 Reviewing the development of the iterations.....	Error! Bookmark not defined.
7.3 Development of the design frameworks in this study. ....	265
7.4 Presentation of Design Framework 3 .....	293
7.5 Returning to the Research Questions .....	297
7.6 Emergent issues .....	330
7.7 Conclusion.....	334
<b>Chapter 8: Conclusion .....</b>	<b>336</b>
8.1 Link between conjectures and research questions .....	336
8.2 Research contribution .....	338
8.2.1 Contributions to Methodology .....	339
8.2.2 Contribution to Theory .....	340
8.2.3 Contribution to Practice .....	342
8.3 Limitations of this study.....	343
8.4 Suggestions for future research .....	345
<b>References .....</b>	<b>349</b>
<b>Appendix A .....</b>	<b>377</b>
<b>Appendix B .....</b>	<b>383</b>
<b>Appendix C .....</b>	<b>386</b>
<b>Appendix D .....</b>	<b>388</b>
<b>Appendix E.....</b>	<b>392</b>
<b>Appendix F .....</b>	<b>394</b>
<b>Appendix G .....</b>	<b>396</b>

<b>Appendix H .....</b>	<b>398</b>
<b>Appendix I .....</b>	<b>399</b>
<b>Appendix J .....</b>	<b>401</b>
<b>Appendix K .....</b>	<b>402</b>
<b>Appendix L .....</b>	<b>404</b>
<b>Appendix M .....</b>	<b>405</b>
<b>Appendix N .....</b>	<b>406</b>
<b>Appendix O .....</b>	<b>407</b>
<b>Appendix P .....</b>	<b>408</b>
<b>Appendix Q .....</b>	<b>409</b>
<b>Appendix R .....</b>	<b>410</b>
<b>Appendix S .....</b>	<b>411</b>
<b>Appendix T .....</b>	<b>421</b>
<b>Appendix U .....</b>	<b>422</b>

## List of tables

Table 1: New tools mapped onto pedagogic usage .....	38
Table 2: Participants of this study .....	96
Table 3: Interview questions in Iteration 1 that seek answers for the research questions of this study .....	102
Table 4: Interview questions in Iteration 2 that seek answers for the research questions of this study .....	104
Table 5: Demographic data of participants in Exploratory Study (n=8).....	128
Table 6: Demographic data of a participant in Exploratory Study (n=1).....	133
Table 7: Initial design of Iteration 1 and the conjectures tested .....	136
Table 8: Demographic data of participants in Exploratory Study (n=5).....	138
Table 9: Facebook Group members in Iteration 1 .....	149
Table 10: Summary of pedagogical affordances of smartphones and Facebook .....	155
Table 11: Types of smart mobile devices used by participants.....	160
Table 12: Refinement of design conjectures in Iteration 1 .....	199
Table 13: Demographic data of participants in Iteration 2 (n=8) .....	204
Table 14: Refinement of design conjectures in Iteration 2 .....	249
Table 15: Development of design frameworks in this study .....	267
Table 16: Design Framework 3 .....	293
Table 17: Design Framework 3 and the conceptual framework of this study ..	295

## List of figures

Figure 1: Conceptual Framework to study .....	68
Figure 2: Stages involved in this research .....	93
Figure 3: A screen shot of Sources in NVivo.....	117
Figure 4: Different folders in NVivo .....	117
Figure 5: Different nodes in RQ Affordances node .....	119
Figure 6: DM's post on Facebook Group.....	158
Figure 7: Facebook Groups created by all groups .....	163
Figure 8: Photos of DE that were taken from Facebook .....	177
Figure 9: Participants' thread of discussion on their Facebook Group.....	181
Figure 10: A 'CCTV' video by AZL uploaded to his Facebook Group .....	182
Figure 11: DM's video that was uploaded to Youtube .....	183
Figure 12: A posting by SHA on Facebook Group .....	222
Figure 13: Communication between SAI, SHA and the teacher on Whatsapp Group .....	234
Figure 14: Postings by the teacher on Facebook Group.....	235
Figure 15: ZAI's posting on Facebook Group.....	236
Figure 16: A reminder from the teacher via Whatsapp Group.....	238
Figure 17: Participants' active discussion on Facebook Messenger .....	240
Figure 18: A text notification on an iPhone smartphone screen.....	242
Figure 19: A long text message on Whatsapp Group .....	244
Figure 20: Small chat box of Facebook chat tool .....	247
Figure 21: Big chat box on Facebook Messenger .....	248
Figure 22: Development of iterations in this study .....	256
Figure 23: A formal element from the teacher's text message .....	264

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## **Chapter 1: Introduction**

### **1.1 General introduction**

Teaching is a challenging profession as it demands dynamic and creative ways to manage the learning process. To enhance that management of the learning process, technology has a great role to play in producing dynamic teachers of the present generation. It is expected that contemporary technology will be seen in and integrated into today's classroom. During my years in a teacher training programme (1997 to 2001), I was trained to use CALL (Computer Assisted Language Learning) and I was exposed to information searching using the Internet to assist my teaching. I was excited to use the Internet for my teaching as I saw how the technology revolutionized the computer and communications world like nothing before. It had the capability of world-wide broadcasting to disseminate information, besides being a medium for communication and collaboration between users in all parts of the world. Information searching started to be an important skill needed by everybody and the devices mostly used during that time to access the Internet were desktop computers and laptops. When I started teaching, I applied my CALL knowledge and the Internet, and I found the combination was effective in capturing my students' attention and enhancing their learning. In classrooms, teachers started asking students to do assignments that required them to gather and analyze data from the web. The incarnations of the Internet provided students with the opportunity to be independent in learning as they were exposed to searching for information online. As a person who loved to explore various ways to enhance my teaching, I continued exploring the possibilities of technologies around me for the benefit of my students.

After about 10 years of teaching, I witnessed a gradual increase in the use of wireless, mobile, and handheld devices among students and also across every sector of education. Traxler (2007 p.2) stated that “mobile, personal and wireless devices are now radically transforming societal notions of discourse and knowledge, and are responsible for new forms of art, employment, language commerce, deprivation and crime, as well as learning”. The most common device that has grown in visibility among students in higher education is the smartphone. Back in 2010, while I was still using my old mobile phone, I saw my students use their smartphones not just to make calls and to write texts, but also to check and send e-mails and to find and share information any time and anywhere. I was amazed to know that smartphones could serve the same function as a computer and I remember that I was lost when my students first explained about the various ‘apps’ to fulfill particular purposes that can be downloaded by smartphone users. There were times when I felt that the transformation period was too fast: that I suddenly had to make sense of common terms used among my students such as ‘Blackberry’, ‘Apple’, ‘OS’, ‘Android’, ‘Web 2.0’ and ‘social network’.

With the ubiquity and transformative effects of smartphones for users nowadays, it is foreseen that more users will opt for smartphones rather than just normal mobile phones as they become cheaper, more affordable and more convenient. According to the International Telecommunication Union (2015), worldwide statistics indicate that, in 2015, there were more than seven billion mobile cellular subscriptions worldwide, an increase from less than 1 billion in 2000. From my observation, from 2013 (the year when I started to do this research), smartphone users in the UK started to use the high speed of the fourth-generation cellular telephony (4G), which was an enhanced version of

the usual voice system and other services of 3G. In the near future, the 5G service will be much faster. This trend has been mirrored in most nations, including Malaysia, where subscriptions for mobile phones reached 145.0% for the year 2014 (Malaysian Communications and Multimedia Commission, 2014). The percentage greater than 100 was due to multiple subscriptions to a mobile-cellular network.

In terms of the percentage of Internet users by category in Malaysia, the statistics by the Malaysian government through Malaysia Communication and Multimedia indicate that 41.7% of the users are aged 20 to 29 and 23.1% are aged 30 to 39 (Malaysian Communications and Multimedia Commission, 2014). These figures were important to this study as they indicated that a high percentage of Internet users in Malaysia included university undergraduates and postgraduates. In order to enable more Malaysian youths to access the information highway, in the 2013 Malaysian budget, the Malaysian government decided to give a rebate of MYR200 for all types of smartphones for individuals aged 21 to 30 with a monthly income below MYR3000. The government introduced the package with the cooperation of the Malaysian Communications and Multimedia Commission (MCMC) and telecommunications companies. A sum of approximately 300 million Malaysian Ringgit was allocated for this purpose with a target of 1.5 million young people in the country.

In Malaysia, many individual educators and researchers are exploring research on mobile technology integration in classrooms. For example, Jacob and Issac (2008) found that smart mobile devices were used by the university students participating in their study as a means of making subject learning interesting, besides being an effective learning tool. In Open University Malaysia, Abas, Lim and Tai-Kwan (2009) reported the great potential of mobile learning to be

integrated with the existing blend of pedagogies in the university because it contributed to the flexibility of learning in open and distance learning institutions. In Universiti Kebangsaan Malaysia, Nordin et al.(2010 p.1) concluded that the participants of their study agreed that mobile phones had successfully enhanced the teaching and learning process and mobile learning activities were effective ways to motivate and foster interaction among students. While most mobile learning projects were still focussing on the idea of establishing foundations, theory, design, types of mobile learning and activities supported by mobile devices (Pollara & Kee Broussard, 2011), the research on mobile learning projects in Malaysia was also still in its infancy (Hussin et al., 2012). The authors found that “little was known about the pedagogical effects of integrating the m-learning in ESL courses especially in Malaysia” (Hussin et al., 2012 p.277).

As a teacher who teaches ESL learners, I started to be interested in studying the pedagogical affordances of mobile devices, particularly smartphones, because by using the device, users could be connected to Web 2.0, a platform that allowed for the creation of new content and thus opened previously unexplored communication channels and provided language learners with opportunities to easily interact with people from around the world. One of the widely used Web 2.0 tools investigated in this study is Facebook. This social media giant has attracted 28 million students between the ages of 18-25 and over 845 million users worldwide and, from the worldwide statistics, 425 million of them are mobile users (Alexander, 2012). This social networking site is used across the globe as it supports more than 50 foreign languages including Malay, Afrikaans, Korean, German, Dutch, Polish and Filipino, to enable its users to interact via social media (Facebook Newsroom, 2014). Ranked 21<sup>st</sup> in the world

and 8<sup>th</sup> in Asia in terms of Facebook usage, Malaysia has 13.3 million Facebook users, which is 45.5 per cent of the country's total population (Hogan Jr, 2013).

Among university students worldwide, Facebook is regarded as the leading social network platform (Christy et al., 2011). To understand the relevance of Facebook and smartphones in students' lives, I conducted a discussion with my class students asking them about the significance of Facebook and smartphones in their life because I had the impression that they were only used for social life and entertainment purposes. However, the students convinced me that the combination was also useful for education. It was free of charge and, for them, it was user-friendly software. For learning activities that required them to search for information or to share and discuss to reach consensus among group members while they were apart, all opted to use Facebook and smartphones. After the discussion with the students, I reflected that, as a teacher, I should keep up with the technologies, as the students asserted that they helped to enhance their learning. My interest in research on mobile learning grew stronger and I started to make sense of the rising tide of possibilities created by the social networking site and smartphones for education.

I continued exploring Facebook by opening my own account, besides reading past research on Facebook in the literature. Generally, the literature suggested a positive and beneficial impact of using Facebook, especially for the context of learning in higher education (Mazer, Murphy, & Simonds, 2007; Steinfield, Ellison, & Lampe, 2008; Gamble, 2014). Although new technologies may not always be an appropriate or successful vehicle for formal teaching and learning activities (Lohnes & Kinzer, 2007; Waycott, et al., 2010), the application of Facebook to L2 education has been shown to improve students' overall interest

in language learning (Mills, 2009; Shih, 2011; Buzzetto-More, 2012) and engagement (Blattner & Fiori, 2009; Kabilan, Ahmad, & Zainol Abidin, 2010; Shih, 2011; Yunus & Salehi, 2012; Harwood & Blackstone, 2012). In Malaysia, Danyaro et al. (2010) and Abdul Jalil et al. (2010) conducted a study with undergraduates in higher learning institutions in the country. Nearly half of the participants in the study by Abdul Jalil et al. (2010) used the social network daily due to the special features and various social applications (Danyaro et al., 2010) including the discussion board, email, chatting, links, tagging, and the ability to upload and share videos and pictures.

For the context of my students, who were ESL learners, I was especially interested in the findings of a study conducted by Ellison, Steinfield, & Lampe (2007), because the writers found that Facebook helps to reduce barriers that lower self-esteem students might experience in forming the kind of large, heterogeneous networks that were sources of bridging social capital. While their research focused on the psychological effects of the use of the website, I wondered if this social networking site would help to motivate ESL learners to learn English. Based on my years of teaching, I observed that most of my ESL learners had low self-esteem about their use of English language in public because they were conscious of making mistakes. While this issue may be common to all language learners, a primary need of a language learner is to be able to have opportunities to practice the language when they are outside their classrooms. In the context of second language acquisition, the sociocultural approach to language learning views students as active learners who become involved in their own learning process by engaging with others through authentic interaction (Lantolf & Thorne, 2006). If Facebook could provide an authentic platform for learners to practice using language, the present study

would explore how teachers should design a lesson that integrates the social networking site to enhance students' language learning.

Besides Facebook, this study also researched its combination with smartphones due to the multimedia affordances of the device. As a teacher, I believe in the seven distinct intelligences identified by Gardner (1991), who suggested that learning disciplines should be presented in a numbers of ways due to the different learning styles of learners. I was interested in researching the combination of Facebook and smartphones because I believed that the use of a mix of media or multimedia may appeal to most learners including ESL learners. This mix of media (audio, visual, video) can be retrieved via various applications in smartphones. Compared to Personal Digital Assistants (PDAs), tablets and laptops, smartphones are the only mass media device that can perform all the functions of phone calling, imaging (camera), movies (video camera), Wi-fi (laptops), music (video player), gaming (game consoles), and Internet (computers) (Vatanparast, 2009). It would be valid to ask about the implications of this smart mobile technology in the modern teaching and learning environment since I saw that the device was widely used, especially among university students. Teaching in the world of evolving technologies, I took this challenge to investigate the pedagogical affordances of smartphones because, as a teacher, I believed that I should continue exploring possibilities of new technologies to enhance my teaching. If the combination of Facebook and smartphone technology can encourage learners to take their own initiatives to improve their proficiency, find and share information and learn collaboratively with other learners, I wondered how teachers could use these platforms to provide a space for practice and communication, free of the traditional pedagogic concerns of a typical classroom. As can be seen from the above, my

main personal reason for conducting this research was a desire to bring about positive pedagogical change to the area of professional development in the use and integration of Facebook and smartphones into teaching due to the potential advantages that the technologies offer.

Besides my own personal motivation, the momentum of this research was also drawn from the critiques of educational research in mobile learning areas, which lacked explicit underpinning pedagogical theory and limited longitudinal studies within the published research (Kukulka-Hulme & Traxler, 2005). Traxler (2007 p.1) reported that mobile learning area research still lacked “theoretical conceptualisation of mobile learning and with it any evaluation methodologies specifically aligned to the unique attributes of mobile learning”. Cobcroft et. al. (2006 p.25) also highlighted that “there was a need for conceptual frameworks to guide the design of learning-centred educational environments that best exploited mobile and wireless devices”. Sharples et al. (2009) added that there was also a lack of transferable design frameworks for mobile learning research. A review study by Viberg (2012) found that the most commonly used method found in mobile learning research was experimental, so the research area needed more solid empirical evidence in order to underpin theoretical conclusions about how mobile technologies can assist language learning. In response to these critiques, this research was based on the theory of language learning and theory of mobile learning by Sharples, Taylor and Vavoula (2007) and involved a series of iterations. This PhD research was not really a longitudinal study because it was not conducted over a long period of time, but it did enable me to follow students over a period of time that suited the duration given to complete my PhD research. Conducted in various learning contexts, it aimed to create a model for implementing mobile learning for ESL students.

## **1.2 Why Malaysian ESL learners in the UK**

This research explored how Malaysian students who were ESL learners enhanced their English language learning by utilizing the affordances of smartphones and Facebook while they were studying in the UK. It did not intend to compare the network infrastructure between the two countries (United Kingdom and Malaysia) because this study was not about 'what is now' in Malaysia and in the UK. It was conducted with Malaysian ESL students in the UK because it was expected that Malaysia, an emerging economic country, was on its way to improving its network infrastructure for smart mobile device users to access the mobile web conveniently; therefore this study is about 'what will be' in the country probably in a couple of years. Thus, this study is relevant to Malaysian students as it studied future practice for Malaysian students in the country.

In order to conduct research on smartphones and Facebook to support learning, the most important element needed is good Internet connectivity via the device and surroundings that allow the use of the device to access the Internet conveniently. To reduce network infrastructure issues, it was required that, for the period of the research, participants should use appropriate smartphones that have Internet Data. Initially, I planned to conduct this study in Malaysia but there were a number of problems that I foresaw if I conducted this study there. Most of my potential research participants (Malaysian ESL learners studying at Universiti Teknologi Malaysia) who agreed to participate in my research owned appropriate smartphones but they could not enjoy unlimited access to the Internet due to the high cost of the Internet Data plan (3G). With this constraint, they only subscribed to a limited Internet Data plan that they used for their own daily or monthly basis use. In terms of the Internet connectivity in Malaysia, the

connection was still unreliable and unstable in some places. Free Wi-Fi service was provided in most university compounds but they could not rely on the service because there were only a few places which were hotspot connected. The students also could not afford to subscribe to the wireless Internet connectivity when they were in their student residences. To access the Internet, especially for purposes which required more Internet data, most of them opted to use the landline Internet connection using desktop computers provided by the university rather than using mobile Internet from their own mobile devices. Their smartphones were usually used for purposes that did not use a lot of Internet data such as communication via a mobile communication app, called 'Whatsapp'.

Having the opportunity to study at the University of Exeter, I minimized problems of network infrastructure while focusing on exploring the mobile learning potentials because the UK had a good network infrastructure in most places. All University of Exeter students, which included the participants of this study, enjoy free, high speed unlimited Wi-fi access whenever they are on the university campus. When they are at their homes, they also subscribe to the broadband Internet services to continue their study. In terms of the mobile devices used, when the data collection of this study began in 2013, all participants used advanced smartphones which had high resolution for video camera and were capable of recording and uploading video to Youtube, email, and browsing the Internet. Their phones had high capacity memory storage, high-resolution touch screen interfaces and a wide variety of pre-installed downloadable applications that integrated with Web 2.0 social software such as Facebook. Chatting via Whatsapp, video calls using Skype, instant data searching and sharing were not a problem, as they enjoyed the wireless

connectivity speed offered for the first generation 3G devices and also 4G, with improved Internet coverage.

The advanced features of smartphones being used in the UK environment with its good network infrastructure provided a rich set of affordances that could be investigated for their pedagogical potentials. I therefore took the opportunity to investigate how ESL Malaysian students utilized this conducive environment to enhance their learning. My exploration began when I conducted an informal interview with Malaysian ESL learners studying in the University of Exeter, UK, asking them about the possibilities of using Facebook as a tool for learning and about their common practices in using mobile devices for learning. Some of these students also took part in my research when it began in 2013. These students were considered to be motivated and excellent learners as they were selected by the Malaysian government to be awarded scholarships to study in the UK based on their previous academic achievement. With the good network infrastructure in the UK and the free Wi-Fi service provided by the university, these students were able to learn at any time and in any place using their smart mobile devices. These students stated that learning using Web 2.0 tools and mobile apps had been part of their life. They created Facebook Groups for the course they were studying to share information and to post quick updates. With high speed Internet connectivity, they learnt from Youtube videos, chatted using Whatsapp, Facebook Messenger and iMessage and also had video calls using Skype and Ovu to have academic discussions with their friends all around the world. They also downloaded useful applications (mobile apps) that were related to their course on their smartphones so that they could learn during their free time. Findings from these students reflected the findings from the Horizon 2012 Higher Education Review, which reported the trend that students expected

to be able to study whenever and wherever they wanted (Johnson, Adams, & Cummins, 2012). Conducive learning environments that had good network infrastructure resulted in students always wanting faster and more timely access to information and collaboration in their social network. From my observations, it appeared that these demands could be achieved by having good smartphones and a Facebook account.

### **1.3 Statement of the problem**

Kukulska-Hulme (2009 p.158) emphasized that “to a certain extent, by dint of their ubiquity, mobile devices are already influencing how people learn; so teachers need to do more than just watch it happen”. The more sophisticated use and the advanced technology of smart mobile devices have influenced cultural practices besides enabling new contexts for learning and this poses a challenge to educators and designers to understand and explore how best we should use these resources to support learning. Nevertheless, there has also been a certain level of reluctance or apprehension about the use of the technology in general, especially by educators (Garrison & Kanuka, 2004; Lomicka & Williams, 2011). Educators have been reluctant to integrate the newer generation of social networking sites, mostly because they are unfamiliar with many of them and are afraid to cross inappropriate social boundaries, which could merge parts of their professional and social worlds (Schwartz, 2009). Advancement of technologies at times can also be too rapid and too vast, especially for teachers, where they are unclear on how to fully utilize new technologies in teaching because they need to teach in ways that they have never been taught (Conole et al., 2004). Consequently, their application of the technology has often been based on common sense rather than being theoretically informed by pedagogical theory. For McNaught (2003), some

reasons why academics outside the field of education have not applied the models and theories of e-learning practitioners are because there are too many of them and these academics are not familiar with them.

I agree with the literature above and to ground my feeling on an empirical basis for this research, my research included a finding from a short investigation of 10 English language teachers from Malaysia in the Exploratory Study stage. The teachers were asked for their views on their capabilities and possibilities of using smartphones and Facebook to enhance students' learning. Their responses are explained in detail in the Exploratory Study in Chapter 5 but, generally, they indicated that, although Facebook and smartphones were an integral part of the Net Generation students' life (Tapscott, 1998) and can be a viable resource in the context of education, learners did not necessarily know how to take advantage of Web 2.0 tools in ways that would benefit them in computer-assisted language learning (CALL). Therefore, teachers need to have the knowledge to guide learners in selecting appropriate strategies to adopt in order to efficiently take advantage of this dynamic environment. However, they admitted that not all teachers had the knowledge and the confidence to utilize new technologies in their teaching for various reasons. Answers from the teachers and also my personal experience teaching with teachers in a few schools and a university in Malaysia confirmed my point of view that one of the challenges of adapting mobile learning is teachers' lack of confidence in and knowledge of how to explore the technologies. Hence, a design framework that involved principles and guidelines for expanding teaching using Facebook and smartphones to ESL learners was sought through the present study.

#### **1.4 Research aims**

With the firm belief that teachers need to broaden their understanding of the design of emerging technologies, this research aims to investigate the pedagogical affordances of smartphones and Facebook and produce pedagogical guidelines for teachers to use the combination of these technologies to enhance the teaching and learning of English for ESL learners. Using Design Based Research as a methodology, teaching and learning problems in context were understood, before interventions and ongoing evaluations took place. This research contributes to the literature as there was a need for pedagogical guidelines to guide the design of learning-centred educational environments that best exploit mobile and wireless devices (Cobcroft et al. 2006). Reeves, Herrington and Oliver (2005) argued for more adoption of the design-based research approach to enhance the quality of research on computer and other technologies in education. Ravenscroft et al. (2012 p.178) also emphasized the need to move to new methodologies that include “empirical examinations of social media for learning, and accommodate new or revised methodologies for the development, deployment, and evaluation of social media for learning”. In response to these demands, this qualitative study aims to bring about positive change for the professional development of teachers teaching ESL learners by suggesting the pedagogical affordances of smartphones and Web 2.0 tools, particularly Facebook, to support collaborative learning and motivate learners.

#### **1.5 Research objectives**

Towards achieving the main aim, this study hopes to do the following:

- i. Identify the pedagogical affordances of smartphones and Facebook for the teaching and learning of English for ESL students.
- ii. Generate a framework for ESL curriculum design that integrates smartphones and Facebook tools that can promote collaborative learning based on both the literature and empirical data.
- iii. Investigate ways in which different means of communication and different technologies can help to create continuity of learning.
- iv. Explore possible guidelines for teachers when adopting smartphones and Facebook for teaching.

### **1.6 Research questions**

Laurillard (2007) emphasized that research questions in mobile learning research should centre around the learning process and exploit the richness of the remote environments. The questions should also focus on the roles of teachers in constructing different kinds of remote environments that support mobile learning. These factors were taken into account in developing this study's research questions:

1. What are the pedagogical affordances of integrating the tools of Facebook and smartphones into the teaching and learning of English for ESL students?
  - a. What factors influence the pedagogical affordances of the combination of smartphones and Facebook to enhance the learning of English for ESL learners?

- b. To what extent can learning through smartphones and Facebook tools support collaborative learning, and how?
  - c. To what extent can learning through smartphones engage and motivate learners, and how?
2. How do different means of communication and different technologies help to create continuity of learning?
  3. What are the roles of teachers when adapting the technology of smartphones and Facebook for their teaching?

### **1.7 Significance of this study**

This study is significant in the education field because it was designed to achieve one of the goals in the field, which is to identify efficient educational tools that could be best utilized to enhance learning. An essential part of this research was the transformation of educational practices in authentic situations, where the study investigated the possibility of refining and improving the use of smartphones and Facebook for English language learning. Using technologies that were the closest to learners nowadays, this study contributed to the mobile learning field by suggesting a refined and improved design framework, which was based on two iterations of exploration of how smartphones and Facebook can be optimized to enhance students' learning. The design framework was particularly significant for teachers to enhance their teaching.

One challenge of using Facebook and mobile technologies in the classroom is to use them in ways that enhance learning, not simply because they are available. Although Facebook's popularity continues to surge, this study is significant as it studied what corollary aspects of learning Facebook can bring to

the classroom and how it can support learning outside of it. The study moved beyond the argument that one ought to adopt the combination simply because of its pervasiveness. Using a student-centred approach in the teaching that integrated mobile technologies, this study contributes to the mobile learning research as it helps to establish pedagogical affordances of smartphones and Facebook within appropriate theoretical underpinnings. This is in relation to the argument of Herrington and Herrington (2007 p.4), who noted that “despite the significant potential of mobile technologies to be used as powerful learning tools in higher education, their current use appears to be predominantly within a didactic, teacher-centred paradigm, rather than a more constructivist environment”.

## **1.8 Organisation of the thesis**

### Chapter 1: Introduction

The introduction chapter explains the motivation that drives this research from the aspect of my own personal reflection as a teacher and from the needs arising in the literature. The chapter finishes by outlining the research questions and the significance of this research.

### Chapter 2: Literature review

This chapter discusses the theoretical input that was used as the basis of the framework for the iterations of this study and reviews previous research on mobile learning. It also summarizes my position concerning the substantive and theoretical issues and problems in the light of the review. This chapter further indicates how the initial design framework of this study was derived, based on the findings from the literature.

### Chapter 3: Methodology

This chapter introduces Design Based research (DBR), the methodology that informs this study. A comprehensive review of this methodology is carried out by presenting important aspects of the methodology and the chapter concludes with a rationale as to why this methodology is chosen over other methodologies.

### Chapter 4: Exploratory study

This chapter narrates the process involved when conducting the Exploratory Study with teachers and ESL learners followed by a presentation of the findings. Based on the input from the participants and also from the literature, this chapter ends with a formulation of Design Framework 1 (DF1) to be tested in Iteration 1.

### Chapter 5: Iteration 1

A rich description of how Iteration 1 was conducted and its findings are provided in this chapter. Based on the findings and important issues which emerged in iteration 1, the design framework of this iteration was refined to be further investigated in the next iteration. This chapter ends with the formulation of Design Framework 2 (DF2).

### Chapter 6: Iteration 2

A rich description of how Iteration 2 was conducted and its findings are provided in this chapter. Based on the findings and evaluation from this iteration and also the previous iteration, this chapter ends with the formulation of Design Framework 3 (DF3).

### Chapter 7: Discussion

This chapter ties together the findings from both iterations conducted in this study, and discusses their significance in relation to the literature. It also revisits the research questions of this study.

#### Chapter 8: Conclusion

This chapter discusses the contribution of this study to methodology, theory and practice. It highlights the main findings of this study, acknowledges the limitations and suggests further research to be conducted.

## **Chapter 2: Literature review**

### **2.1 Introduction**

Research into the affordances of mobile learning in combination with Web 2.0 tools, particularly Facebook, is important because they have significant potential to be used as a tool to enhance students' learning (Lim & Ismail, 2010). As smartphones and Facebook's popularity continues to surge, it is important to research what corollary aspects of learning the technologies can bring into (and outside of) classrooms, as doing so will move beyond the argument that one ought to adopt the medium simply because of its pervasiveness.

This chapter begins with an explanation of the key concepts used in this research, as this understanding is essential to provide the backdrop of this study. Then, this chapter proceeds with a discussion of how the application of mobile technologies has been researched in the past before it focuses on the development of mobile learning research in Malaysia. This is followed by a discussion of past research on Facebook. Then, this chapter discusses studies carried out in Malaysia. Discussion of learning theories in education and how they are related to computer aided technology are presented before current theories of mobile learning and pedagogical design guidelines to implement mobile learning are discussed. Finally, this chapter concludes with the formation of a conceptual framework for this study. This conceptual framework is further explored in the exploratory phase, which is presented in the next chapter.

## **2.2 Definition of main research terms used**

### **2.2.1 Affordances**

Wright and Parchoma (2011 p.248), in their literature review of mobile learning initiatives, found that there was a widespread adaption of the concept of 'affordances for learning' in relation to mobile devices. Due to the variation and imprecision of meaning, they questioned the validity of this concept and its function in positioning mobile devices as 'technologies for learning'. The writers described how the affordance concept was developed by Gibson, in his work on perception. Gibson believed that affordances were latent in the environment, objectively measurable and independent of the individual's ability to recognize them, but were always in relation to the actor. The term affordance was made more complex by Norman (1988) as cited in Wright and Parchoma (2011), who moved from Gibson's supposedly objective 'real affordance' to considering 'perceived affordances'. Norman's definition incorporated subjective interpretation and mental activity but was rejected by Gibson. Their disagreement lead Oliver (2005 p.406) to conclude that "'affordance' becomes redundant as an analytic concept" .

Nevertheless, Norman's definition of affordances spread quickly and the ambiguity led to widely varying uses of the concept (McGrenere & Ho, 2000). In mobile learning research, "despite its positivistic origin, unclear usage and logical inconsistencies, affordance is both a prevalent and persistent term in the literature" (Wright & Parchoma, 2011 p. 249). Wright and Parchoma (2011) explained that the term appeared in Yang et al. (2007); Herrington and Herrington (2007); Koole (2009); Sharples et. al. (2009), Cochrane, Thomas and Bateman (2010); Cochrane, (2010); Orr (2010); and Traxler (2010) among

others. For example, in the research by Cochrane (2010), the term was used synonymously with the technical affordances of mobile devices such as GPS tagging, and built-in cameras. Orr (2010 p.108) referred to the physical size of the device as he found that “the primary affordance of mobile learning was that since mobile devices were small and can be carried anywhere, learning was available to the user in a ubiquitous fashion”. For Cochrane, Thomas and Bateman (2010 p.4), the term referred to the features of mobile Web 2.0 technologies which were “connectivity, mobility, geolocation, social networking, personal podcasting and vodcasting, etc”. McGrenere and Ho (2000) argued that the utility of an object and the actions it affords for users with its usability may signal its affordances.

Kirschner (2002 p.19) defined educational affordances as “those characteristics of an artifact (e.g. how a chosen educational paradigm is implemented) that determine if and how a particular learning behavior could possibly be enacted within a given context (e.g. project team, distributed learning community)”. When researching the pedagogical affordances of a certain technology design and use “what educational researchers and designers are actually dealing with are not the affordances themselves, but rather the combination of the perceptible or perceived affordances the constraints that are placed upon them, and the conventions regarding the affordance and its use” (Norman, 1990, 1999 as cited in Kirschner, 2002 p.13). This author pays attention to the context of when and how a certain artifact is to be used as its affordance relies on it.

The affordances investigated in this study refer to the pedagogical affordances of Facebook and smartphones to enhance teaching and learning. It refers to the characteristics or features of the combination of technologies and how lessons that incorporate them should be designed to benefit their users. Considering the

definitions of educational affordances by Kirschner (2002), rather than just focusing on what technology is to be used, this study studied the affordances of the technologies by getting the perspectives of teachers and students who used them for teaching and learning and their opinions regarding how and when the combination of the technologies benefitted them most.

### **2.2.2 Mobile learning (M-learning)**

With respect to technologies, 'mobile' means portable and personal like a mobile phone or a tablet. Early approaches to define mobile learning focused on technology such as "any educational provision where the sole or dominant technologies are handheld or palmtop devices" (Traxler, 2005). For Crompton (2013 p.4), mobile learning was defined as "learning across multiple contexts, through social and content interactions, using personal electronic devices". For learning to occur, mobility is no longer seen as a barrier today, as there are a number of devices that could facilitate learners to get information at any time and in any place. Before the era of smart mobile devices, laptops had always been associated with mobile learning as they offered functions similar to desktop-personal computers, but they were too heavy to be carried around for students' learning. Today, the concept of learning at any time and in any place has materialized with the generation of ubiquitous computing devices, like smartphones and tablets. These mobile technologies offer unique affordances of creating more learning opportunities that suit the needs and lifestyle of learners especially for those who appreciate learning while on the move. Using suitable mobile devices, mobile learning is similar to ubiquitous learning as it matches the characteristics of ubiquitous learning such as permanency, accessibility, immediacy, interactivity and the situating of instructional activities (Ogata & Yano, 2005).

Sharples et al. (2007 p.225) defined mobile learning as a “process of coming to know through conversations across multiple contexts amongst people and personal interactive technologies”. This definition was independent to specific mobile technologies; thus, it became generalized in that it did not focus on the uniqueness of the mobility feature of a device but focused on the processes involved in mobile learning. The authors believed that mobile learning constituted a combination of experiences: not only technology but also people can be mobile. In their opinion, elements of mobile learning constituted mobility in physical and social space, mobility of technology, mobility in conceptual space, and learning dispersed in time. Mobility of physical space was seen when people were continually on the move and crammed learning to fill the gaps of their daily life. Mobility of technology referred to the convenience of carrying portable smart mobile devices, which were packed into a single lightweight device. Due to the lightweight nature of mobile devices, it was also possible to see learners alternating in use between devices, for example from laptop to smartphone and then to tablet, when learning. Mobility in social space was seen when learning was performed within various social groups. Mobility in conceptual space referred to the various learning themes that were chosen by learners, driven by their personal interest and curiosity. The last aspect, learning dispersed in time, focused on learning as a cumulative process, involving connections and reinforcement among a variety of learning experiences across formal and informal contexts.

Traxler (2007) and Frohberg, Göth, & Schwabe (2009) warned that if research on mobile learning was defined based on application, then it was technology-dependent and could fall into the trap of becoming obsolete. So, Traxler (2007) argued that there was a need to move away from a techno-centric definition as

it constrained the field of mobile learning. Kukulska-Hulme and Traxler (2007) emphasized a conceptualization of mobile learning in terms of learners' experiences, with an emphasis on device ownership, informality, movement and context that will always be inaccessible to conventional e-learning. They identified key attributes of mobile learning which had potentials for learning, seeing it as personalized, situated, authentic, spontaneous and informal. Definitions of mobile learning by Sharples et al. (2007) and Kukulska-Hulme and Traxler (2007) were relevant for this research because the learners were placed at the centre of learning, and they self determined their own learning using their own smart mobile devices.

### **2.2.3 Mobile assisted language learning (MALL)**

A subset of m-learning, mobile assisted language learning (MALL), is an approach to learning language which is enhanced via the use of portable devices such as mobile phones, MP3 and MP4 players, Personal Digital Assistants (PDAs), smartphones, tablets and electronic dictionaries. In the new millennium, creating the same phenomenon that computer-assisted language learning (CALL) experienced in the 1990s, MALL has evolved to support students' language learning, as learners are able to access language learning materials and to communicate with their teachers and friends at any time and in any place. MALL is also a solution for busy students and professionals seeking to learn new languages, due to the learning flexibility that it offers. With the increase of possible delivery tools, a wide-range of mobile language learning programs has emerged in the market, from a very short tutorial to a full course. Mobile language learning programs can be retrieved by downloading their applications to smart mobile devices. Students may opt for MALL as one of their primary sources of language learning as it may support the retention and

utilization of newly-acquired language skills required by them (Kukulska-Hulme & Pettit, 2009). In relation to the affordances of smart mobile technologies, they have a special connection with the growing importance of lifelong and informal learning (Sharples, 1999).

#### **2.2.4 Smartphones**

A smartphone is a device that can make telephone calls and performs many computer functions such as the ability to send and receive emails and also search for information from the web. It also includes features of personal digital assistants (PDAs), media players and GPS navigation units. In the past, mobile phones were mainly used for making calls and message texting while PDAs were used as personal, portable organizers, which could be synchronized to computers. With the wireless connectivity feature, users of PDAs were able to send and receive emails. These computer-like features are now added into cell phones and the result is the smartphone. Users of smartphones can also browse the Internet via different networks. While this study was being conducted, the use of 4G networks in the UK was on the rise: the Internet access was at a higher speed than that of the 3G network. Another distinctive feature of a smartphone is a QWERTY keyboard. Working very similarly to computers, the keyboards in smartphones have keys that are laid out in the same manner as a computer keyboard. Depending on the type of smartphone, the keyboard may be hardware (physical keys that users type on) or software (on a touch screen, like on the iPhone).

In general, different types of smartphones work with different operating systems (OS). An operating system allows the applications in the smartphones to run. For example, Apple's iPhone runs the iOS, the Blackberry smartphones run the

BlackBerry OS and other types of smartphones like Samsung, Lenovo, Oppo and Asus run Google's Android. A computer program designed to run on smartphones and also other mobile devices such as tablet computers is called an Application (App). Apps are specific pieces of software that can be downloaded to enhance smart mobile device functionality, such as calendar, organizer, games, and reading tools. They are usually available through application distribution platforms, and are typically operated by the owner of the mobile operating system. Some Apps are free and some must be bought. An example of a text messaging App that is widely used between and among users of smartphones across all platforms of operating system is Whatsapp. For this research, all the respondents used this application as their means of communication. Using this application, users of smartphones can send text messages between individuals and also within a group. Chatting through this application allows the sharing of images, audio and videos among the users.

### **2.2.5 Web 2.0 tools**

The advent of Web 2.0 tools, a term which is closely associated with Tim O'Reilly, led to the second generation of web development and design. It aims at facilitating communication and securing information sharing, interoperability, user-centred design and collaboration on the World Wide Web (Reilly, 2006). Clearly, the web is a controversial concept because a web is always participatory but there is a distinct difference in the way Web 2.0 is being used with its advanced tools. In contrast to the technology of Web 1.0, which was centered around a top-down approach, in that website users were limited to the passive viewing of content, Web 2.0 has more to offer because it allows its users to self-initiate and control the use of the tools to publish content on the web and share it with friends, family, students, and the world. With its low or no

cost access, which promotes socializing and frequent use, users of Web 2.0 have the opportunity to interact or collaborate with others without the limit of time and place, provided that they have the Internet connection.

Generations of Web 2.0 users can communicate and collaborate in social media dialogue in a virtual community such as in social networking sites like Facebook, blogs, Twitter, wikis and the video-sharing site, YouTube. There has also been significant interest from researchers who have investigated how these rich sets of new communication, sharing and networking tools could be used in educational contexts (Abdallah, 2011; Cochrane, 2010). De Freitas and Conole (2010) argued that the characteristics of Web 2.0 tools such as active participation, peer critique and collective intelligence through social aggregation of resources, aligned well with what was perceived as wisdom on 'good pedagogy' (inquiry-based learning, dialogic and collaborative learning, constructivism and active engagement). The same authors mapped some key characteristics and trends associated with technologies and illustrated how they can be mapped pedagogically in Table 1 below.

**Table 1: New tools mapped onto pedagogic usage**

<b>Trends in the uses of applications and tools</b>	<b>Pedagogical drive</b>
<b>New Web 2.0 practices</b>	From individual to social
<b>Location-aware technologies</b>	Contextualized and situated
<b>Adaptation and customization</b>	Personalized learning
<b>Virtual and immersive 3D worlds</b>	Experiential learning
<b>Google it!</b>	Enquiry learning
<b>User-generated content</b>	Open educational resources
<b>Badges, World of Warcraft</b>	Peer learning
<b>Blogging, peer critique</b>	Reflection
<b>Cloud computing</b>	Distributed cognition

(De Freitas & Conole, 2010 p.5)

### **2.2.6 Facebook**

Facebook (<http://www.facebook.com>), created by Zuckerberg in 2006, is a fun, user-friendly, free-to-access form of social networking that appeals to many worldwide users and especially to teenagers, adolescents and university students (Alexander, 2012). It is a social networking system (SNS), one of the tools of Web 2.0, a social medium that allows the sharing of URLs that point users to Internet posts (video, blogs, image sites) and relies on aggregators to retrieve and integrate information from different sources. Via this social software, users can search for and keep in touch with their friends, communicate about their lives, post their opinions and share ideas or information in open surroundings.

In order to have a collection of 'Friends' on Facebook, first, an individual needs to sign up for a Facebook account (which is free of charge). Then, he or she must search for their friends by typing their names or emails and send a 'Friend' request to them. Then, a notification will be sent to the person and the person can choose whether to accept or reject the request. If the Facebook app is downloaded into a smartphone and Facebook notification is turned on, users will be notified each time a posting in Facebook is made. One of the tools of Facebook that is widely used by Facebook users is the Facebook Group. Members of the groups can upload relevant information to the group's wall page to be shared with others. Besides making postings to the group page, they communicate with each other by commenting on the announcements and postings made by the group members. Besides communicating with others on their wall page, users of Facebook can also send personal text messages via 'Facebook Messenger' and also make video calls.

### **2.3 Previous research on mobile learning**

In the early years of mobile learning, Collins (2005 p.2) found the technology that supported language learning via handheld devices was mostly “static and non-interactive where viewers could only listen and view content, but not do much more”. Findings of studies during that time did not support learning at any time and in any place because the devices, practices and locales were controlled. Problems such as the screen size, computational power, battery capacity, input interfaces and network bandwidth (Chen, Chang, and Wang, 2008) restricted the capacity of mobile devices, preventing them from being used for an entire learning process. Learning language via mobile phones also posed challenges e.g. limited audiovisual quality, virtual keyboarding, one-finger data entry and limited power (Chinnery, 2006). Chinnery (2006) also pointed out the potentially limited social interaction, limited message length and lack of cultural context. Yamaguchi (2005) proposed that a computer is better than a mobile phone for handling various types of information such as visual, audio, and textual information, although a mobile phone is superior compared to a computer in terms of its portability.

In terms of language learning, stipulations were also articulated about the pedagogical effectiveness of using mobile devices to learn as compared to traditional second language instruction. Ng’ambi, Bozalek and Gachago (2013) revealed that the most common factor that hindered the use of emerging technologies to improve teaching was the lack of pedagogical knowledge. Without being familiarized with models of authentic pedagogical uses of emerging technologies, pedagogical knowledge remained a barrier to effective use of these technologies. There was also concern that the introduction of mobile learning devices into teaching and learning activities in classrooms may

also change the social relations between class members, the nature of teaching materials and assignments, and also the types of classroom interaction (Liu et al., 2002). Herrington and Herrington (2007 p.4) added that “despite the significant potential of mobile technologies to be used as powerful learning tools in higher education, their current use appears to be predominantly within a didactic, teacher-centred paradigm, rather than a more constructivist environment”.

Despite the arguments that question the ability of mobile phones to assist learning, mobile technologies are rapidly attracting new users due to their increased capacity besides allowing more sophisticated use. The International Telecommunication Union (2014) reported that smartphones were the fastest growing handheld device. Due to the factors that influenced its breakthrough such as flexibility, low cost, small size and user-friendliness (Huang et al., 2012), this must-have item nowadays attracts users, especially higher education students. As most students today carry personal smartphones that enhance their communication and information searching and sharing, distinct characteristics of mobile learning are that learning can be done across various contexts and learners are given the power to personalize their learning. Not all students have their own computers, but most can usually afford to own mobile phones (Godwin-Jones, 2011; Thornton & Houser, 2005). With the rapid advancement of technology, there has also been an increase in the quantity of research into applying mobile technologies to learning. With their increased use as tools in research (Murphy, 2010), researchers are interested in exploring how the affordances of smart mobile technology can enhance language learning.

Klopfer, Squire and Jenkins (2002) described five properties of handheld devices that produced unique educational affordances:

- a) Portability – the small size and light weight of mobile devices allow them to be taken to different sites and move around within a location. So the boundaries of the classroom are extended to the limits of wireless network.
- b) Social interactivity – users of the device can exchange data and collaborate with other people face to face via the wireless technologies.
- c) Context sensitivity – mobile device users can gather and respond to data unique to the current location, environment, and time, including both real and simulated data.
- d) Connectivity – mobile device users can connect handhelds to data collection devices, other handhelds, and to a common network that creates a true shared environment.
- e) Individuality – the device provides unique scaffolding that is customized to the individual's path of investigation.

(Klopfer, Squire, & Jenkins, 2002 p.1)

In relation to the properties of handheld devices as presented by Klopfer, Squire and Jenkins (2002), it seems that they can motivate learners to learn individually and also collaboratively. Learners are motivated to learn individually due to the motivating aspects of mobile learning which are freedom, ownership, communication, fun, context, and continuity between contexts (Jones, et al., 2006). Especially in informal settings, Jones et al. (2006) believe that learning using mobile devices is motivating because learners have more freedom to define tasks and relate activities to their own goals, resulting in a strong sense of control and ownership of learning. It can motivate learning because smart mobile devices are used by many people, particularly the young, for entertainment, so “the excitement engendered by this context may carry over to the device, thus mobiles become identified as “fun” devices” (Jones et al., 2006 p.252).

Furthermore, the use of mobile devices is motivating due to their ability to locate resources and information at the point where they are needed. Jones et al. (2006) highlighted the ability to provide continuity of information transfer between different settings or contexts. As informal learning is usually carried out in small and distributed chunks, smart mobile device users can plan their informal learning to be conducted over time to suit the episodic nature of informal learning (Jones et al., 2006).

Mobile learning also motivates learners to learn collaboratively when learners utilize the main function of smart mobile devices: that is, for communication. In a study by Shih (2011), the participants felt that it was convenient for them to use SMS to enhance their learning. The author found that, when participants used their personal mobile devices, there were more interactions between students and instructors and more collaboration between students. In a study by O'Malley et al. (2005 p.17), the authors compared students who learnt with and without mobile devices and found "indications that mobile learning is more interactive, involves more 'bustle', more contact, communication and collaboration with people". As they were able to communicate with each other, students could do collaborative activities, and, given the right conditions, this aspect of working with others was in itself motivating (Crook, 2000). For Crook (2000), collaboration is a motivating activity because it has a distinct and important emotional dimension. Through collaboration, learners have a sense of shared histories particularly unique to their groups.

Cochrane (2010) outlined the potential of smart mobile devices to be used for learning because they "bridge pedagogically designed learning contexts, facilitate learner-generated contexts and content (both personal and collaborative), while providing personalization and ubiquitous social

connectedness, that sets apart from more traditional environments” (p.134). There is also a special connection between the affordances of mobile technologies with the growing importance of lifelong and informal learning. Duncan-Howell and Lee (2007) suggested the possibility of bridging formal classroom learning and informal out-of-classroom learning through the use of mobile devices. Especially for digital learners, learning was more meaningful when some formality of learning was removed. For the benefits of distance education, Traxler (2007 p.131) claimed that mobile learning “increases motivation, especially amongst learners who would normally be considered distant, disengaged or disenfranchised, and hence improves retention and progression”. This recognition indicates that mobile technology can act as a catalyst for an enquiry into learner preferences, skills and study behavior (Kukulska-Hulme & Pettit, 2009).

With all the motivating elements offered and the possibilities of mobile learning to enhance collaborative learning, mobile learning is intriguing with its movement between indoors and outdoors, across formal and informal settings and allowing learners to lead some of the way. Kukulska-Hulme & Pettit (2009) claimed that, if language learners’ preferences and needs can be allowed to have a bearing on what is learnt and how learning should take place, mobile technologies have a clear role to play in realizing such an objective. The writers posed a challenge to educators to determine what is best learnt in the classroom, what should be learnt outside, and the ways in which the connections between these settings can be made. They suggested that developers and educators seek an understanding of how people engage with their surroundings to create ‘impromptu sites of learning’, because learners

want to use time productively while waiting and they will try to find ways of adapting learning materials to suit their particular lifestyle needs.

#### **2.4 Research on mobile learning in Malaysia**

Alzaza and Yaakob (2011) investigated students' awareness and requirements of mobile learning services among Malaysian students in a higher education environment. Their results showed that the students had adequate knowledge and awareness to use mobile technology in their education environment and the higher education investigated had the required infrastructure to utilize mobile learning services. The authors, however, highlighted that the greatest limitation regarding the implementation of mobile learning in the Malaysian higher education environment was the cost of transaction and slow data exchange with networks. They acknowledged that their study was limited to one institution and suggested that future research should be conducted with a greater number of respondents from various higher learning institutions in Malaysia to ensure representative and conclusive findings. To date, there has been no other research that investigates the infrastructure that supports mobile learning in higher education institutions in Malaysia.

Ismail et al. (2010a) conducted a survey to identify the satisfaction level of participants when using mobile learning. Due to the easy access of study materials, important notes and daily reminders on their course of study, the majority of their respondents had high satisfaction with mobile learning. They also agreed that mobile learning helped them to pace their studies for distance learning courses. Nevertheless, they were not satisfied with the cost of communication with the tutors and other students in mobile learning courses. In another study by Ismail et al. (2010b), the majority of the respondents agreed

that SMS learning was safe, easy, effective and useful for their studies. However, they raised the problem of communication via mobile devices which at times was not clear due to various factors such as Internet connectivity.

Hussin et al. (2012), in their study on mobile learning readiness among Malaysian students from two public universities, found that although the students were highly familiar with computing and communication activities using their smartphones, half of the participants were not ready for mobile learning to take place at the time when the study was conducted due to financial issues. They were uncertain about spending extra money for mobile learning, as it required them to pay for the hardware, software, hardware maintenance and also a phone line. As mobile learning was still in the early stages in Malaysia, they were also not sure about how best to engage in mobile learning; thus, they suggested that blended learning should be maintained in the courses for the time being. To represent a more complete picture of mobile learning readiness among Malaysian university students, Hussin et al. (2012) suggested research with important groups e.g. administrators and educators, whose responses also need to be studied. For effective and successful mobile learning to take place in Malaysian contexts, Hussin et al. (2012 p.282) suggested that administrators should “be ready with a strong support system that provided infrastructure and mobile phone gadgets, human resource training for educators or teachers, annual budget for m-learning, and incentives to promote a greater success in the implementation of m-learning at the universities”. The authors also suggested that educators should acquire pedagogical knowledge of how to integrate mobile phones in their teaching besides preparing themselves to adapt to a new work culture or work ethic when implementing mobile learning.

The studies mentioned above indicate positive results on Malaysian students' perception and awareness of the advantages of mobile learning. Although Malaysian students were generally ready with the computing skills that mobile learning requires, they were still hesitant in terms of their readiness and satisfaction level in adapting smart mobile devices for learning in this country due to various factors. As concluded by Hussin et al. (2012), although most students might seem to be ready for mobile learning, it was difficult to claim that Malaysian Institutions of Higher Learning were similarly ready as most administrators and educators were still unprepared.

## **2.5 Types of mobile learning research**

A popular way of using mobile technologies has proved to be fieldwork, a type of learning activity that can take place at many different levels of education and in a range of settings (Kukulka-Hulme & Traxler, 2013). Kukulka-Hulme & Traxler (ibid) also found that most research on mobile learning was hampered by the current state of the technologies and by the diversity of educational objectives. Although there were constraints of budgetary and human resources, institutional practices, procedures and priorities, research on mobile learning gradually moved from small-scale, short-term trials to larger, more sustained and blended deployment (Kukulka-Hulme and Traxler, 2013). In terms of the approaches to mobile language learning, Kukulka-Hulme and Shield (2008) suggested that there were two main approaches used: content-related and design-related studies. Content-based research focused on the delivery of learning content through mobile devices while design-oriented research focused on authentic and/or social mobile learning activities. The literature was still dominated by content-related studies, but research had gradually shifted towards design-oriented studies (Wong & Looi, 2010) with experiments as the

most commonly used methods as compared to interpretive studies (Viberg, Olga and Grönlund, 2012). These authors, who conducted a literature review of MALL research within areas of second language acquisition, suggested that MALL field research still needed more solid empirical evidence to indicate how mobile technologies can enhance language learning and in order to build theoretical models that were specific to the area. In terms of the aspects of MALL being researched, they found the dominant research focuses were on learners' attitudes towards technology, their intention to use it, and the various actual uses of mobile technology integrated in their second and foreign language learning. Impact of learning measured when learning was enhanced using mobile technology was mostly based on learners' perception (Viberg, Olga and Grönlund, 2012).

On the aspects of linguistic knowledge and language skills, Viberg, Olga and Grönlund (2012) found that most of the reviewed papers examined vocabulary acquisition, listening and speaking skills and language acquisition in general terms. Based on the review, they suggested that mobile learning researchers should integrate the use of mobile technology in both formal and informal contexts. Learning was found to be more engaging when learners learn in authentic contexts and contribute to the creation of learning contents. To assess the effectiveness of using the mobile technologies, most of the research reviewed used surveys to assess learners' attitudes and analyzed outcomes of learners' proficiency. Viberg, Olga and Grönlund (2012) concluded that the results were as yet inconclusive because most of the studies were conducted within short periods of time and involved small numbers of participants. The authors suggested that more empirical studies should be undertaken, providing evidence of how students' results were better with the use of mobile learning.

They also suggested that longer studies be conducted with larger test groups to ensure reliability.

## **2.6 Previous research on Facebook**

Facebook has undergone exponential growth over the last six years or so. At the time of this study, Facebook had over 600 million active users worldwide. Such social media have resulted in the current generation of students (termed the “Net Generation” or “Generation Y”) being constantly connected (Evan, 2014). Evan (2014) believed that Facebook was generally considered to be the leading social networking site used by college and university students as compared to other social networking sites. Using tools like Facebook Group and Facebook Messenger, students and teachers can discuss course assignments, group projects and share useful course links. However, empirical findings to support the claims are still inadequate. Moreover, the patchy literature that explored the academic potential of social networking sites, especially Facebook, emphasises the affordances of this technology at institutional levels but not its pedagogical potential at micro levels. Until recently, there has been no reliable evidence from studies that suggested a design framework for the pedagogical use of Facebook and smartphones, which is the focus of this research.

In the education field, current major topics of research on SNS, particularly Facebook, focus on the extent of students’ use of the site each day and motives for use, effects of Facebook use, students’ attitudes to the use of the site and teachers’ use of the site for their pedagogic practice. In the review of literature on the use of Facebook by Hew (2011), the author identified nine main motives for using Facebook among college and university students: “to maintain existing relationships, to meet new people, to gain popularity, to enjoy the ‘cool’ and ‘fun’

site, to gain popularity, to express oneself and for learning purposes” (Hew , 2011 p.664). Most of the reasons found were related to the social space of the users as, originally, Facebook was created mainly for its users’ social activity. Overall studies reviewed by Hew (2011) concluded that Facebook had very little educational use as the website was mainly used by students to keep in touch with their friends. The uncommon use of the site for educational purposes was also found in studies by Madge et al. (2009); Mazer, Murphy and Simonds (2007) and Selwyn, (2009). The majority of students’ postings on Facebook walls were not about education (Selwyn, 2009); only 10% of 312 undergraduates used Facebook for academic work such as discussion for revision and arranging group work. The majority of participants in the study by Madge et al. (2009) admitted that they had never used Facebook as their channel of communication with academic staff. Selwyn (2009), Robelia, Greenhow and Hughes (2009), Mazman (2011) and Usluel and Mazman (2009) concluded that students generally accepted Facebook as a social technology rather than a formal teaching tool. Baran (2010) and Madge et al. (2009) expressed caution about the invasion into the social-networking space that students clearly felt was theirs, although it was used for their educational benefit. The findings of studies that indicated a scarcity of education-related Facebook use by students were partly the result of the fact that, in those studies, the use of the website was not planned to be part of the teaching and learning. For example, the research by Madge et al. (2009) focussed on the social use of Facebook by students in settling into university life. The majority of their respondents reported that they specifically joined Facebook pre-registration as a means of making new friends at university, as well as keeping in touch with friends and family at home. This finding demonstrates the social

networking site serving its purpose for entertainment and for fostering the social relationships of the users.

Over the years, the literature has started to grow in proving the positive affordances of Facebook for learning. Schroeder and Greenbowe (2009) used a WebCT forum and a Facebook group to get undergraduate students discussing questions. The use of WebCT was compulsory, while the use of the Facebook group was optional. The result showed that the number of posts on Facebook was nearly four times more than on WebCT, and the postings raised more complex topics and generated more detailed replies. Possible reasons included the fact that students often visited Facebook and spent a lot of time in Facebook and the result indicated a positive outcome of the use of Facebook and smartphones as an alternative form of assessment for learning in general. 11 out of 12 students in the study reported that using a smartphone and Facebook increased their motivation, independent learning and sense of responsibility. They suggested that integration of any new technology would only be beneficial if students were capable of using the technology. The findings indicated that teachers need to consider giving training to students when implementing new technology in teaching.

For Kurtz (2014), although Facebook was not originally created for educational purposes, it can be used as a virtual environment for discussion and sharing knowledge. Using Facebook Groups, the respondents reported that they were engaged in interaction and actively participated in the discussions held. The author saw that a Facebook Group was perceived as a protected environment that fostered social learning processes while emphasizing learner involvement and active contribution as well as frequent interaction with peers and instructors.

Harasim (2012) believed that the learning processes, especially in Facebook Groups, were congruent with the basic tenets of social-constructivist pedagogy, which placed an emphasis on the role of interaction and collaboration, particularly among the participants. Facebook Groups were found to be a useful feature of the social media that provided a platform for students to contribute to the sense of class community and collaboration outside the classroom. Using the platform, Ekoc (2014) believed that teachers could meet students in their territory. To encourage students to contribute to the online community, the author suggested some form of facilitation and encouragement be given to students so that they could feel motivated to participate. Therefore, using Facebook as part of learning and teaching was as much of a challenge for many students as it may be for most educators. Gray, Annabell, & Kennedy (2010) did not find that Facebook can transform students from passive and disengaged to active and participatory learners, with only a very limited number of the students in Facebook study groups contributing strongly to them. They were of the opinion that both technological affordances and group dynamics were factors contributing to groups' mixed successes so teachers should play their role in encouraging and facilitating students –

*“If students have an open mind about using Facebook educationally... and are motivated to maintain contribution, interest, regulation, social ties, a knowledge base and a structured approach to educational objectives, then the unique environment that Facebook offers has the potential to enhance their learning experience”*

(Gray et al., 2010 p.976).

Other than a platform for communication, a Facebook Group can be used as a platform that keeps important information for the benefit of its members. In a study by Ooi and Loh (2010), a Facebook group was created for a class of secondary school students to learn the Chinese language. The Facebook group

was found useful for both teacher and students to share course resources and give comments. Also, the use of events on Facebook allowed the teacher to conveniently organize learning activities such as lesson observations. McCarthy (2012) reported that students were largely supportive of using a social networking system in their higher education courses as an academic tool, highlighting responses indicating that Facebook was a platform which was familiar to students and allowed access to academic information on a system that they were constantly engaged with.

McCarthy (2012) found that students liked the fact that they could receive academic information on Facebook, because it was something they accessed frequently and because it meant that they did not have to log in to an additional university based web page to receive that information. In his study exploring the efficacy of the online social networking site Facebook for linking international digital media student cohorts through an e-mentoring scheme between two universities, he highlighted that institution-based learning management systems often require students to navigate to the university website, insert a password and then navigate to the correct course page before being able to receive announcements or information. The respondents in his study saw this process as cumbersome and problematic. Facebook, on the other hand, appeared to be a site that students were interacting with frequently, particularly given that the application was available for tablet and smart phone devices. This social networking site provided a convenient environment in which academic information could be integrated into a space that students were already using.

While most studies indicated the potential of Facebook in enhancing teaching and learning, there were also studies that raised cautions on the issue of privacy that users had to deal with when using this social website. In their study,

Cheung and Vogel (2010) found that, with Facebook, communication between teachers and students could be enhanced. However, students were willing to use Facebook to communicate with their teachers purely for academic and project-related matters through the project group established in Facebook rather than acting as 'Friends' in their personal Facebook page. They concluded that, while Facebook can improve the communication between teachers and students, there were concerns from the students because they treated academic and social life separately. The finding indicated a gap that the students put between themselves and their teachers.

Teclehaimanot and Hickman (2011) suggested that teachers should remain passive rather than active when they interacted with students on Facebook out of class. They should avoid commenting on students' personal photos or sending an invitation on their own initiative as they should be conscious of the gap between students and teachers. Bruneel et al. (2013) supported the findings of Teclehaimanot and Hickman (2011), as they found that none of their interviewees accepted a friendship request from a faculty member, partly based on an awareness of the consequences of too much self-disclosure on Facebook. Strater and Lipford (2008) demonstrated the need for mechanisms that provided awareness of the privacy impact of users' daily interactions.

## **2.7 Research on Facebook for learning in Malaysia**

In Malaysia, Kabilan, Ahmad and Zainol Abidin (2010) investigated whether university students considered Facebook a useful and meaningful learning environment that could support, enhance and/or strengthen their learning of the English language. Their respondents believed that the site was useful as a medium to facilitate the learning of English. Students could improve their

English by interacting with native speakers and modeling the native speakers' style of writing good English sentences. The authors also found that Facebook helped students to improve their reading skills when reading messages posted by their friends. For the benefits of ESL learners, Kabilan, Ahmad and Zainol Abidin (2010) and Balakrishnan and Shamim (2013) found that Facebook helped to develop students' confidence when they received replies to their postings on the site. Their level of confidence in using the English language increased as they did more reading and writing in the language via Facebook. Yunus et al. (2012) and Omar et al. (2012) also concluded that Facebook was a good platform for Malaysian students with lower language skills to interact with each other via online discussion. In order to ensure that the outcomes of students' learning were meaningful, Kabilan, Ahmad and Zainol Abidin (2010) suggested that teachers or language instructors integrate Facebook as an educational project with predetermined learning objectives. They also suggested that future research should focus on the meaningfulness of Facebook to students' language learning experiences.

Another advantage of Facebook that was utilized by Malaysian students was its extension as a platform for interaction and collaboration. Helou and Ab Rahim (2014) and Lim and Ismail (2010) found that the platform increased teacher-student and student-student interaction as it was used by their respondents to extend their learning to outside the classroom. Their respondents also admitted the benefit of the social networking site in fostering collaborative learning. For Lim, Fadzil and Mansor (2011) and Tiryakioglu and Enzurum (2011), Facebook had the potential to be used as a medium of communication between teachers and students because the social network was found to be flexible, user-friendly and was easily used as compared to other education management systems.

However, Lim et al. (2011) emphasized that in drawing distance learners into meaningful academic conversations, the quantity and quality of posts very much depended on the timing as well as the topics of discussion.

Other than that, Facebook was also used as an information and resource-sharing platform where teachers and students updated and disseminated information pertaining to course related matters (Mat Noh et al., 2013). In the study by the authors, the platform was used as a centre for announcement making.

## **2.8 Pedagogical foundations for mobile learning research**

Ally (2004) emphasised the importance of using suitable learning theories and instructional design principles to design learning materials for mobile devices. This was to ensure that learners' needs were met and to achieve the desired learning outcomes. As studies that contributed to the development of mobile learning were still scarce, comprehensive and conceptual frameworks in this field have been hampered by the rapid changes in mobile technologies.

*“There exist as yet no comprehensive theoretical and conceptual frameworks to explain the complex interrelationship between the characteristics of rapid and sometimes groundbreaking technological developments, their potential for learning as well as their embeddedness in the everyday lives of users”*

*(Pachler et al. 2010 p.3).*

Traxler, (2007 p.7) also proposed the “development of theoretical conceptualization and with it any evaluation methodologies specifically aligned to the unique attributes of mobile learning”. As mobile learning research is on the rise, researchers have been using various established pedagogical theories and frameworks for their mobile learning projects. For example Sharples et al. (2007) used a combination of Activity Theory and a modified version of

Laurillard's Conversational Framework while Herrington et al. (2008) utilized Authentic Learning.

Due to the lack of a generally accepted pedagogical theory that informs mobile learning research, this study has developed pedagogical frameworks by referring to established language learning theories and mobile learning theories developed in the literature. This section first reviewed the main learning theories that have been informing tasks and course design in language learning which were related to the use of computer and mobile technology. Then, it explained why a social constructivist pedagogical foundation was chosen to govern the direction of this research.

### **2.8.1 Behaviorism**

Learning theories were originally dominated by behaviorist accounts of learning. The behaviorists believe that learning is all about the successive increase of skills and shaping learners' responses through demonstration and reinforcement of closer approximations to the intended response (Palincsar, 1998). In the domain of Second Language Acquisition (SLA), this learning theory is translated into practice by having learners go through a series of drills and oral practices that will lead to habit formation, because behaviorist learning activities promote learning as a change in learners' observable actions (Lightbown & Spada, 2013). Learners' responses are shaped using "instructional procedures such as modeling, demonstration and reinforcement of closer approximations of the targeted responses" and the curriculum is carefully analyzed and sequenced to ensure that each component part is introduced beginning from introduction, then to more advanced material (Palincsar, 1998 p.346).

In computer-aided technology learning, based on the theory of behaviorism, learners are expected to give a solution (response) to the presentation of problem (stimulus). Then, reinforcement is given via the feedback from the system. Palincsar (1998) claimed that while the behaviourist approach was found to be an effective way of teaching factual contents, evidence that proved this instruction transferred to higher order cognitive skills, such as reasoning and problem solving, was still scarce. In most early research on mobile learning, Herrington and Herrington (2007) and Traxler (2007) observed that there was no significant change in pedagogy as behaviorism and content transmission were still the dominating paradigm, as they paid particular attention to the potential of mobile learning to facilitate 'anytime, anywhere' access to learning contents. As the behaviorism paradigm could not offer explanations for the mechanisms that account for learning, reaction to this approach came in a form of a 'cognitive revolution'. Beginning from behaviorist strategies that can be used to teach facts (what), then moving to cognitivist strategies to teach principles and process (how), Ally (2004) stated that there was a shift towards constructivist strategies where learners were taught real-life and personal application of contextual learning and they were given the opportunity to construct their own meaning from the information presented. "Learners learn best when they can contextualize what they learn, both for immediate application and to acquire personal learning" (Ally 2004 p.3). By using mobile devices, the writer believed that learners' personalized learning was enhanced because the devices allowed contextualized learning (and collaboration) from any place and at any time (Ally, 2004).

## **2.8.2 Constructivism**

Based on John Dewey's experiential learning (Dewey, 1938; Piaget, 1970), the constructivists believe in the importance of experience and concepts application to learners' existing knowledge in order to construct meaning. Knowledge is constructed through active engagement in personal experimentation and enabled by teachers. Rather than simply memorizing and copying pre-packaged ideas, learners could construct their own understanding when they are involved in the learning process, discovering new concepts, and developing life-long learning skills.

Two main schools of thought emerged from constructivist thinking: cognitive constructivism, which was based on the work of Jean Piaget (1970), and social constructivism, following the theories of Lev Vygotsky (1978). For Bruner (1990 p.2), the cognitive perspective is "an all-out effort to establish meaning as the central concept of psychology – not stimuli and responses, not overtly observable behavior, not biological drives and their transformation but meaning". Cognitive constructivism focuses on mental process involved in the individual's construction of knowledge where ideas are constructed in individuals through a personal process as opposed to social constructivism where ideas are constructed through interaction with the teacher and other students (Powell & Kalina, 2009 ; Eggen and Kauchak, 1999; and McInerney and McInerney, 2002). Cognitive constructivism includes assimilation and accommodation, which are processes children go through as a search for balance or equilibration (Wadsworth 2004). Assimilation refers to the situation when learners bring in new knowledge to their own thinking (schemas) and accommodation is when children have to adjust their schemas to fit into what

they have already learnt. In cognitive constructivism, Piaget (1970) also paid particular attention to each individual needing to learn at his own pace.

For social constructivists, the interpretation of reality made by a person is believed to be heavily dependent on variables such as social interaction, culture and language (Powell & Kalina, 2009). To relate this theory to language learning, social constructivists believe that learning occurs when students participate and discuss actively with other learners and experts rather than just receiving input passively from their teachers. For social constructivists, learning is perceived to be an active process and involves negotiation, so Powell and Kalina (2009) suggested that it is a highly effective method of teaching since this paradigm incorporates collaboration and social interaction. Rather than memorizing facts from readings or from what is being said, real learning occurs when learners critically analyze the information received, actively search for meanings, making sense of what they have understood (meaning-making), and are involved in social activities. They also must share, collaborate and interact with other learners to widen their perspectives on problems.

One of the main theories of Vygotsky (1978), which is related to the constructivist view of learning, is the theory of zone of proximal development (ZPD) which refers to “the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers” (Vygotsky, 1978 p.86). With scaffolding in learning from teachers, peers and other adults, children are believed to grow and are able to do more once they get to the next level of understanding (Powell & Kalina, 2009). To create a deeper level of understanding, Powell and Kalina (2009) stated that Vygotsky used cooperative learning as “a part of

creating a social constructivist classroom”. Besides the social interaction while cooperating with others, another factor that contributes to how learning occurs, according to Vygotsky (1979), is cultural influence. Diversity of students in the classroom should be recognized and the differences should be embraced. Diversity refers to differences in terms of ethnicity, identity and biological differences that determine the various experiences and understanding of each student (Woolfolk, 2000).

### **2.8.3 Authentic learning**

Derived from the constructivist learning paradigm, authentic learning refers to situations where learners are placed in learning contexts where “they encounter activities that involve problems and investigations reflective of those they are likely to face in their real world professional contexts” (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991). For Herrington and Herrington (2006 p.2), authentic learning activities are “motivating and challenging activities that require collaboration and support and reflect the task seen in real professions and workplaces”. As language learning is an interactive and dynamic process, learners should be placed in authentic situations so that they can explore authentic sources.

The tenets of authentic learning resonate closely with the approach taken in this research in designing learning tasks that incorporate smartphones and Facebook because this study aims to show how smart mobile technology presents the opportunity to employ powerful cognitive tools that can be used by students to solve complex and authentic problems. Referring to the characteristics of authentic learning suggested by Herrington and Oliver (2000),

the application of authentic learning to mobile learning was explored through the learning tasks given in this study. The characteristics include the following:

1. Authentic contexts that reflect the way the knowledge will be used in real-life.
2. Authentic activities that are complex, ill-defined problems and investigations.
3. Access to expert performances enabling the modelling of processes.
4. Multiple roles and perspectives providing alternative solution pathways.
5. Collaboration allowing for the social construction of knowledge.
6. Opportunities for reflection involving metacognition.
7. Opportunities for articulation to enable tacit knowledge to be made explicit.
8. Coaching and scaffolding by the teacher at critical times.
9. Authentic assessment that reflects the way knowledge is assessed in real life.

(Herrington & Oliver, 2000 p.26)

In applying authentic learning in this research, the learning tasks were project-based and required students to use real materials and situations (Comas-Quinn, Mardomingo, and Valentine, 2009). Kukulska-Hulme, Traxler and Pettit (2007, p.55) noted that projects should be relevant and interesting to learners, where “students should be engaged in exploration and inquiry, that they should have opportunities for social discourse, and that ample resources should be available to them as they pursue meaningful problems”. For Kukulska-Hulme, Traxler and Pettit (2007), mobile learning enables the conditions of authentic learning to be met due to the affordances and flexibilities of mobile devices. They argued the importance of designing learning activities with particular characteristics of mobile learning in mind in parallel because, for them, learners themselves are taking matters into their own hands, and are already creating

mobile learning experiences for themselves (Kukulska-Hulme, Traxler & Pettit, 2007).

#### **2.8.4 Situated learning**

Situated learning perspectives pay particular attention to the influence of the social and cultural context where learning takes place. Through this perspective, learning is enhanced when it takes place in the course of activity and in appropriate and meaningful authentic contexts (Lave & Wenger, 1991). Sharing many characteristics of authentic learning, situated learning derived from the idea of looking at people learning in communities as apprentices by a process of increased participation (Lave & Wenger, 1991), where the learning can be extended to learning, for example, in the field (for botany students), in the hospital ward (for trainee nurses), in the classroom (for trainee teachers) and in the workshop (for engineering students). The authors located learning in the process of co-participation and in the field of social interaction, not in the heads of individuals, because learning was seen as a process of participation in shared learning activities and social processes of knowledge construction.

An ideal setting to encourage language acquisition through this perspective of learning is to provide situated learning experiences in a country where the language is spoken, but this situation is rarely possible. Students should be given learning activities that require active interaction and collaboration between them. As an alternative, context-rich experiences can be provided through authentic learning materials that facilitate interaction among learners. Mobile technologies are especially effective in providing 'context-aware learning' (Naismith & Corlett, 2006) because they are available in different contexts, so learners can draw on those contexts to enhance the learning activity. Kukulska-

Hulme, Traxler and Pettit (2007 p.55) also argued that “mobile learning with its capacity to facilitate and empower situated learning can challenge one of the underlying mechanisms of many educational systems”. Through mobile and wireless technology, the writers believed in the technologies’ capacity to take learners and learning back into the outside world: “They can structure and scaffold learners’ engagement with this world rather than mediate and constrain it” (Kukulska-Hulme, Traxler & Pettit, 2007, p.55).

Based on my teaching experience, lessons conducted according to the notion of situated learning would only show improvements in students’ performance if teachers took the initiative to plan learning that involved real-world problems and projects that were relevant and interesting to the learner. Selecting suitable authentic materials for teaching is complicated because they need to suit the teaching contents. As a result, situated learning may not authentically occur in classrooms. However, with the ability of mobile learning to bridge learning contexts and facilitate student-generated contexts, wireless mobile devices may facilitate the design of pedagogical activities that enable students to continue learning conversations and experiences both in and beyond classroom. The next section further discusses initiatives of developing frameworks of theorizing mobile learning.

## **2.9 Theory of mobile learning**

Most studies in the field of mobile assisted language learning (MALL) used theories only to interpret or illustrate findings (Viberg, Olga and Grönlund, 2012). Viberg, Olga and Grönlund (2012) reviewed mobile learning research conducted between 2002 and 2012 and found that there was only one theory-generating study, which was by Sharples et al. (2007). Their attempt to produce

theory was specifically focused on the field of mobile learning. Petit and Santos (2014) demonstrated that the “novelty of mobile learning does not consist of new educational theory, but more in the possibilities of new educational practices”. However, attempts made to create field-specific theory by Sharples et al. (2007) helped to give a direction to other mobile learning researchers. In order to understand how people learn through mobile, pervasive and life-long interaction with technology, they suggested the need to understand the implications of learning with mobile technology and build an appropriate theory of education for the mobile age.

Sharples et al. (2007) suggested a framework for theorizing mobile learning that complemented theories of infant, classroom, workplace and informal learning. Their first step in postulating a theory of mobile learning was to distinguish between mobile learning and other types of learning activity. They placed mobility as the object of analysis and acknowledged that knowledge and skills were transferred across different contexts. Secondly, they suggested that a theory of mobile learning must embrace the fact that a considerable amount of learning happened outside of formal learning premises as people took their own initiatives to learn. Thirdly, these authors recommended that the theory be based on contemporary accounts of practices that enabled successful learning. The practices broadly matched a social-constructivist approach, which viewed learning as an active process of knowledge and skills construction through practice with a supportive community. Based on the findings from the US National Research Council (1999), it was concluded that effective learning is:

*Learner centred* – It builds on the skills and knowledge of students, enabling them to reason from their own experience.

*Knowledge centred* - The curriculum is built from a sound foundation of validated knowledge, taught efficiently and with inventive use of concepts and methods;

*Assessment centred* - Assessment is matched to the ability of learners, offering diagnosis and informative guidance that builds on success;

*Community centred* - Successful learners form a mutually promotive community, sharing knowledge and supporting less able students.

(US National Research Council, 1999 as cited in Sharples et al., 2007 p.3)

Lastly, these authors claimed that a theory of mobile learning must take account of the ubiquitous use of personal and shared technology nowadays. The trend of people owning varieties of smart mobile devices and also computers indicates that people have found the gadgets useful for their daily lives. Just as learning has become a personalized and learner-centred activity, mobile-networked technology has allowed learning to be done collaboratively with others. Viberg, Olga and Grönlund (2012) believed that the effort of creating theory by Sharples et al. (2007) indicated an attempt to distinguish the MALL field from other scientific learning areas such as Computer Assisted Language Learning (CALL) so they suggested more studies be conducted to develop a mobile learning theory and to construct new theoretical models for mobile language learning.

## **2.10 Gaps in mobile learning research**

The literature review so far has incorporated studies that demonstrated possibilities of using Facebook and smartphones for teaching and learning, as well as those studies that concentrated on limitations and precautions that need to be taken when adopting the technologies. It has also covered a range of different research studies that had a bearing on the links between theories of learning and theories of mobile learning. A review of the literature also indicates

that there are several shortcomings in most mobile learning research as this field is still developing.

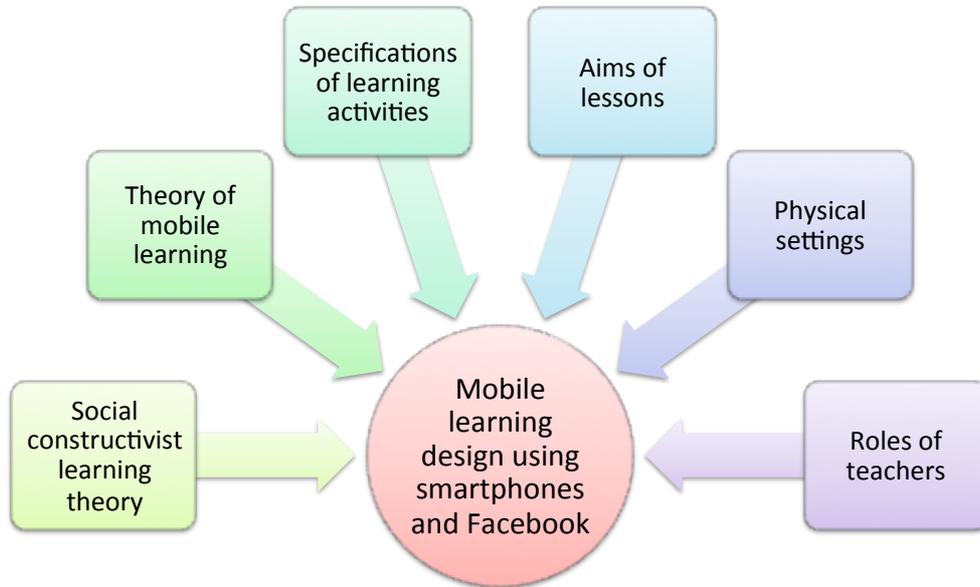
Kukulka-Hulme & Traxler (2005) highlighted the lack of explicit underlying pedagogical theory and a general lack of evaluation of the projects. The authors also indicated that mobile learning research still lacked longitudinal studies. Viberg, Olga and Grönlund (2012) noted that most mobile learning research has been conducted within a short period of time with a small number of participants. The authors also suggested that a more qualitative approach should be adopted to complement the findings from quantitative studies. Sharples et al. (2009) pointed out that there was still a lack of a design framework for mobile learning research and Laurillard (2007) stated that this field still lacked pedagogical integration. To date, there are no studies that integrate the use of smartphones and Facebook in the context of ESL learners.

Some of the shortcomings identified have been addressed in the present study, which aims to produce a pedagogical design framework for smartphones and Facebook to enhance the teaching and learning of English for ESL learners. The learning activities designed were based on social constructivist theory and mobile learning theory as proposed in the literature. This qualitative study was conducted with a significant number of participants within the time given to complete a PhD.

### **2.11 Conceptual framework of this study**

This section is particularly important in that it informs the preliminary design framework to be further developed in the fieldwork stage. As shown in Figure 1 below, a conceptual framework for this study was developed after reviewing the literature and considering the social constructivist learning theories, theory of

mobile learning, aims and requirement of learning activities, the physical settings where mobile learning activities take place and the roles of teachers.



**Figure 1: Conceptual Framework to study**

### **Social constructivist learning theory**

As much of the theory and empirical findings in research in second language learning have been overlooked by developers of language learning technological support (Kukulska-Hulme & Bull, 2009), the initial design framework of this study considered the application of social constructivist theory in the context of ESL learners. A social-constructivist views learning as an active process of building knowledge and skills through practice within a supportive group and as a continual process of personal development, enrichment, and the possibility of rapid and radical conceptual change. For second language learners, language learning is a socially constructed

phenomenon and learners need to be engaged in meaningful activities where they are able to construct their knowledge of the target language on their own through collaboration and social interaction (Lightbown & Spada, 2013). For Iteration 1, the project based tasks were developed in a way that used authentic materials (Herrington & Herrington, 2006), and were designed to be contextual and situated (Lave & Wenger, 1991), where participants were encouraged be in charge of their own learning and at the same time able to learn from others. The project-based tasks were also designed to prompt learners to use a combination of applications in smartphones and Facebook. Teachers were expected to provide active, self-regulating, reflective learning strategies in a motivating learning environment which was learner-centred. When learners were given the opportunity to explore and to try out the language by themselves in a rich and contextual context, they had the opportunity to reflect on the new knowledge that they gained besides learning from their mistakes.

### **Theory of mobile learning**

The theory of mobile learning by Sharples et al. (2007) was important as a direction of this study because it offered the chance to understand how people learn through a mobile, pervasive and life-long interaction with technology. The theory starts with an assumption that learners are continually on the move and that a considerable amount of learning happens when learners are outside classrooms where they receive formal learning. With the portability and individuality aspect of smartphones, they can be used to enhance learning. To test the affordances of mobile technologies for teaching and learning, this study looked beyond the use of smart mobile devices and considered their use integrated in classroom practice and as part of the learning experience outside the classroom. In designing mobile learning activities that used smartphones,

characterizations of mobile learning suggested by Sharples (2013 p.12) such as 'personal', 'spontaneous', 'opportunistic', 'informal', 'pervasive', 'situated', 'private', 'context-aware', 'bite-sized' and 'portable' were considered. The characterizations implied a conceptualization of mobile learning in terms of the learners' experience with an emphasis on device ownership, informality, movement and context that were inaccessible to conventional e-learning (Kukulska-Hulme & Traxler, 2013). These authors asserted that the devices that learners used were hardly relevant but what was important to them was the notion of mobility and the construction of learning conversations in that process. In this study, the project-based tasks prompted learners to use mobile technologies while they were on the move and when they were outside the classroom.

### **Specification of learning activities**

After identifying the characterization of mobile learning, Kukulska-Hulme and Traxler (2013) asserted that the design of mobile learning should proceed with the specification of learning activities that integrated the use of mobile technologies. From an educator's point of view, the authors suggested three key designs to consider, namely "design of content, of activities and of communication" (Kukulska-Hulme & Traxler, 2013 p.250). In terms of the content, they suggested educators find appropriate content to be accessed via mobile devices and also the aspects below:

- Open-endedness: if students are expected to construct some of the content as part of their learning, this could be done in various locations and mobile devices can facilitate it.
- Personalisation: mobile devices can cater to individual needs by enabling learners to receive, assemble and carry around personally useful resources.

- Time-critical nature: content updates may be more easily delivered to mobile devices when learners are highly mobile.
- Portability: content such as portfolios might be best developed on mobile devices and physically owned and carried around by learners.
- Measured delivery: when content needs to be accessed by learners little by little over a period of time, mobile devices can make this easier.
- Aural medium: if the content is aural, a personal listening device is often the best way to access it.
- Prioritising medium: when some content is made available for mobile devices, this can prioritise or reinforce it over other content, which may be a useful deliberate teaching strategy.
- Alternative medium: learners can appreciate having the option of mobile access to electronic learning materials and resources, even if they generally prefer desktop access.

(Kukulska-Hulme & Traxler, 2013 p.250-251)

In terms of the activities, the authors suggested that educators design tasks that are suitable to mobile learning and tasks that combine the use of mobile devices with other learning resources. The use of various devices may contribute to continuity of learning and “mobile devices can be used as a way to facilitate remote, ‘on the move’ participation in online activities that might be continued or completed at a desktop PC” (Kukulska-Hulme & Traxler, 2013 p.251).

Besides making use of useful smartphone applications and social networking sites to enhance teaching and learning, Naismith and Corlett (2006) suggested that teachers create quick and simple interactions, prepare flexible materials that can be assessed across contexts and consider special affordances of mobile devices that might add to students’ experience. Song and Fox (2008 p.311) concluded that respondents’ uses of the technologies were shaped by the learning activities that they were engaged in: “It is not the technology itself, but the students’ use of the technology that can change learning practices”.

With the use of different smart mobile devices to access the tools of Web 2.0, mobile technologies offer a potential for a new phase of technology-enhanced learning evolution, highlighted by a continuity of the learning experience across various learning contexts. This new learning situation is described as 'seamless learning' by Chan et al. (2006). Seamless learning implies that learners can learn whenever they are curious, in a variety of scenarios, and that they can switch from one scenario to another easily and quickly using their personal device as a mediator. These scenarios include learning individually, with another student, a small group, or a large online community, face-to-face or in different modes of interaction at a distance places.

In designing mobile applications for learning, Pea and Maldonado (2006) also suggested that aspects of seamless learning should be considered with an emphasis on inquiry processes, social constructivist theories and distributed cognition designs. For example, for learning activities that require important decision-making and long discussions, other means of communication may be chosen. Therefore, although mobile devices may enhance communication among learners, participants should be given the liberty of choosing suitable devices and means of communication to use which are suitable to the context and situation they are in. Orr (2010) suggested more studies that explored choices made by learners in terms of the device used when they were given tasks that required recording, retrieving and presenting data. As mobile devices continue to roll out in a broad spectrum, new features will continue to be added that enhance learning. Based on this account, the tasks in this study were designed to enhance students' learning by allowing them to use a variety of applications on smart mobile devices, and other personal and shared

technologies in order to motivate their participation and to help them learn collaboratively.

### **Aims of lesson**

Besides considering the suggestions by Kukulska-Hulme & Traxler (2013), the design of the conceptual framework of the current study considered the unique technological affordances of smartphones and Facebook while designing learning activities that resonated with the aims of the lesson. Sharples (2013) suggested that designs for mobile learning should begin by considering how deployment or use of mobile technology will support conceptualization or consideration, and how any proposed learning activity relates to the affordances of any technology. The design of mobile learning activities should be driven by specific learning objectives where the use of mobile technology should not be the target; rather, it should facilitate activities that were otherwise not possible to do, or to increase the benefits for students.

### **Physical setting**

The capabilities of mobile devices are only enhanced if they can connect to the technologies of Web 2.0 in a setting that supports mobile learning. Besides the factor of the physical setting, Litchfield et al. (2007) identified the need for mobile learning that supported both the on and the off campus learning environments with ubiquitous connectivity that was cost-effective. Participants should have access to technology as successful mobile learning projects have made mobile technology and connectivity available wherever and whenever they were needed (Naismith & Corlett, 2006). The authors also emphasized the importance of connectivity for mobile learning projects to succeed. This is due to the fact that many mobile learning projects are based on wireless or mobile

phone connectivity in order to provide access to learning resources, to link people across contexts and to allow students to capture materials that can be sent to personal media spaces and then shared or presented.

Therefore, this study was conducted in an environment that supported mobile learning activities in the UK. In relation to the findings by Hussin et al. (2012) and Alzaza (2011) on the readiness of Malaysian higher education institutions to adapt mobile learning, it was foreseen that the participants of this study would face difficulties in conducting the mobile learning activities if this study were conducted in Malaysia. As admitted by the authors, the Internet connectivity in most higher education institutions in the country was still developing and it was not cost effective for students.

### **Roles of teachers**

Sharples et al. (2009) suggested that mobile learning activities should also promote enriching conversations between students and teachers within and across contexts. Therefore, it is imperative for teachers to understand how to design technologies, media and interactions to support a seamless flow of learning across contexts, besides knowing how to integrate mobile technology into education.

In relation to the roles of teachers when delivering education via smart mobile devices, Cochrane, Thomas and Bateman (2010) commented on the importance of the pedagogical integration of the technology into course assessment, lecturer modeling of the pedagogical use of the tools, the need for regular formative feedback from lecturers to students, and the appropriate choice of mobile devices and software to support the pedagogical model underlying the course. Besides recognizing the specific affordances of mobile

devices that can be used to enhance learning, teachers should also be aware of the constraints of mobile learning when designing lessons that integrate the use of the technology. Orr (2010) identified the constraints, which included the size of the mobile device, connection issues, inconsistent platforms and distracted mobile learners. Due to the small size, limited storage, short battery life and slow text input, learners may not be able to totally rely on mobile devices as they may only be used for short and instant communications.

## **2.12 Conclusion**

This review aimed to indicate the affordances of mobile learning and a social networking site in enhancing teaching and learning as found in the literature, besides investigating other affordances of this combination of technologies. It also investigated the factors that influenced the pedagogical affordances of the combination of smartphones and Facebook to enhance the learning of English for ESL learners. The literature suggests that the combination of mobile learning and social networking could support collaboration and also motivate learners. So, with thoughtful planning about integrating the technologies into teaching, and with the design of task-based activities that need to be completed in groups, this study explored the factors that influenced the pedagogical affordances of the combination and the extent to which they support collaborative learning and motivate learners. In understanding the nature of learning using mobile devices and the Facebook social networking site, it was suggested in the literature that respondents' uses of the technologies were shaped by the learning activities that they were engaged in. The combination of mobile, fixed technologies and other means of communication was assumed to support different parts of the learning experience, so this study investigated how different means of communications and technologies work together to create

continuity of learning. Lastly, as the literature also raised the importance of educators being up to date with new technologies that can enhance their teaching, this study investigated how teachers should play their role when adopting smartphones and Facebook in teaching.

Up until this point, this thesis has offered rationale as to why a study to investigate the affordance of smartphones and Facebook to promote collaborative learning of English language for the context of Malaysian ESL learners should be carried out. It has also presented relevant theoretical input and previous research in mobile language learning and tools of Web 2.0 that inform the design of the interventions in this study. This chapter ends with a conceptual framework to be further refined in the Exploratory Stage of this study. The next chapter will provide more details regarding how this study was conducted using Design Based Research methodology.

## **Chapter 3: Methodology**

### **3.1 Introduction**

This chapter introduces the methodology of this study and explains where it stands among other paradigms. It goes on to outline the research framework and design, namely Design Based Research (DBR). The chapter continues with a discussion of the methods used and the data analysis procedure. This is followed by a discussion of the extent to which the research design and methods used comply with ethical principles and practices. The final section outlines the limitations and also difficulties faced while this study was being conducted.

### **3.2 Contextualising Design Based Research (DBR).**

This study involved designing, developing and evaluating educational interventions for ESL learners studying English language skills: interventions that were enhanced using smartphones and Facebook tools. It entailed generating a theoretical framework for design (i.e. design framework) that included a number of design conjectures that were tested through short interventions. To achieve such a goal, a range of research methodologies can be used, such as experimental research, formative evaluation and participatory action research, all of which have some similarities with DBR; however, this methodology was chosen because it corresponded with the lens of this research, which was pragmatism.

Viberg, Olga and Grönlund (2012) found that the most commonly applied method in the mobile learning area was experiment followed by interpretive studies. Pedagogically, research on MALL has been largely constrained by behaviourist, teacher-centred and tutorial applications (Burston, 2014;

Kukulska-Hulme & Shield, 2008). Experimental research, which stands under the positivist paradigm or the experimentalist tradition, involves pre-post testing and involves certain beliefs such as prediction and control, empirical verification and the idea that research is value-free. "Positivism strives for objectivity, measurability, predictability controllability, patterning, the construction of laws and rules of behaviour and the ascription of causality" (Cohen, Manion, & Morrison, 2011 p.7). Regarding prediction and control, positivists aim to discover patterns of cause and effect that can be used as a basis for predicting and controlling natural phenomena. They believe that, through observations or measurements, researchers can rely on their perceptions of the world to provide accurate data and, with strict methodological protocols, research will be free of subjective bias and objectivity will be achieved (Creswell, 2009). Methods used under this paradigm ensure that there is a distance between the subjective biases of the researcher and the objective reality she or he studies. Positivists' research is also conclusive in its purpose as it tries to quantify the problem and understand the results which are projectable to a larger population (Creswell, 2009).

At first glance, this paradigm seemed to be appropriate for this research but a deeper look revealed that it did not suit the context of this study because the phenomenon under study was complicated. With an approach that avoided being too theoretical and isolated from the real practices of teaching and learning, it was hoped that the findings of this research would contribute to building local theories based on realistic practices and interactions in context. Trying to create the same learning environment within a laboratory would be difficult, as this research involved the use of mobile devices by learners outside their classrooms. To do the tasks assigned in the iterations, the respondents

also used various means of communication and technologies and their reasons for doing so were unique to the situations they were in while this study was conducted. The findings of this study may not be generalized to larger contexts, as is the case in experimental studies, which provide statistical generalization; however, this study can contribute to providing analytical generalization (Schwandt, 2007), since it attempted to link findings from certain phenomena in a particular set of circumstances from both iterations to the proposed theories of mobile learning.

As MALL is still in an emerging phase, it needs more empirical evidence in order to underpin theoretical conclusions about how mobile technologies can enhance language learning (Burston, 2013; Shield & Kukulska-Hulme, 2006). There is now growing momentum for exploiting the pedagogical communicative affordances of available technologies, and research in this field has become both rich and diverse, and open to considerable interpretations. This study explores the pedagogical affordances of smartphones and Facebook and investigates the problems or issues that arose when these technologies were used for teaching and learning, before suggesting a revised framework for using a combination of technologies for teachers to enhance their teaching. The current study was undertaken within an interpretivist positioning, because the researcher believed that the knowledge and meaning acquired were socially constructed rather than objectively determined and perceived. It relied on the interpretation of people looking at, and participating in, phenomena and recognized the impact on the research of their own background and experiences. Hudson and Ozanne (1988) say that the position of interpretivism in relation to ontology and epistemology is that interpretivists believe that reality is multiple and relative. These multiple realities also depend on other systems of

meanings which are more complicated to interpret in terms of fixed realities (Neuman, 2005). The understanding of motives, meanings, reasons and other subjective experiences which are time and context bound is pertinent in this kind of paradigm (Hudson & Ozanne, 1988; Neuman, 2005). Interpretations of the world or constructions of the situation of the research rely on all participants involved, including the researchers, who bring their own unique perspectives. Researchers thus need to be open to the attitudes and values of the participants or, more actively, to suspend prior cultural assumptions (Mackenzie & Knipe, 2006).

Although the construction of meaning in this research relied on the input of the participants and myself as the researcher, and the knowledge gained was through experience that came from interviewing and observing what happened, one of the main objectives of the current study was to produce a revised design framework that was tested and developed through a series of iterations for teachers who want to adapt the use of mobile learning and Facebook for teaching. Central to this study were the research problems, so suitable data collection and analysis methods were chosen to provide insights into the research questions. Therefore, I believe this study falls within the pragmatic paradigm, since, according to Creswell (2009), pragmatists are free to choose suitable methods that seem appropriate because what takes precedence is the resolution of the problem and what matters to the pragmatists, as Creswell (2009 p.10) claims, is “what works”. Pragmatism, according to this author, is a worldview that arises from actions, situations and consequences. The pragmatists view knowledge as both being constructed and based on the reality of the world we experience (Johnson & Onwuegbuzie, 2004). The choice of approach is linked directly to the objectives and the nature of the research

questions. Darlington and Scott (2002) supported the theory of pragmatism as they claimed that, in reality, a great number of decisions of whether to take a quantitative or qualitative research approach are not based on philosophical commitment but on a belief of a design and methodology being best suited to purpose.

Charles Sanders, William James and John Dewey are usually seen as the founding fathers of pragmatism (Biesta & Burbules, 2003). The pragmatic paradigm arose as a single paradigm “out of actions, situations and consequences rather than antecedent conditions” (Creswell, 2009). While scientific realism stresses the real things in the world and interpretivism stresses the interpretations in the minds of subjects, pragmatism is based on the belief that the only reality is co-constructed in interactions because researchers do not have access to objects or to subjects but all they have is interaction (transaction). For Creswell (2009), to take a pragmatist paradigm is not just to be pragmatic in the everyday sense of the term, which implies choosing the best method to answer the research questions, but also, philosophically, to reject the distinction between objective science (positivist paradigm) and subjective interpretation (interpretivist paradigm) and say that we are always in the world of interaction.

Pragmatism covers a range of philosophical topics such as logic, methodology, metaphysics, ethics, politics and education, but Dewey’s philosophy has more to offer for educational practice. Dewey (1929), as cited in Biesta and Burbules (2003 p.16), believed that educational practice is “the beginning and the close” of all educational enquiry. While it provides the source of problems to be investigated, educational practice is also the final test of value of the conclusions of all research. With his constant claim that the only purpose of

educational enquiry is to make the actions of educators more intelligent, Dewey believed that the “final reality” of educational science was “the minds of those engaged in directing educational activities” (Dewey, 1929 p.16 as cited in Biesta & Burbules 2003). As implied by Dewey’s view, Biesta and Burbules (2003) suggested that teachers should become active researchers and approach their teaching practice in an experimental and an investigative way.

According to Johnson and Onwuegbuzie (2004), to answer research questions, the research approaches under the paradigm of pragmatism can be mixed fruitfully with research that is often multi-purpose. Nevertheless, from the lens of pragmatism for educational practice, no specific approach is proposed for carrying out educational research but it is suggested that there should be an underlying transactional framework that helps the understanding of knowledge for human action and interactions, with the outcomes of educational research being applicable to the practitioners (Biesta & Burbules, 2003).

### **3.3 Methodology**

The pragmatic paradigm permits studies to be conducted in areas that are of interest, embracing appropriate methods and using findings in a positive manner in harmony with the value system held by the researcher (Creswell, 2009). In the current research investigating the affordances of mobile learning and Facebook to enhance ESL learning, a flexible approach was needed that allowed me to interpret what I was exploring to determine a theoretical framework that could be the basis of my iterations. Concurrently, I needed to ensure that I designed appropriate classroom interventions that adapted the use of mobile learning and Facebook in the learning activities. The methodological choice that I made needed to incorporate on-going iterative processes where

theories and practice were tested according to the feedback from the participants, my reflections and the environment. I needed to be able to explore both positive and also negative affordances of the technologies that I investigated, and initiate possible solutions to address any problem that arose. The solutions needed to be useful to teachers teaching ESL learners. For these reasons, it was decided that Design Based Research (DBR) methodology fitted well with pragmatism because this methodology involves a set of analytical techniques that balances the scientific and naturalistic paradigms and aims to bridge theory and practice in education. Using DBR, I was able to understand how, when, and why educational innovation works in practice, as this methodology aims to “undercover the relationship between educational theory, designed artifact and practice” (The Design Based Research Collective, 2003).

Wang and Hannafin (2005) explained that DBR was originally used to design models to address emerging technological innovations. This practical and comprehensible methodology allowed researchers to use appropriate tactics and techniques in different stages of test and modifications. It involved cycles of designs that went through the process of testing, modification, re-designing, making another test and modifying it. Past research that used this methodology aimed at improving ICT integration (Sandoval & Bell, 2004; Wang & Hannafin, 2005) as well as proposing innovative technological-based solutions to address educational problems (Mantei & Kervin, 2007). As the methodology was mostly used in research related to technological innovations and continuous improvement of education practices, it was relevant to be adapted in this study because it suggested designs that addressed realistic teaching skills and needs.

### **3.4 Design Based Research (DBR)**

Wang and Hannafin (2005 p.6) defined DBR as “a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories”. It is an empirical technique and too loose to be considered a methodology, but the practice of DBR has begun to differentiate and become more disparate. Sandoval and Bell (2004) considered it as a paradigm, especially because it has been used primarily for educational technologies and other complex innovative approaches in classroom settings.

There are five key characteristics of DBR listed by Wang and Hannafin (2005): it is pragmatic; grounded; interactive, iterative and flexible; integrative and contextual. First, DBR is pragmatic because it refines both theory and practice. Research using this methodology is theory-oriented where the design is based on a conceptual framework and upon theoretical propositions, with the systematic evaluation of consecutive prototypes of the intervention contributing to the theory development; without this attribute, DBR is reduced to simply methods and procedure. Second, DBR is grounded since, according to Wang and Hannafin (2005), this methodology requires researchers to select theory about learning and instruction and to examine the literature before conducting any research. Third, DBR is interactive, iterative and flexible as it involves designing interventions that are tested, evaluated, refined and adjusted (Cobb et al., 2003). These practices reflect the continuous, cyclical, iterative and flexible nature, which aims to produce design principles. This methodology ends with design principles, learning theories, interventions, curricular products, instructional tools, and practical solutions, which can be continuously refined

and improved. Fourth, DBR is integrative because it requires collaboration among researchers and practitioners to develop workable and effective interventions by studying successive versions of the intervention in the target context (The Design Based Research Collective, 2003). Anderson & Shattuck (2012) felt that the partnership between researcher and teachers in conducting research is important because teachers are usually occupied with their own work and may not have skills for conducting research. However, their input can be very beneficial for researchers. Finally, DBR is contextual because the research result is connected with the design process and findings. The research has to be conducted in classroom practice, with aspects of the research able to be made generalizable, and it is utility-oriented, where the merit of a design is measured, in part by its practicality for users in real contexts (Akker, 1999). Cobb et al. (2003) also said that DBR is different from conventional approaches because it aims at advancing knowledge about the characteristics of interventions, and also focuses on the design and the development processes. It involves the dissemination of ideas because the main purpose of DBR is to accomplish more 'usable knowledge' that relates directly to the problem of practice (The Design Based Research Collective, 2003 p.5).

DBR when compared with the 'traditional' approaches, to a certain extent, can be seen as a type of action research as it involves a process of studying a real school or classroom situations to understand and improve the quality of actions or instruction; however, when compared to action research, which is initiated to solve an immediate problem, DBR is informed by relevant literature. Both approaches aim to bridge the gap between research and practice in education through investigating and understanding reality, and hope to introduce solutions to solve realistic problems and thus improve practices in educational settings

(Cohen, Manion, & Morrison, 2007). However, DBR is different from action research in that it aims not only to refine a design intervention towards improving practice but also to refine theory (Bielaczyc & Collins, 1999). Another aspect of difference is the role of participants: Wang and Hannafin (2005) emphasized that, in DBR, the researchers take on the role of both researchers and designers of interventions, while in action research, practitioners initiate the research process and researchers are only invited later to facilitate the research process. This is due to the fact that action research is a form of self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own practices, their understanding of these practices, and the situations in which the practices are carried out (Carr & Kemmis, 1986 p.162).

Two other approaches which I believe to be similar to DBR are participatory action research and formative evaluation. Participatory action research is a qualitative approach that supports systematic theorizing and improvement in both theories and practice. With the aim of understanding what is going on in the research setting and to improve the quality of actions or instructions, it combines both the goals of improved capacity and practice of researchers, as in action research, and of achieving practical objectives and changing social reality, as in participatory research, through group participation. Nevertheless, improvements resulting from this approach typically derive from participants' own research, as they are responsible for carrying out the data collection and analyzing the results, unlike interventions designed and progressively refined in collaboration with researchers (Kemmis & McTaggart, 2005). This approach is therefore suitable to be used with teachers as participants but not with students, as is the case in this study.

Similarly, intervention design, also known as formative evaluation, focuses on the process while an intervention takes place and permits the researchers, designers and learners to monitor how well the instructional goals and objectives are being met. However, this approach does not have theory generation as a goal; rather, its goal is to improve the practice of design (Barab & Squire, 2004). This explains the reason why formative evaluation is considered as a main methodology under the umbrella of DBR but not the other way around (Wang & Hannafin, 2005a). To produce new theories that account for teaching or learning in naturalistic settings (Barab & Squire, 2004), the evaluation carried out in DBR is not simply a type of formative evaluation since it does not allow researchers to understand the ecological validity of theoretical claims generated in the laboratory but rather focuses on advancing theory grounded in naturalistic contexts.

DBR can be time-consuming, with the continuous development of interventions and theories, but the ongoing and recursive nature of the design process demonstrates more flexibility than the traditional experimental approaches. Unlike DBR, traditional experimental approaches or quasi-experiments have control groups, with subjects randomly assigned between the groups, and the researcher manipulates one variable and controls or randomizes the rest of the variables. Tied to neither positivist nor interpretivist approaches, DBR is more flexible and, as suggested by Abdallah (2011) and Wegerif (2009), simplified versions of DBR can be used by PhD researchers. According to Wang and Hannafin (2005), DBR has one outstanding characteristic: it is flexible and can be adjusted to the purpose of the research work. However, there are a number of criticisms and challenges of this methodology and these are discussed in the

next section, followed by an explanation of how I tried to overcome these criticisms and how I adapted the methodology to conduct the study.

### **3.5 Criticisms and challenges of DBR**

Using theory-driven design to produce an adaptable intervention that can be improved through empirical studies raises significant challenges in order for DBR to be accepted as a scientifically sound enterprise. Since this emerging paradigm is still in its early stages, Dede (2005) highlighted that it lacks a unified standard, which means in essence that this methodology is criticized for lacking validity and credibility. Addressing this challenge, Bielaczyc and Collins (2007) and Dede (2005) suggest that the DBR community should engage in substantial collective reflection on setting standards that improve the quality of DBR. However, for Bowler and Large (2008), the strength of DBR lies in its contextual nature. Experimental designs may provide the opportunity to identify cause-and-effect relationships and tend to be higher in internal validity, but non-experimental studies like DBR tend to be higher in external validity as results can be used to generalize and/or extrapolate to natural settings, especially to contexts similar to where the research is conducted. Techniques of other research philosophy are adapted, such as thick description of datasets, systematic analysis of data with carefully defined measures, and consensus building within the field around interpretation of data (The Design Based Research Collective, 2003). Another way of addressing the issue of the reliability, validity and credibility of DBR is to utilize triangulation, which, according to Bryman (2012), helps to enhance confidence in the findings. With the use of multiple and mixed methods, the body of evidence is built up to support the theoretical principles underlying each iteration, thus helping to refine innovations in contexts (Kelly, 2004; Wang & Hannafin, 2005a).

While DBR has the potential to develop theories of learning and instruction that are contextually based (The Design Based Research Collective, 2003), Cobb et al. (2003) claimed that many design studies lacked a strong theoretical foundation, as they did not attempt to generate findings for the refinement and evolution of theory. Brown (1992) also warned of the tension between theory and practice, and raised challenges to those engaged in DBR in determining how to actually contribute to theory development in a way that leads to both conceptual understanding and to practical dissemination. However, Dede (2005) contended that under-conceptualising and over-methodologising are not intrinsic to DBR, as some studies result in valuable findings and use elegant collection and analysis strategies. One of the examples that showed new insights concerning new pedagogy in the classroom context highlighted in The Design Based Research Collective (2003) was the research by Linn and Hsi (2000).

Research conducted in school settings could interfere with school time, plan and schedule, and is often conducted within natural, messy teaching situations (Brown, 1992). There is also a logistical challenge for this methodology, requiring collaborative partnership with participants in the research context, where the success of the innovation and the knowledge gained from the study rely on a sustained partnership between researchers and teachers (Linn & Hsi, 2000). Probably for these reasons, Herrington, Mckenney, Reeves and Oliver (2007) claimed that DBR was avoided by doctoral students who were expected to complete their degree in 4 to 5 years, although the use of this methodology is feasible if it is used to suit the context and particular condition of PhD studies. As DBR is open to modifications, this attribute also poses a challenge to researchers to design a study in a format that answers the questions addressed

and allows the research to be conducted within the specified time allocated. To address the issues mentioned, this study used a simplified and flexible format of DBR that suited the time span given for me to complete my PhD.

During the long period required to conduct a study using this methodology, DBR can also be 'over-methodologised' because it can produce excessive amounts of data which subsequently require a great deal of analysis (Brown, 1992; Dede, 2005). Since it permits the use of mixed methods, the data can derive from ethnographic methods and also from statistics (Collins, Joseph, & Bielaczyc, 2004) and may therefore require a longer data analysis process. With various types and means of data collection, Brown (1992) was concerned that it may lead to selection bias, where, when selecting cases to illustrate points, a biased view of the data may be created. Equally importantly, the complexity of implementation, the inability to control many variables in complex settings, and the problem of analyzing large amounts of data collected before the next cycle could also make it difficult to generalize among participants (Kelly, 2004). To address this complication, a researcher planning to use this methodology should understand that controlling variables as in experimental studies is not the main practice of DBR, although this situation still gives the challenge of rigor for DBR to be used as an established methodology. Experimental research may seem to be more rigorous as it has the power of controlling and generalizing results to other contexts. However, for research conducted in the context of human learning, there are many interfering variables, such as students' socio-economic background and personal experience of using technological devices, which cannot be controlled. Therefore, to ensure that the findings and the research process of a study adapting DBR can be disseminated to others, it is important that the methods,

the data collection and the analysis are performed systematically and as openly as possible.

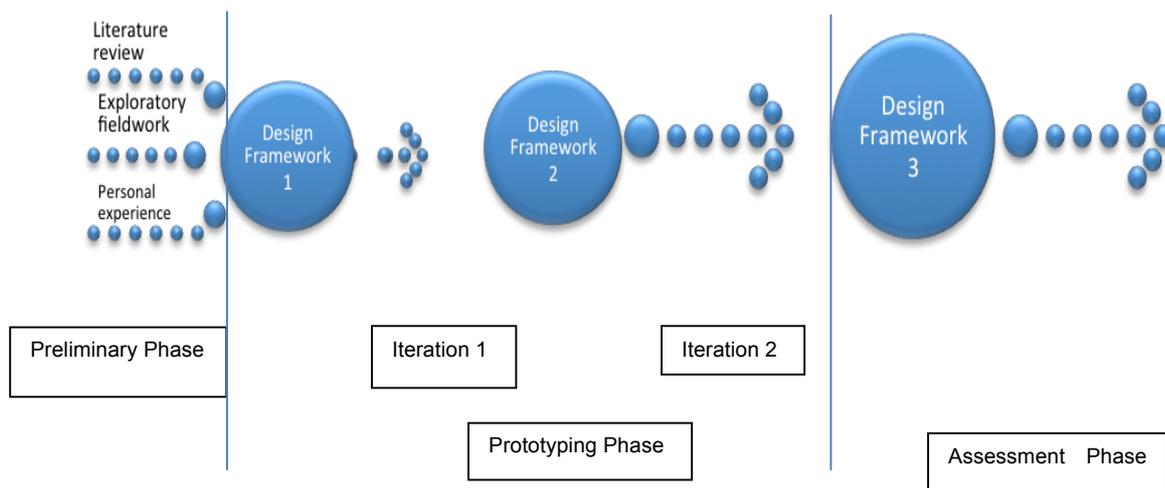
A study which is contextual, deep and detailed, could be seen as more rigorous than others whose results are generalizable but inaccurate. Furthermore, through iterations that are designed to be prospective and also reflective in DBR, researchers can develop and respond to the imperfections and issues emerging in the teaching and learning settings and also allow for investigation of other aspects of the research field that may have not been the initial focus. Researchers applying DBR should also be able to adapt themselves to other roles while iterations are being conducted without losing sight of their primary role of researcher. The experience of conducting this research has taught me to balance my roles as a teacher and as a researcher. As a teacher, I tend to facilitate students' learning and give them various clues for any tasks they are assigned so that they can answer the questions posed. However, since my research explored the affordances of mobile learning and Web 2.0 tools, I learnt to limit myself in assisting the participants and I encouraged them to use suitable technologies that they felt could answer the questions, and to make decisions without my influence. As a teacher, I always felt that I had control over my students when doing any tasks related to my teaching; but in this research, I learnt that, although the participants volunteered to take part in the study, they had the right to withdraw from the study any time they wished. I also learnt that good researchers should be able to balance their roles by realizing when one role should be more dominant than another in a certain stage. I found this balancing a challenge as I had to ensure that every decision that I took as a teacher, while the iterations were being conducted, was because it had been

planned in the design framework, and not because of the power that I had as a teacher or researcher.

### **3.6 Research procedures**

Common procedures and steps for conducting a DBR study involve a number of stages. Conducted based on the three-phase DBR design proposed by Plomp and Nieveen (2007), this study was unique because it adapted the cyclical character of DBR (analysis, design, evaluation and revision) to address the research questions. The normal practice of DBR has a linear sequence of iteration, where researchers build their understanding based on the findings that they learn from the previous iterations. All refined conjectures are re-tested in subsequent iterations. However, for this study, not all conjectures that had been proven in the first iteration were tested in the second iteration. It was done in a semi-linear way because it selected salient conjectures from Iteration 1 to be investigated in Iteration 2, rather than repeating the testing of the full set of conjectures. Important issues which emerged from the first iteration were further investigated in the second iteration using a different learning focus and different participants.

Figure 2 illustrates how this study was conducted using DBR methodology, adapting the model of Plomp and Nieveen (2007).



**Figure 2: Stages involved in this research**

This study began with the Preliminary Phase. This phase acted as a theoretical and empirical foundation of the whole study. A comprehensive review of literature was conducted to clarify the key terms used in the research, finding the affordances of Facebook and smartphones for language learning, and understanding the theoretical principles that underpin most mobile learning projects and relating them to the needs of ESL learners. The conceptual framework of this study was presented at the end of Chapter Two (Literature Review).

Still in the Preliminary Phase, an exploratory study was conducted with 14 practitioners to refine the initial design framework. Chapter 4 explains how the exploratory study was conducted and the findings of this stage. The practitioners involved were eight teachers and five students who had experience of adopting mobile devices and Web 2.0 in their teaching and learning, and also an engineer, who commented on the network infrastructure in Malaysia and in the UK (the setting where this study took place). The teachers and the students were asked how a lesson that incorporated smartphones and Facebook technologies should be designed and about the challenges of

adapting the technologies for teaching and learning. Based on their input, the literature, and also my personal experience as a teacher, Design Framework 1 was formed and it is presented at the end of Chapter Four.

This study then proceeded to the Prototyping Phase. I tested and developed the design conjectures of this research through a series of two iterations. The first iteration tested a set of design conjectures (Design Framework 1). Based on the findings from this iteration, salient conjectures were selected and some were refined, rather than repeating the testing of the full set of conjectures in Iteration 2 (refer to Chapter 6). Besides testing the refined conjectures, Iteration 2 also further investigated important issues raised from Iteration 1. Based on the feedback from the respondents, a number of new conjectures were also developed. Conjectures from Design Framework 1 that had been proven but were not suitable to be re-tested for the context of Iteration 2 were proposed as Design Framework 3.

Both iterations were conducted with different participants and in different learning contexts. The activities in each iteration were designed in consideration of the affordances of the technologies tested. Each iteration, being a micro-cycle of research with formative evaluation as the most important research activity, aimed at improving and refining the interventions. Iteration 1 (refer to Chapter 5) tested all the conjectures in Design Framework 1.

This qualitative study was very detailed and precise in studying how each group participated in their Facebook Groups and used mobile applications besides other means of communication in order to do the tasks assigned. Starting with the first group in the first iteration, I used the basis of their answers in the interview, my observations and my notes as a researcher to confirm the

conjectures tested before I decided my focus for iteration 2. To add to the reliability of this research, when evaluating the learning programme in each iteration, I also used some quantitative data by giving numbers to how many participants mentioned the positive and negative points, and how many of them raised any new interesting issues to be further investigated for future research.

The last stage of this study is the assessment/ reflective phase. The findings from Iteration 2 were reported, and guided the revised version of the framework. Based on the input from the Prototyping phase, summative evaluation was carried out to conclude whether the intervention met the pre-determined specification and to suggest recommendations for further improvement. The final design framework produced suggested implications for ESL curriculum design, together with contributions to theory, practice and methodology.

### **3.7 Context of the study**

The Exploratory Study was conducted through Facebook online platform and also face-to-face interaction. This was because the participants were in different locations while the Exploratory Study was conducted. For the Prototyping Phase, both iterations were conducted in Exeter, United Kingdom, with all the student participants still studying in the University of Exeter. Both iterations took place at different times from 2013 to 2014 in a context of peak times for most university students, in that a large number of the participants had deadlines for assignments, writings and tests. It was difficult to delay the study to a time where all participants were free from assignments, tests and deadlines as the iterations had to take place during the university academic year. All participants refused to take part in this study if it was to be conducted during term breaks.

### 3.8 Participants

Different groups of participants took part in the two iterations. All of them are Malaysians and they were chosen because they are all adult learners and speak English as a second language. They varied in terms of their background, the courses that they were enrolled in and their ages. Only one participant was not a student, while the rest were all University of Exeter students. The student participants were all high achievers as they had been selected to receive a scholarship from various agencies in Malaysia to study at the University of Exeter. They also had to meet certain criteria before being accepted at the university. Table 2 shows the pseudonyms of the participants: 14 participants took part in the Exploratory Study, 17 participants were involved in Iteration 1 and 8 in Iteration 2. More details of the participants can be found in subsequent chapters.

**Table 2: Participants of this study**

No.	Exploratory Study	Prototyping Phase	
		Iteration 1	Iteration 2
1	SP	AR	JOY
2	SR	AL	SHA
3	RM	DE	ZAI
4	AD	AH	ATI
5	SY	AZL	SAI
6	NR	LS	SYA
7	HN	IZ	AIR
8	FT	BH	NAN

9	ZL	IL	
10	IK	AI	
11	WD	FD	
12	BN	YT	
13	YN	SYE	
14	JJ	DM	
15		AZ	
16		EM	
17		LE	

### **3.9 Teaching sessions and tasks in each iteration**

The iterations included a formal face-to-face input of content by the teacher in the classroom before students were asked to do task-based group assignments utilizing smart mobile devices and Facebook technologies. In Iteration 1, the participants attended the Professional Communication Skills at the Workplace workshop. The task-based group assignments required them to prepare for group presentations that utilized a variety of media (images, audio and video). In their presentation, they had to conduct two different meetings: the first meeting was between a marketing team and customers and the second was between a Domestic Enquiry Team and a board of directors of a company. In Iteration 2, the participants attended an academic writing workshop. The tasks given after the workshop required them to write academic essays, to comment on each others' work and to have group discussions on their writing using the online platforms. More details of the lessons and the tasks given in both iterations are provided in Chapters 5 and 6.

### **3.10 Methods used**

The main data in this qualitative study came from semi-structured interviews, online entries, and my research field notes. All three methods were used in both iterations.

#### **3.10.1 Semi-structured interview**

The interview is among the most popular data collection methods and it allows construction of knowledge and exchanging of experiences between the interviewer and the interviewee (Kvale & Brinkmann, 2009). Kvale and Brinkmann (2009) also suggested using this method to draw out the deeper significance of an event. The approach in qualitative studies is less structured as compared to quantitative research, which is intended to maximize the reliability and validity of the measurement of key concepts (Bryman, 2012). Interviews in qualitative studies focus on greater generality in the formulation of initial research ideas and on interviewees' perspectives; so, 'rambling' or going off at a tangent is often encouraged to give insight into what the interviewee sees as relevant and important because what the researcher wants are rich, detailed answers (Bryman, 2012).

The semi-structured interview, the type chosen in this research, is "a planned and flexible interview with the purpose of obtaining descriptions of the life world of the interviewee with respect to interpreting the meaning of the described phenomena" (Kvale & Brinkmann, 2009 p.124). As stated by Manson (2002), this type of interview relies on the researchers' specific ontological and epistemological positions concerning knowledge and interaction with participants. It was used in the context of this study to understand the participants' perspectives when using the technologies investigated. In both

iterations, the respondents were asked about their experience and understanding of using their own smartphones and Facebook, and also other mobile technologies and means of communication, to do the task based activities assigned. The experience may not have been fully captured if other tools of investigation had been used because in this study; the focus on meanings from the participants' perspectives and their understanding and experience were very important to answer all the research questions. The semi-structured interview also adds flexibility to the investigation (Cohen et al., 2007), as it allows researchers to have a deeper understanding of the phenomenon under investigation and, at the same time, to cope with unexpected findings. In addition, the use of semi-structured interviews is also in line with the requirements of DBR methodology, which emphasizes the importance of interaction with individuals involved in the research process by interacting with them as co-participants who have a significant role (The Design Based Research Collective, 2003; Collins et al., 2004).

In Iteration 1, the interview was conducted with 17 participants, while in Iteration 2, eight participants were involved. All interview questions were tested with other Malaysian students studying at the same university as the participants of this study. They were also validated by the research supervisors of this study. All interviews with the 25 participants from both iterations were completed within two months, and were conducted after the students had finished the tasks assigned. Each session lasted for an hour and interviews were conducted face-to-face. All participants determined their own locations; most of them preferred to be interviewed in their houses or in empty classrooms in the Forum building, University of Exeter. With the consent from the participants, all the interviews were videoed and audio-taped. Both devices were used to back up each other

in case one of them failed while the recording took place. I asked a person to help to do the video recording and take care of all the equipment needed for each interview, such as tripod, extension wire, external hard-drive and laptop, so that I could be more focused. By having him take charge of the technical matters, I also hoped that this would create a good image for my respondents, showing them that everything was well taken care of for the interview sessions. After the interviews were transcribed, they were sent to the participants for them to validate.

In Iteration 1, to answer the research questions of this study, 27 questions were set to investigate the affordances of integrating the tools of Facebook and smartphones, the factors that influence the pedagogical affordances of the combination, the extent to which learning through the combination of technologies can support collaborative learning and motivate students, the ways in which different means of technology and communication work together to create continuity of learning, and the roles of teachers when utilizing these technologies in their teaching (See Appendix F for interview schedule and Appendix G for interview questions). Although the themes guided the knowledge construction, the semi-structured interviews used in this research were also inter-subjective and social, in that the researcher and the participants made co-constructions of knowledge. The interview structure kept the conversation free-flowing and there was also “openness to changes of sequence and forms of questions in order to follow up the specific answers given and the stories told by the subjects” (Kvale & Brinkmann, 2009 p.124). It was hard to have a firm, totally structured order for the questions as each participant had his/her own way of adapting smartphones and Facebook to do the tasks assigned; Miller and Brewer (2007 p.167) highlighted that the flexibility

of using semi-structured interview lies in the fact that “the interviewer may ask certain major questions the same way each time but may alter their sequence and probe for more information”. While conducting the interview, there were also times when I rephrased some questions when I realized that participants were unsure of how to answer them. They were also given equal opportunities to elaborate any matters that they felt were very significant to them in this study.

### **3.10.2 Development of the interview questions**

As shown in Table 3 below, the interview questions were developed to answer the research questions of this study. They were also modified after I conducted the Exploratory study, and a number of research questions added. For example, to find the answer for research question 1, initially the student participants were only asked about possible Facebook tools and smart mobile devices that they would use to do the tasks. The participants said that it was impossible that they would only Facebook tools and smartphone because they needed other technologies and means of communication to do the tasks. They agreed that they would use Facebook as their platform to keep information and their channel of communication but they emphasized that they also needed their laptops, various smartphones and tablets’ applications, and also face-to-face meetings to communicate about the tasks. So, questions asking about other possible technologies and means of communications were added to the interview to explore the pedagogical affordances of Facebook and smartphones to enhance their learning. Based on the respondents’ answers, research question 2 was also added, asking how the different means of communications and technologies help to create continuity of learning.

**Table 3: Interview questions in Iteration 1 that seek answers for the research questions of this study**

<b>Research question</b>	<b>Interview questions for Iteration 1</b>
<p>1. What are the pedagogical affordances of integrating the tools of Facebook and smartphones into the teaching and learning of English for ESL students?</p>	<p>Do you use any smart mobile device for language learning purposes?</p> <p>What are your favourite applications in your smart mobile devices that are helpful for language learning?</p> <p>For this assignment, what types of mobile devices did you use?</p> <p>Did you use laptops? If you did, when and where did you prefer to use laptops?</p> <p>Did you use Facebook tools to do the assignment?</p> <p>Which Facebook tool did you use and how did it help you to do the assignment?</p>
<p>a. What factors influence the pedagogical affordances of the combination of smartphones and Facebook to enhance learning of English for ESL learners?</p>	<p>Explain some situations where using smart mobile devices and Facebook tools helped in your learning in this iteration.</p> <p>In what situations did the combination of technologies not help?</p> <p>When did you connect to Facebook from your smart mobile devices, and in which situation did you use your laptop to get into the website?</p>
<p>b. To what extent can learning through smartphones and Facebook tools support collaborative learning, and how?</p>	<p>How did your group collaborate to prepare the videos and the presentation?</p> <p>In this assignment, you were required to do it with your group, discussed how to do it virtually using your smart mobile devices, and searched and shared information with the others. Did these requirements burden you?</p> <p>If yes, in what way did the requirements burden you? If no, in what way did the requirements not</p>

	<p>burden you?</p> <p>What were the problems/issues that you faced that might have delayed your/your group progress?</p>
<p>c. To what extent can learning through smartphones engage and motivate learners, and how?</p>	<p>Did you like learning with each other using smartphones and Facebook in this iteration?</p> <p>Did they engage and motivate you to learn in this iteration? If so, how?</p> <p>How did you find the task that required you to use videos and pictures for the presentation?</p>
<p>2. How do different means of communication and different technologies help to create continuity of learning?</p>	<p>Besides Facebook, were there other Web 2.0 tools and software/applications that you used to do the assignment?</p> <p>How did they help to do the assignment?</p> <p>What means did you use to conduct discussions with your friends?</p> <p>When did you prefer to discuss virtually and in what kinds of situations did you prefer to discuss face-to-face?</p> <p>Did the use of various technologies and means of communications help your learning in this iteration? If they did, how were they useful and if they didn't, how were they not useful?</p> <p>How did the use of various technologies and means of communications during the iteration help to create continuity of learning?</p>
<p>3. What are the roles of teachers when adapting the technology of smartphones and Facebook for their teaching?</p>	<p>What kind of guidance from Kak Normy did you hope to receive as you were expected to work collaboratively, use your smart mobile devices and Web 2.0 tools?</p> <p>How did you feel when Kak Normy posted information on your Facebook Group wall? Did it have any impact on your group's work progress?</p> <p>In your opinion, how can Kak Normy improve the task so that students would use their smartphones/tablets and tools of Web 2.0 to learn</p>

	collaboratively with others?  Do you have other things to say regarding the use of smartphones and Facebook for learning in this iteration?
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In Iteration 2, semi-structured qualitative interviews were conducted to evaluate the participants' perceptions of the impact of this intervention (Bryman, 2012). The findings and suggestions from the participants were considered for the design of the third iteration. As this iteration further explored the issues raised in Iteration 1, the interview focused on how teachers should conduct their lesson using smartphones and Facebook tools with consideration of the positive and negative affordances of the technologies (see Appendix K for interview questions and Appendix L for interview schedule). Iteration 2 was conducted with a particular focus on the issue of social intrusion; therefore, as shown in Table 4 below, the interview questions focused on how many notifications on smartphones and Facebook given to participants were just right, how much was too much and what were the roles of teachers in creating a motivating and supporting online learning environment. Based on the experience of being involved in this study, participants were also asked to raise any issues that should be addressed for the improvement of future research.

**Table 4: Interview questions in Iteration 2 that seek answers for the research questions of this study**

<b>Research question</b>	<b>Interview questions for Iteration 2</b>
1. What are the pedagogical affordances of integrating the tools of Facebook and	In this iteration, you were asked to correct your friends' work, you received feedback on your work from various friends and the teacher and you also took part in the online conversation that shared ideas on how to improve academic

<p>smartphones into the teaching and learning of English for ESL students?</p>	<p>writings. What have you learnt from this experience?</p> <p>Do you have other things to say regarding the use of smartphones and Facebook for learning in this iteration?</p>
<p>a. What factors influence the pedagogical affordances of the combination of smartphones and Facebook to enhance learning of English for ESL learners?</p>	<p>What do you think about the use of Facebook tools and the Whatsapp Group in this iteration?</p> <p>Have you ever felt that your social space was being violated in this iteration? If so, how?</p> <p>How could the use of Facebook tools and Whatsapp be improved?</p>
<p>b. To what extent can learning through smartphones and Facebook tools support collaborative learning, and how?</p>	<p>Could Smartphones and Facebook technologies encourage collaborative learning among students? If so, how?</p>
<p>c. To what extent can learning through smartphones engage and motivate learners, and how?</p>	<p>How did you feel when your friends and the teacher commented on your work and gave their opinion?</p> <p>How did you manage the different perspectives?</p> <p>After several people checked your writing, do you think that the checking made you more aware? If so, what makes you think so?</p> <p>When you did your writing individually, did you think about the comments given by your friends and teacher?</p>
<p>2. How do different means of communication and different technologies help to create continuity of learning?</p>	<p>What were the technologies and means of communications that you used in this iteration?</p> <p>Why are they useful in your learning?</p>
<p>3. What are the roles of teachers when adapting</p>	<p>How did you feel when messages or announcements were sent to you through the Facebook and the Whatsapp Group used in this</p>

<p>the technology of smartphones and Facebook for their teaching?</p>	<p>iteration? Did they bother you in some way? If so, how?</p> <p>Imagine that you assign a group of students to work on a project collaboratively. The students are busy with their study and social life but the project gives benefits to them in some way. How would you overcome the tendency of violating the students' social space so that they could still produce the project collaboratively?</p> <p>How much notification is just right and how much is too much?</p> <p>What do you think about the Ground Rules that were set in this iteration?</p> <p>Are they important for teaching and learning that utilize smartphones and Facebook? If so, why?</p> <p>Is there a possibility that having the ground rules may prevent some unknown danger? What are the dangers?</p> <p>Instead of setting up rules, do you think students should be given more freedom to utilize their smartphone and Facebook technology anytime and anywhere they want for learning?</p>
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As with Iteration 1, all the interviews in Iteration 2 were recorded, transcribed and checked by the participants for accuracy and to add to the reliability of the qualitative data.

Before conducting the interviews for both iterations in this study, I paid particular attention to building rapport with all my participants. In my opinion, interviews of this qualitative nature require a good relationship between researchers and the respondents and this was not achieved instantly. In iteration 1, while asking my respondents to share their experiences, initially, I felt that they treated the interview very formally; they were anxious that they might not be able to answer

the questions and I saw that they really tried their best to answer with very good sentence structure, free of grammatical error. In the first two interviews, all the answers given by them reflected positive affordances of smart mobile devices and Web 2.0 tool in enhancing their learning and not one participant touched on their negative aspects. I suspected that this kind of response might be because the respondents did not see me as a researcher but as an English teacher, a person who might assess them. So, I changed my strategy by being more casual with them. I had some casual chat before the interview started, I thanked them for participating in the research and I told them that they were allowed to use Malay language or a mix of Malay and English throughout the interview. I clearly informed them that they were not assessed by the choice of language that they used. In fact, the interview was conducted just to ask about their experience in the iteration. When they were allowed to use Malay, I sensed that I had lowered the imbalance of power in the relationship between the respondents and myself, and most of them were then willing to discuss some negative points in the iteration and the use of smart mobile devices and Web 2.0 for the assignments. In making sure that they were comfortable, I allowed every participant to read the entire interview questions and the interview session only commenced once the respondents were ready. For most respondents, I realized that some information was conveyed faster when we both used Malay, probably because they felt that it was easier to express certain points using our mother tongue. For this reason, I did not use a transcription service for transcribing and translating all the interviews; this was carried out by me. As an English teacher who had the experience of teaching in schools and a university in Malaysia and also a speaker of Malay language as my first language, I believed in my ability to translate the interview from the

Malay language into English. I did not get anybody's help to interpret the meanings of the interview, as I was the one who conducted it, and I was able to remember my participants' gestures when conveying their point. With an understanding of the cultural background of the respondents, I believed I was the best person to interpret their meanings.

In Iteration 1 and Iteration 2, to build a rapport with my participants, from the beginning of the iteration, all participants addressed me as 'Kak Normy' instead of using a more traditional form of addressing a teacher, like 'Mrs Sazalli'. 'Kak Normy' literally means 'Sister Normy', and after 2011, all Malaysian students studying at the University of Exeter addressed me with that name. They called me sister because I was older than them and that address in the Malaysian culture is used as a sign of respect to the elders. Malaysians generally would feel uncomfortable if they did not properly address people who were older than them. I believed the address 'Kak Normy' also helped to create a degree of family bonding between the respondents and myself and thus encouraged them to feel comfortable and to be sincere in expressing their thoughts during the interview. I was aware that all the participants in this iteration had never participated in research and most admitted that they felt nervous to be interviewed. So, while conducting the interview, I created an atmosphere that encouraged them to talk freely and to be clearly understood by being an active listener. I realized that this was difficult for me because I always tended to give my own opinion while they were expressing theirs. So, I had a habit of holding a pen tightly as a way to allow them to talk and to stop me from 'hogging' the interview. Being an active listener, I also asked questions that I genuinely wanted to find the answers to, not the kind of questions that fed the responses that I hoped to get. After getting the answers from them, I also reiterated what

had been said by the respondents by saying something like, *“let’s go to what you have said on the advantages of using smartphones for this assignment”*. The respondents were given a chance to clarify themselves for parts that they thought were not clearly conveyed.

### **3.10.3 Online entries**

Silverman (2001) said that to study a culture, social setting or phenomenon, the act of collecting and analyzing the texts and online entries produced and used by members of the society can help to foster understanding. When analyzing texts and online entries, the researcher may focus on how and for whom the online entries are created, what is included and not included in the document, and how the document is used. The online entries collected in this study, however, were not intended to be analyzed because they were used to support the findings from the interview. The online entries collected were from the teacher and participants’ postings on Facebook Group Walls, students’ comments and their threads of conversations in their Facebook Group. There were also threads of students’ group conversation with the teacher on Facebook Messenger. Besides student and teacher conversations on Facebook, the online entries collected in this study were also gathered from personal and group conversation via Whatsapp messages through smartphones. These messages were essential in explaining how participants in both iterations utilized their smartphones to communicate and collaborate with each other when doing the tasks given.

### **3.10.4 Research field notes**

According to Cohen et al. (2007), the notion of reflexivity requires a self-conscious awareness of the effects that the participants as practitioners and

researchers are having on the research process: how their values, attitudes, perceptions, opinions, actions, feelings are feeding into the situation being studied. To carry out reflection-in-action and reflection-on-action, my research field notes were very important in recording all the reflections that I had before, during and after both iterations took place. The importance of reflexivity in research was also highlighted by Atkinson and Hammersley (2007), Cohen et al. (2007) and Flick (2014), since researchers are inescapably part of the social world they are investigating. Before this study was conducted, I recorded my thoughts about the primary and secondary source materials on mobile learning research that I read. To find the areas that I wanted to focus on in this study, the research field notes recorded my questions about the materials, my tentative answers to those questions and documented the connections that I drew between the materials that I read. I also recorded the gaps that I found in the journal articles on mobile learning and Web 2.0 and the questions that the writers posted to be investigated in future research. The reflections that I documented in my research field notes in some way helped to narrow my focus in mobile learning research besides helping to build the theoretical framework for my study.

While finding some ideas on how I should conduct Iteration 1, I used my research field notes to document how university students used their smart mobile devices for their own independent learning and also how the technologies can be used to enhance collaborative learning. I also recorded possible applications that helped their language learning and I compared how they might be used during my iteration. The input was mainly from past studies in the literature, my former ESL students and potential respondents of this study. Based on my observations that I noted in my research field notes, I

chose to investigate smartphones and Facebook because they were the most commonly used technologies among university students. In the research field notes, I also recorded possible questions that I hoped to ask my potential participants during the interview sessions.

Flick (2014) described the effectiveness of using computers to assist researchers during different stages. Hence computer-based or Web-based research field notes may help to facilitate researchers' reflections. I had a specific Microsoft Word Office file which contained all my research field notes entries, but they were not made on a specific day or at a particular time. So, I recorded my thoughts using the Notes application in my smartphone, as the recording can be done at any time and in any place, whenever I had some ideas about my research. The notes were sent to my electronic mail. After that, the research field notes entry was copied to a Microsoft Word research field notes file for compilation. I found the use of smartphones to record my thoughts was very flexible and manageable for later use. In both iterations, I recorded all my thoughts when I observed students' discussions and activities on their Facebook Groups. I also recorded my observations when I saw postings being 'commented on' and being 'seen' by the participants and my feeling when I read my participants' conversation through Facebook Messenger and Whatsapp text messaging. While both iterations were being conducted, I also had informal discussions with teachers who had experience of using smartphones and Facebook for teaching and other students who used the combination for their learning. Discussions with them were pertinent so they were recorded in my research field notes. At the end of both iterations, I used my research field notes to document my reflections on the current study as this input was important to propose revised design frameworks. I recorded my weaknesses as a teacher in

terms of my actions and decisions and I reflected on which part of the technologies I still needed to improve.

### **3.11 Data analysis**

The data analysis of this study followed the six steps suggested by Creswell (2009), as shown below:

Step 1: *Organization and preparation of data for analysis*. This step was completed by transcribing the interview and arranging the information collected from all sources of data. Each interview took about one hour, and I took about six hours to transcribe every interview. While transcribing them, I started to analyse the meaning of what was said and I stayed close to the data at all times. After the transcription process was completed, the transcriptions were sent to the respondents for checking. They were able to review what they had said and could add more information or make corrections before I began the analysis. After both iterations were completed, I still kept in touch with the respondents as they were interested to know the findings of this study. As stated by Radnor (1994), this is a key aspect of qualitative research. Conversations that I had with the participants after both iterations were completed helped me to reflect on the present study.

Step 2: *Reading the whole data*. The aim of this step is to attain a general sense of the collected data by writing notes in the margin.

Step 3: *Coding procedure*. Creswell (2009) defines this step as segmenting the materials into categories and labelling each category by a term or code. A code is usually a short phrase or a word that “symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data” (Saldana, 2009, p.8).

Step 4: *Description*. This refers to detailed information about people, events or places in the event. A small number of categories or themes are generated by using codes. Themes are the main findings of qualitative research and they should be supported by diverse quotations from the participants (Creswell, 2009).

Step 5: *Representation of the description of the themes*. In this stage, in order to convey the findings of the analysis, a narrative passage is used. Along with this discussion, figures or tables may be constructed to assist the discussion (Creswell, 2009).

Step 6: *Interpretation*. In this final step, the meaning is derived from the information discovered in the findings. Interpretation of analyzed data refers to the explanation of any relationship between generated themes and subthemes. However, “identifying, sifting through and sorting through all the possible factors showing the nature of relationships does not result in a simple “if...then” statement” (Strauss and Corbin, 1998 p.130)

In order to analyze the data, which was mainly from the interviews, thematic analysis was applied where major thematic ideas in the discourse were extracted because they explained what was going on in the data and were relevant to the research questions of this study. Bryman (2012 p.578) said, “a theme for some writers is more or less the same as code, whereas for others it transcends any one code and is built up out of groups of codes”. The coding process in this study was done inductively and in a pragmatic approach, as the coding was driven by the data. It was done within the top-level themes with reference to some of the principles of Grounded Theory. According to Strauss and Corbin (1990), the procedures of grounded theory are designed to develop a well-integrated set of concepts that provide a thorough theoretical explanation

of the social phenomenon under study. The goal of this approach is to generate theories that explain how some aspect of the social world 'works' and develop a theory that emerges from and is therefore connected to the reality the theory is developed to explain (Strauss and Corbin, 1990). In Grounded Theory research, Strauss & Corbi (1990) describe some flexible guidelines for three types of coding: open coding, axial coding and selective coding. The intention of the three types of coding approach is to “deconstruct the data into manageable chunks in order to facilitate an understanding of the phenomenon in question” (Cohen, Manion and Morrison, 2007, p.493).

1. Open Coding: “The process of breaking down, examining, comparing, conceptualizing and categorizing data’ (p.61).
2. Axial Coding: “A set of procedures whereby data are put back together in new ways after open coding, by making connections between categories. This is done by utilizing a coding paradigm involving conditions, contexts, action/interactional strategies and consequences” (p.96).
3. Selective coding: “The process of selecting the core category, systematically relating it to other categories, validating those relationships, and filling in categories that need further refinement and development” (p.116).

All the codings done in Iteration 1 helped to illustrate the pedagogical affordances of smartphones and Facebook in enhancing learning for the context of ESL learners in this study. They also guided the refinement of conjectures tested in the Iteration 1 to be tested in Iteration 2. The approach taken in the data analysis was applied in a systematic and valid way that was founded on established methods, rather than driven by a data analysis tool itself. In this

study, the data from Iteration 1 was analyzed with the help of NVivo 10 software. The software helps to manage, explore and find patterns in the research data but it cannot replace a researcher's analytical expertise (QSR International, 2014).

In order to find the themes, all the data from Iteration 1 was imported into the NVivo qualitative data analysis computer software package. The interview in Iteration 1 was analyzed using the procedures below:

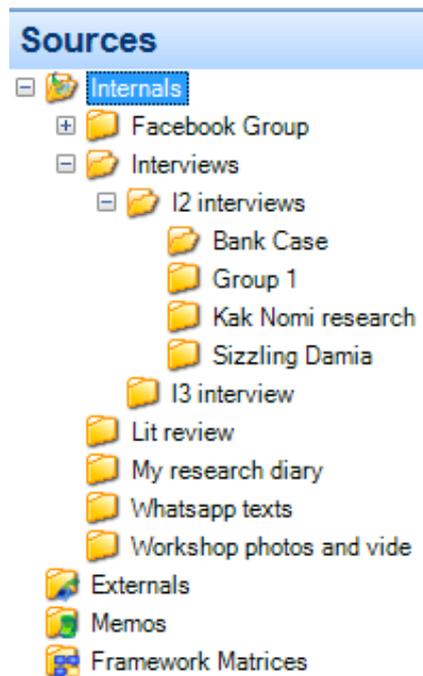
1. Noticing concepts relevant to this study.
2. Collecting examples of these concepts in the interviews.
3. Analyzing these examples in order to find the similarities, the differences, the patterns and the structures.

In noticing concepts relevant to this study, a set of categories or themes was derived from the literature before I began my analysis. The themes used as a framework for analysis in this study were based on the theoretical concepts of the affordances of mobile learning and Web 2.0 tools. In building the concepts relevant to this study, parts of the interviews were first roughly categorized into major themes to reflect possible answers to my research questions. This initial method of organization was to help me code my data. After collecting samples of these concepts, a deductive approach was used because the sample concepts acted as a framework to help me find relevant quotations. Analysis of the data in this research was mostly inductive in that I amended the concepts within each theme which emerged via open and inductive coding. Both inductive and deductive approaches were used, mainly because the interviews were conducted in a semi-structured way, but also due to their flexible nature in helping me to categorize my findings.

Based on the themes emerging from the interview, I searched for related illustrations in the discourse data from the research field notes, Facebook entries and students' personal text messages to support the themes found. The findings from the interview were linked to the actual examples of their discourse. It was important that all the data of this study were imported into NVivo software as this allows an illustration from all the data being coded together. Direct quotations were used to support the conclusions and to bring the readers of this study into the reality of the situation being studied.

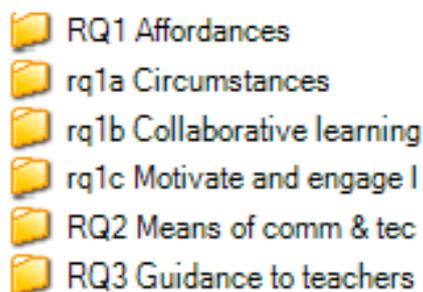
### **3.11.1 Process of coding**

Before any coding was done, all data was first entered into NVivo 10 software. The transcribed interviews, tape and video recording of the interviews, postings in Facebook Groups, my research field notes, photos and videos taken during the workshops, and personal text messages texts were imported as Internal Sources. As can be seen in Figure 3, the Sources contained data from Facebook groups and the Interview folders contained all the information from the respondents of this iteration. All the 17 respondents were divided into four groups: Bank Case, Group 1, Kak Nomi research group and Sizzling Damia.



**Figure 3: A screen shot of Sources in NVivo**

The mode of interview analysis for this iteration focused on meaning making. I created six different folders for every research questions of my study as shown in Figure 4.



**Figure 4: Different folders in NVivo**

Next, different nodes for each theme in the framework were created and labeled with different colours to store all the relevant quotations. The relevant quotations were chunks of data which were mostly sentences and paragraphs. All the main themes were coded as parent nodes and all the sub-themes that

emerged were coded as child nodes. These sentences or paragraphs were allocated or labeled with a closed code from the list of themes, all created to answer the research questions. With the aid of NVivo, this code-retrieve program allowed the coded passages to be retrieved and inspected over again, with options of recoding and of combining codes. The software was also used because, after the coding process was completed, the whole context of where certain coding was derived from could be checked easily.

The codes created were based on the affordances of smartphones and Facebook, which were based on the literature. Meanings of the interviews conducted in this iteration were coded into categories of how often the themes of the affordances of the technologies were addressed in the texts. Other new themes and subthemes that were implicitly embedded in the responses and explicitly mentioned by the respondents were also coded as they emerged. These were un-stated unique topics, which were further researched. As shown in Figure 5 below, the node 'Personal use continuous learning' was created to include participants' quotations on their personal use of smartphones and Facebook tools for their own study. I created the node to record the importance of using the technologies to the participants as evidence that the participants selected in the iteration were all motivated learners and active users of the technologies for their own education purposes.

RQ1 Affordances			
Name	References	Sources	
Personal use continuous learning	57	15	
RQ 1 Affordances of SP and FB	0	0	
Scaffolding to learners' needs	25	12	
Learner generated content	53	16	
Asynchronous & synchronous communication	121	17	
Data & resource capturing and collaboration	99	17	
Enable rich data sharing	32	12	
Negative aspects of SP and FB	0	0	
Social obligation	45	15	
Distraction to students when they are studying	13	9	
sharing unnecessary things	4	4	
phone limitation	25	14	
take for granted	10	7	
no human touch	14	7	

**Figure 5: Different nodes in RQ Affordances node**

After preparing the nodes for all the codes, the next stage was to bring all the individual codes in each theme together. NVIVO allows convenient organization and reorganization of codes, and easy re-coding. It also allows the creation of new themes besides making the process of emerging and detaching of existing themes or sub-themes convenient. Looking at the sets of nodes created, I then examined how each of the themes and subthemes related to each other. After all the interviews were done, I constructed a narrative from the themes and the quotes. Description of my themes and the quotes from my interviews were used to support my writing when explaining the findings of this research.

As can be seen in Figure 5, nodes with high numbers of 'References' indicated how frequently the respondents raised the point. The input under the 'Sources' column shows how many participants raised the points. The maximum number of sources was 17 as there were 17 participants in this iteration. All the nodes under 'RQ1 Affordances of SP and FB' answer the research question 'What are the affordances of integrating the tools of Facebook and smartphones for the

teaching and learning of English for ESL learners?'. In Figure 5, the answers to the question are the child nodes 'Scaffolding to learners' needs', 'Learner generated content', 'Asynchronous and synchronous communication', 'Data & resource capturing and collaboration' and 'Enable rich data sharing'. In the RQ1 Affordances nodes, I also created a 'Negative aspects of SP and FB' node to include participants' points of view on the negative affordances of the technologies which they thought need to be considered by teachers. The creation of this node was important because it led to further investigation in Iteration 2. In Figure 5, the node 'social obligation' had 45 references from 15 sources. The node 'distraction to students when studying' had a similar meaning to 'social obligation' and a high number of References and Sources. So, both nodes were merged into one. The social obligation issue was considered a negative affordance of smartphone and Facebook technology.

While working on the analysis stages, I was constantly aware of the key ideas in qualitative research analysis, which allowed new ideas and themes to emerge. This was especially relevant when using interviews. I also needed to be systematic in ensuring that I followed the same steps and procedures when doing the analysis. Most importantly, I needed to be transparent by telling the reader what I did and why. Coherence was also pertinent where my interpretation should reflect patterns and ideas in the interview.

For Iteration 2, I did not use NVivo software to analyze the data because this iteration was conducted to further investigate the issues which emerged from iteration 1. The design framework for Iteration 2 focused in particular on the issue of social intrusion as well as on the affordances of mobile learning to promote collaborative and dialogic learning. As can be seen in Appendix K, the questions were arranged in different parts to investigate the issues below.

Part A: How the experience contributes to dialogic learning.

Part B: Collaborative learning using smart mobile devices and Facebook.

Part C: Various means of communications and technologies in creating continuity in learning.

Most importantly, as Iteration 2 focused on the social obligation issue of smartphones and Facebook, participants in this iteration were asked about possible ways of addressing this issue. The participants' answers for each section were used to refine the design conjectures tested in the iteration.

### **3.12 Ethics**

Individuals involved in this study were treated with respect, as required in the Ethical Guidelines for Educational Research determined by BERA. Prior to the research getting underway, all participants were asked to sign a voluntary informed consent form (Appendix B), which indicated that they understood and agreed to participate without any duress. There was no form of deception and all respondents were informed of the study objectives, how the study was to be conducted, all the processes in which they would be engaged, why their participation was valued, how it would be used, and to whom and how the study would be reported. A certificate of ethical research approval from the Graduate School of Education, University of Exeter, was obtained before the current study commenced (Appendix A).

Before both iterations were conducted, informal meetings were held to discuss the research, what would be expected from the participants and how they would benefit from the research. In addressing the issue of privacy, the participants were informed that the monitoring and the analysis of their online interaction

and their participation during the interviews would only be used for the purpose of this study and they were permitted to have access to the information. As smartphones were used mainly for their social space, the use of their device in this study might make them uncomfortable as it might violate their social space during the iterations. So, they were informed of their right to withdraw from the study at any time. All respondents also understood that they had to use their individual smartphone for the study and the responsibility of taking care of the device was on them.

Another ethical issue dealt with in this study related to the possibility of revealing respondents' identity through their personal Facebook account. In order to solve this problem, before the iteration was conducted, the respondents were advised to create a new Facebook account specifically for this research if they felt uncomfortable using their current Facebook account. In the new account, I advised them that they should not include all their personal details and they could delete the account once the iteration ended.

### **3.13 Conclusion**

This study aimed to produce a refined version of a design framework of using smartphones and Facebook tools that can promote collaborative learning for ESL learners, which was formulated through the evaluation of a developing design framework in two iterations. This study took a long time to complete as it involved various stages of data collection and analysis but it was designed in a flexible way to suit the duration given me to complete my PhD. It began with conjectures on how smartphones and Facebook should be used to enhance the teaching of English to ESL learners derived from the literature and exploratory fieldwork. The conjectures were then tested and were improved and refined

after cycles of iterations based on the feedback and reflection made. This study is limited in its design because it was conducted not in the real setting of my workplace where I work as an English teacher. The participants who volunteered to take part were not my real registered students since I was on my study leave, but the chosen participants met the criteria of being active users of smartphones and Facebook for learning. Detailed descriptions of the participants for both iterations are provided in the following chapters.

Besides helping me to answer the research questions of this study, DBR was chosen as the methodology because it helped to bridge the gap between theory and practice. The use of this methodology may also avoid a one-way flow of information, which seldom allows for teachers' opinions, fails to reflect the complexities of teaching and does not address the pertinent problem and the concerns that teachers face in their classrooms on a daily basis. As DBR is also a part of action research, this approach was chosen for this study because theories and research related to best practice were used to observe and understand what was happening in a classroom setting and, at the same time, this data was used to understand or inform theory and research related to best practice.

In this chapter, the methodological choice of this study has been discussed and the research design has been introduced. The work plan and activities that took place in all stages of this study, the methods used, the ways to analyse the data, as well as limitations, ethical issues and possible problems encountered in this study have also been presented. The next three chapters will provide more detail of how each research stage of this study was conducted.

## **Chapter 4: Results and discussion from Exploratory Study**

### **4.1 Introduction**

The main findings of this study are presented in two separate chapters (Chapter 5 and Chapter 6) to report the outcomes from two interventions. Before the findings from both iterations are reported, this short chapter reports the findings from the exploratory study. Findings from this exploratory study, combined with the literature review, are important because they contributed to the development of Design Framework 1.

### **4.2 Involvement of practitioners**

An important characteristic of DBR is that it is interventionist (the research aims at designing an intervention in a real world setting), involving practitioners in the various stages of the research (Akker et al., 2006 p.5). In the Generic Design Research Model (GDRM) by Wademan (2005), the author uses the model to illustrate that products of interventions go hand in hand with the 'successive approximation of theory' (which he calls 'design principles'), where an initial problem in context is analyzed using collaboration between practitioner and researcher. Following some elements of the GDRM model, this study incorporated responses from experts who were teachers of English as a second language, a telecommunication engineer who understood the telecommunication and network structure for mobile devices in Malaysia, and ESL learners who were active users of smartphones and Facebook. The ESL learners were undergraduates and postgraduates who also shared the same background as my respondents for Iteration 1 in that they were all from Malaysia.

The exploratory study was conducted in two stages. In Stage One, which was a consultative stage, I interviewed teachers of English who were teaching in Malaysian universities, and a telecommunication engineer in Malaysia, to test my initial assumption about the affordances of smartphones and Facebook to enhance learning and to find possible problems in using the combination to enhance learning in the Malaysian context. The teachers and the engineer were important collaborators because they shared their experience of the possibilities and challenges of implementing mobile learning using smartphones and Facebook in Malaysia. The teachers also provided ideas about how teaching that adopted smartphones and Facebook should be conducted, and their input was important in ensuring that the interventions in this study could be trialed and tested.

In Stage Two, based on the conceptual framework derived from the literature, my teaching experience, and the input from the teachers and the engineer, I developed a prototype solution to be tested during Iteration 1. I conducted a discussion with a group of ESL learners about my iteration. These learners were not the same students who were used in the later stages of this study. The findings from the discussion group helped me to devise and incorporate appropriate strategies into an educational intervention which was tested in the Prototyping Phase. They were important collaborators as, without their insights on the prototype solutions, the iteration that I designed could be seen as an imposition rather than a tool the learners themselves felt comfortable using.

Findings from the exploratory phase were important for me to check that my assumptions about the affordances of the combination were tenable. The outcome from this exploratory fieldwork was a refinement of the initial design framework to be tested in Iteration 1.

#### **4.3 Stage One: English language teachers and a telecommunication engineer.**

The lack of specific literature on the pedagogical affordances of smartphones and Facebook to enhance collaborative learning of English language in the context of learning English as a Second Language (ESL) meant that I have found a potential gap in the research literature; however, I needed to check that my assumptions about the affordances of smartphones and Facebook to enhance students' learning in the context of this study were tenable. The initial and fundamental premise that there was indeed a problem with implementing teaching using smartphones and Facebook in the Malaysian context was explored by asking relevant questions to practitioners from the country.

The teachers were asked the following questions:

1. As a lecturer teaching in one of Malaysia's universities, do you think smartphones can enhance the teaching and learning of English?
2. Are there any obstacles that you see if the combination is used in teaching and learning in the Malaysian higher education context?

The telecommunication engineer was asked the following questions:

1. Generally, can you comment on the speed and coverage of the Internet service and the Internet infrastructure in Malaysia ?
2. What about the subscription price of the Internet service in Malaysia?
  - a. Do you think customers get value for what they pay?
  - b. Do you think the price is affordable especially to university students?

3. Can you make a comparison between the Internet infrastructure in Malaysia and in the UK?

#### **4.3.1 Findings from the teachers**

I interviewed all eight teachers via Facebook Messenger. The demographic data of the teachers are shown in Table 5 below. The teachers were chosen to participate in this exploratory phase because they taught English language in public universities in Malaysia. The acronyms of the universities, where the teachers worked are explained below. Except for FT, the rest of the teachers had more than 10 years of work experience. I chose these respondents because I knew them personally; I knew that they were very committed to their work and they always tried innovative approaches in their teaching using computer technologies. To interview them, firstly, I contacted them via Facebook Messenger and I asked whether they were available to have a discussion with me. Then I posted the questions above via Facebook Messenger. When the respondents were available, they answered the questions and, since I was still online, I had the opportunity to ask them further questions and they responded me in real time. Each conversation took no longer than 20 minutes.

**Table 5: Demographic data of participants in Exploratory Study (n=8)**

Name	SP	SR	RM	AD	SY	NR	HN	FT
Gender	Male	Female	Female	Female	Female	Female	Male	Male
Work-place	UKM	UiTM	UTM	UKM	UTM	UPSI	UTM	UMK
Teaching experience	+20 years	+10 years	+20 years	+10 years	+10 years	+10 years	+20 years	-10 years

UKM: Universiti Kebangsaan Malaysia

UiTM: Universiti Teknologi Mara

UTM: Universiti Teknologi Malaysia

UPSI: Universiti Pendidikan Sultan Idris

UMK: Universiti Malaysia Kelantan

All responses regarding the affordances of smartphones and Facebook to enhance learning and the reasons why the combination may not enhance students' learning were summarized and analyzed. Generally, all of the teachers believed that smartphones can enhance the teaching and learning of English among Malaysian students. AD, SY, HN and NR mentioned that they saw most of their students using their smartphones to find the meaning of words using dictionary applications while they were teaching. They felt that that initiative in a way indicated the affordances of smartphones to help students' individual learning. Based on their observation, initiatives in learning individually or collaboratively by using the technologies were mostly initiated by students. Since most Malaysian undergraduates studying in public universities

received scholarships from various agencies, the teachers commented that the majority of the students used the scholarship to buy smartphones or other devices like laptops and also to subscribe to broadband services at homes. To most students, having access to the Internet was very important for the purpose of learning and also for entertainment. So, in terms of the readiness of students to use various technologies like the Internet and smartphones, the teachers believed that most students in Malaysian universities were ready, and they admitted that most of the time their students were more advanced than they were when it came to the use of technologies.

Commenting on the use of Facebook, except for FT and SP, other respondents had never used the software to conduct discussions related to teaching and learning contents. They only used smartphone applications like Whatsapp to disseminate information pertaining to class matters like announcements of a change of class venue or reminders to submit assignments. However, they saw the potential of Facebook to be used to encourage collaborative learning among students and they felt that it was important for teachers to integrate discussions using Facebook in their teaching because most students nowadays have a Facebook account. In their opinion, most Malaysian students were shy about speaking in English in class, so encouraging them to use the language in Facebook discussions was a good way to boost their confidence and practice using the language. All the respondents felt that it was important for teachers to explore the use of Facebook to encourage English language practice.

Other than that, these teachers also felt that Facebook software was user-friendly in helping information sharing and discussion. AD, NR, SR and FT were aware that their students took the initiative in creating a Facebook Group as a platform for them to disseminate information pertaining to any announcement

that they had on the university learning portal. Some of them also joined their students' Facebook Group and occasionally participated in the students' conversation there. From their observations, most of their colleagues were also positive about the use of Facebook and smartphones as another channel of communication between students. However, they were reluctant to use Facebook and smartphones for formal teaching because they felt that the combination of technologies was mostly used in a social space and for entertainment. All of them were also comfortable in using the learning portal provided by the universities where they were teaching instead of Facebook.

All respondents, except for FT, were also worried that their students could not focus on their studies if they used Facebook for teaching. FT shared her experience of using Facebook when she was a student. She found it very convenient, because every time she joined the discussions on Facebook she referred to books and notes. She admired her teacher's approach of using Facebook as a platform for class discussion because the teacher created a discursive environment and made it very inviting for everyone to participate. During the agreed time and date for their discussion, all her classmates were there on the online platform. FT believed that there should not be any problem for students to use Facebook for learning as long as teachers play their role in designing interesting lessons that integrate the use of Facebook.

SP raised important issues that need to be considered when teaching using smartphones. The first issue related to the cost of the device and the cost of the Internet connection. In Malaysia, reliable smartphones usually cost more than MYR 500 (GBP 100). In the opinion of SP, not all teachers or students could afford to buy one, especially if they had other important financial commitments. In addition, users needed to pay for Internet access for their smartphones.

Another important issue was the low speed of Internet connectivity in some places in Malaysia. According to SP, even when he was in large cities (where the Internet infrastructure was supposed to be good), there were many times when he was disappointed with the Internet access there. Besides the cost and the technical issues, SP also emphasized that not all teachers had the skills (such as how to download apps, or save discussion that takes place in a forum like Whatsapp) for using smartphones for teaching. As compared to using computers, there was also an issue of space constraint in smartphones when catering for multimedia files. SP strongly suggested that teachers should consider these obstacles while designing lessons that integrate the use of smartphones and Facebook in their teaching. Other teachers also shared the same opinion as SP but they felt that with careful preparation students would be more motivated when they learnt from teachers who were able to teach using technologies used by their students.

For their teaching, besides face-to-face teaching, none of the teacher respondents used Facebook because they were obliged to use the learning portal provided by their university. Their heads of departments frequently monitored their posting of topics to be discussed by their students on the portal. Using the university learning portals, their students were rewarded credits for their active participation. However, there were times when they had difficulty in accessing the portal, especially when there were too many users logging on to the portal and when there was a problem with the Internet connection in the university. In the case of NR, she allowed her students two weeks for every online discussion on the task given by her due to the Internet connectivity problem. She also made allowances for those students who did not have easy access to the Internet from their locations. So, communication on the online

platform was not synchronous and was delayed due to the Internet issue. Most of the time, NR resorted to face-to-face teaching, asking the students to have discussions in class. Not only NR but also other respondents felt that unpredictable Internet access hindered them from using technologies, especially if they were in rural areas; the Internet connection was only reliable if the universities they were working with were located in big cities and urban areas. With regard to the network infrastructure to support Wi-fi, most universities in Malaysia had limited hotspots because this involved considerable cost, with the result that this restricted students' and teachers' capability to access the Internet at any time and in any place while they were in the university area.

All in all, the teacher respondents felt that smartphones and Facebook can enhance students learning if the Internet connectivity and speed are fast and if teachers have the necessary pedagogical knowledge to integrate the technologies into their teaching. The teachers believed that not all aspects of teaching can be delivered using smartphones and Facebook but that these combinations of technologies have the potential to enhance students' learning. Therefore, the teachers believed that educators should be creative when designing lessons that consider the affordances of smartphones and Facebook. Before designing any lesson, teachers should take the initiative to become familiar with the combination of both technologies for teaching purposes.

#### **4.3.2 Findings from the engineer**

The engineer was interviewed face-to-face. His demographic data is shown in Table 6 below.

**Table 6: Demographic data of a participant in Exploratory Study (n=1)**

Name	ZL
Gender	Male
Occupation	Telecommunication engineer
Work-place	Telekom Malaysia
Working experience	+10 years

The aim of the interview with ZL was to ask him about the Internet service and the network infrastructure in Malaysia. Clarification regarding these issues was very important because, for smartphones and tablets and Facebook to work, the combination requires good Internet access. ZL also commented on the Internet service and the network structure in the UK as he was in the UK while this study was conducted.

Commenting on the speed of the Internet service in Malaysia, ZL commented that this was still not as good as in other developing countries around the world. In terms of coverage, most areas (urban and industrial) in Malaysia have now been provided with Internet service either by wired or wireless connection, except for very rural areas especially in East Malaysia, where the cost of putting up such infrastructure has been very high due to limitations on geographical access. For online lessons that require real time interaction via applications like Skype and Facebook video calls, ZL felt that there was a possibility of delay in information transfer due to the speed of the Internet in Malaysia. For lessons that do not require real time interaction, (e.g. discussions on a Facebook Group

Wall), he felt that the current infrastructure was sufficient to support teacher and student communication.

In terms of the subscription price of the Internet service, generally ZL felt that Malaysians were paying a considerable amount for the speed of Internet that they received. In his opinion, the price, especially for an unlimited Internet data package, was expensive for university students. Post-paid Internet packages that came with free smartphones are not a usual practice in Malaysia. Users usually have to pay for the Internet data and their smartphones separately. In comparison, in most developed countries, such as the UK, there are a lot of post-paid packages that offer free brand new smartphones if customers subscribe to the Internet with the service provider. In the opinion of ZL, the price paid in the UK is reasonable, bearing in mind the speed of Internet received. Developed countries like the UK have a good network infrastructure that supports high speed, wireless and wired connection in most parts of the country.

#### **4.3.3 Conclusion from Stage One**

The findings from Stage One provide evidence that, in the views of the participants, the most important factors that determined the success of using smartphones and Facebook to enhance learning were teachers' readiness to explore the technologies for teaching, their pedagogical knowledge of integrating the technologies into their teaching, the provision of suitable smartphones and good access to Internet connectivity in an environment that has a good network infrastructure. It was thought that most students in Malaysian universities were ready to use the technologies, suggesting that teachers should take the opportunity to explore the technologies of mobile

learning and Facebook to enhance their teaching. In order for the technologies to be used in learning, ZL was of the opinion that the Internet connectivity in Malaysia was generally good and sufficient to support learning, especially for lessons that did not require real time communication. However, the price of subscription was expensive for university students especially for an unlimited Internet data package. There was also an issue of network infrastructure, which needed to be improved in most Malaysian universities if a study on mobile learning was to be conducted with ease. As this phase highlighted the importance of Internet connectivity, this issue was addressed by conducting this current study in a setting that had a very minimal problem of Internet connectivity. This study was unique because it was conducted in the UK, a country that has a better internet tariffs and bandwidth where, as confirmed by ZL, the Internet speed was generally good. Furthermore, the amount paid for Internet access by students studying in this country was very reasonable and they were in a better position than students in Malaysia to get suitable smartphones to be used for this study. More findings for this exploratory stage were gathered in Stage Two in order to build design conjectures to be tested in the first iteration of this study.

#### **4.4 Stage Two: English as a Second Language students**

The initial and fundamental conjecture of this study was that smartphones and Facebook can enhance students' learning and promote collaborative learning if the learning tasks require students to use the applications of both technologies and teachers play their roles in facilitating students' understanding. This initial conjecture derived from my personal reflection as a teacher and was revised after reviewing the literature and after getting the input from Stage 1 in the Exploratory Study.

The concept of conjecture mapping was adopted from Sandoval (2013 p.3) which referred to a technique for conceptualizing design research as “a means of specifying theoretically salient features of a learning environment design and mapping out how they are predicted to work together to produce desired outcomes” in specific learning contexts. After conjectures were mapped, the results lead to empirical predictions that can be tested, and the results of such tests can lead to both refinements of a particular design as well as refinements of a theoretical perspective (Sandoval, 2013).

The respondents in Stage Two were told that based on the input from the literature and Stage One, some conjectures were mapped to be tested in workshop activities with a group of undergraduates. I described to them how I planned to conduct my iterations and on what theoretical basis the iteration was conducted. They were asked about the technologies that they might use to do the tasks, why the technologies were chosen, possible problems that they could see when the iteration was conducted and their suggestions on how the iteration should be improved. The design of Iteration 1 to test relevant conjectures is illustrated in Table 7 below.

**Table 7: Initial design of Iteration 1 and the conjectures tested**

Iteration 1 design	Conjectures tested
Before conducting the workshop, a session to decide suitable learning contents of the workshop that tailored their needs was conducted.	Learning content that is directly connected to learners’ needs will motivate them to find reasons for learning.
During the workshop, a face-to-face teaching was delivered by me. Various ways were used to make the teaching interesting and effective such as the use of YouTube clips, games, and discussions.	Face-to-face teaching should be conducted before learners’ learning is enhanced in learning tasks that require the use of smartphones and Facebook.

Students also did a number of group activities to make them comfortable working with each other.	Collaborative learning using online platform should begin from collaborative learning activities in classroom.
During the workshop, various individual and group tasks were given to help understanding of the course.	Learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their own individual devices.
Students were given group assignments to be conducted in two weeks. Every group consisted of members who were not housemates and course mates. This allocation was to provoke the students to use their smartphones to contact each other because they seldom met and to encourage them to work collaboratively.	Learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook.  Minimum face-to-face meeting with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information.
The teacher took initiatives to become familiar with possible tools of Facebook and smart mobile applications before planning the workshop and the activities.	Teachers' familiarity with possible smart mobile applications, Web 2.0 tools and software used will help the planning and teaching of the lesson for iterations.
The iteration was conducted in settings that offered free Wi-fi service, and participants could get good Internet access from their smart mobile devices. All participants also used suitable smart mobile devices.	Iterations should be conducted with learners and teachers who use appropriate choice of mobile devices and are located in an environment that has good access to the Internet.

#### 4.4.1 Findings from the students

The discussion with all the five students took place over about one hour and thirty minutes. Their responses were recorded and everybody contributed to the discussion actively. All responses from the students were summarized and analyzed. The demographic data of the students are as shown in Table 8 below.

**Table 8: Demographic data of participants in Exploratory Study (n=5)**

<b>Name</b>	<b>IK</b>	<b>WD</b>	<b>BN</b>	<b>YN</b>	<b>JJ</b>
<b>Gender</b>	Female	Female	Female	Female	Female
<b>Course of study</b>	Business and Management	Accountancy	Accountancy	Accountancy	Business and Management
<b>Place of study</b>	University of Exeter	University of Exeter	University of Exeter	University of Exeter	University of Exeter

Commenting on the contents of learning for the workshop, all the participants agreed that they were suitable for the participants in Iteration 1. All of them suggested that the iteration should be conducted with final year students because in terms of the content of the learning, they felt that input on communication skills in the workplace was vital for students who will start working soon. Therefore, they agreed with the conjecture that learning content that is directly connected to learners' needs will motivate them to find reasons for learning.

All participants also agreed with my plan of conducting face-to-face teaching before their learning was enhanced using any technologies. For them, participants in Iteration 1 might be able to do the tasks without attending the workshop but the quality of their presentation would be better if they learnt aspects of professional communication from the teacher. The participants confirmed the conjecture that face-to-face teaching should be conducted before learners' learning is enhanced in learning tasks that require the use of smartphones and Facebook.

In terms of the collaborative activities planned during the workshop and after the workshop, the participants agreed that although most of the students knew each other, working together in group activities during the workshop was important to create a good momentum for them to continue working together virtually using

smartphones and Facebook platforms. This practice confirmed the conjecture that learners' online collaboration should begin from collaborative learning activities in classrooms.

After understanding what to do, all participants agreed that both tasks required students to use their smart mobile devices to search and share information, besides communicating with each other. Looking at the needs of the tasks, three participants (WD, BN and YN) believed that students would create a Facebook Group for their group to share information on the platform. In situations where they need to instantly find and share information, they would use the search engine application in their smartphones. The most popular search engine application was Safari. Then, from their smartphones, they would share the information on their Facebook Groups so that every member of the group could read or view it. Besides smartphones, the respondents would also use their tablets to search for information when they were not in hurry. Tablets would usually be their option when they need to read from a bigger screen. They agreed with the conjecture that learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their own individual devices.

To do the tasks, they would also contact each other personally using Whatsapp personal texts. They admitted that they seldom meet their group members so they said that they would use both platforms to update each other on what they had done for the group. Only JJ and IK were conscious that participants might opt to have lots of face-to-face meetings instead of using smart mobile devices and Facebook as a platform to share and discuss ideas. Therefore, they suggested that the teacher to instruct the respondents to meet virtually and have less face-to-face meetings when doing the assignment. Commenting on

the group assignment to be done by group members who were not housemates and may not meet each other frequently, all participants believed that the assignment might encourage students to use their smartphones and Facebook to contact each other. So, they confirmed the conjecture that learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook. They also agreed that with the conjecture that minimum face-to-face meetings with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information.

To ensure that I modeled the pedagogical use of the tool, as a teacher who conducted this study, I explained to the participants my initiative of getting myself familiar with the technologies of smart mobile devices and Web 2.0 (particularly smartphones and Facebook since 2009). They believed that as a teacher, I did not influence the choice of technologies to do the tasks given. Their decision of using Facebook, various applications in their smartphones, and other technologies was because they believed the technologies could help them to prepare for the presentation besides making it more interesting. As they saw that the iteration was well planned, all of them agreed with the conjecture that teachers' familiarity with possible smart mobile applications, Web 2.0 tools and software used will help the planning and teaching of lessons.

The participants believed that any technology used in Iteration 1 should support the pedagogical model underlying the course in reducing any problem related to compatibility. They agreed that the iteration should be conducted in a setting that supports mobile learning. They also believed that Iteration 1's participants would have suitable smartphones that should have very minimal problems in

connecting to the Internet and the Wi-fi services in the university and at home. Therefore, they agreed with the conjecture that iterations that are conducted with learners and teachers who use suitable smart mobile devices and who are located in an environment that has good access to the Internet can minimize the problems of accessibility to the web.

All participants suggested more learner and knowledge-centred tasks to be given to Iteration 1 participants because they would inspire them to use their creativity in using various applications from their smartphone. They suggested tasks that required the use of images and videos as they would motivate participants to participate and learn. They also felt that learning tasks that had elements which were learner and knowledge-centred were important because they would enable learners to reason from their own experience. They suggested a conjecture that learning tasks that prompt students to use applications on their smart mobile devices and to explore the tools of Web 2.0 will motivate them to learn and participate.

When asking about the possibility of completing the tasks by just using smartphones and Facebook, all participants advocated that it was impossible, as they needed laptops and also required at least one face-to-face meeting to clarify decisions made. Smartphones were useful for them to have instant communication and to check information while they were on the go. A laptop was particularly useful to help students prepare the slides for presentation and for information searching and sharing when students were at fixed places like in their study rooms. They might also use their laptops to do video conferencing with their group from their homes. Therefore, they suggested a conjecture that learning tasks that allow flexibility in using smart mobile devices, other

technologies and different means of communication will prompt learners to work collaboratively in various ways.

Commenting on the assessment conducted in Iteration 1, all respondents suggested that the students' performance should be judged by a group of professionals who had real experience in the contexts of the tasks to ensure that the participants took the learning during the iteration seriously. Instead of the teacher assessing the students, a group of judges from various fields related to the area of students' presentation should be appointed. This was to assess the ability of the students and to offer diagnosis and formative guidance that was built on success. This practice suggested a conjecture that an assessment is important to ensure that participants consider the learning during an iteration seriously.

Fewkes and McCabe (2012) quoted the American Psychological Association, (2009 p. 456) who suggested that when implementing new technologies in classrooms, it is of the utmost importance that teachers create a rich environment focused on promoting knowledge rather than "simply being a source of information". To promote a mutually supportive community, sharing knowledge and supporting less able students as required in the community centred practice, they suggested that I post information on the students' Facebook Group to facilitate their understanding. Regular feedback should also be given to students who posted any questions to the group. They proposed conjecture that a teacher's postings asking about students' progress and relevant learning input on a Facebook Group wall will facilitate students' understanding and encourage students' communication.

#### **4.4.2 Conclusion from Stage 2**

The findings from this exploratory phase were important because it was conducted with a group of students who had a similar background to my respondents in Iteration 1. Based on the feedback gathered, I understood the respondents' ways of understanding and responding to the rubrics of the tasks given and whether the tasks prompted students to use any smart mobile devices and Web 2.0 tools. Based on the participants' responses and suggestions, I improved the rubrics to be realistic, workable and suit the participants' preferences. The initial design conjectures were also improved for testing in Iteration 1.

Designing tasks to test the affordances of smart mobile devices and Web 2.0 tools as found in the literature was challenging because the nature of the activities needed to prompt students to use their smart mobile devices and Web 2.0 tools. Therefore, in this exploratory phase, I did not make noticeable instructions to my participants to use any specific technologies to do the learning tasks. The most popular device chosen by most respondents was a smartphone and they chose a Facebook Group as a platform for them to share information and to do discussions. Smartphones were used to find and share information while they were on the go and to communicate with each other. When they were at fixed places, they preferred to use their laptops over their smartphones to do the tasks. They felt that the platform was safe in keeping all the information that they shared for the group. Besides Facebook, for a communication tool, BN, WD, YN and IK agreed that they would create Whatsapp Group to chat with each other and with the teacher because they were used to using the platform as their meeting point. I wondered what would differentiate the conversations between the group members of Whatsapp and

the one in Facebook Group. This question was further investigated in next iteration.

#### **4.5 Conclusion**

Commenting on my initial design framework, most of the participants agreed with the conjectures and suggested ideas to improve the framework. Suggestions from the participants were considered and the initial design framework for this study was revisited to produce Design Framework 1 to be tested in Iteration 1 as shown below:

- 1. Learning content that is directly connected to learners' needs will motivate them to find reasons for learning.**
- 2. Face-to-face teaching should be conducted before learners' learning is enhanced in learning tasks that require the use of smartphones and Facebook.**
- 3. Learners' online collaboration should begin from collaborative learning activities in classrooms.**
- 4. Learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their own individual devices.**
- 5. Learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook.**

- 6. Minimum face-to-face meeting with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information.**
- 7. Teachers' familiarity with possible smart mobile applications, Web 2.0 tools and software used will help the planning and teaching of lessons.**
- 8. Iterations that are conducted with learners and teachers who use suitable smart mobile devices and are located in an environment that has good access to the Internet can minimize the problems of accessibility to the web.**
- 9. Learning tasks that prompt students to use applications on their smart mobile devices and to explore the tools of Web 2.0 will motivate them to learn and participate.**
- 10. Learning tasks that allow flexibility in using smart mobile devices, other technologies and different means of communication will prompt learners to work collaboratively in various ways.**
- 11. Assessments are important to ensure that participants consider the learning during the iteration seriously.**
- 12. Teacher's postings which ask students' progress and provide relevant learning input on a Facebook Group wall will facilitate students' understanding and encourage students' communication.**

This chapter has presented the findings of the exploratory phase of this study. The outcome of this study is development of Design Framework 1 to be tested

in Iteration 1. The next chapter outlines how Iteration 1 was conducted and how the findings were reported.

## **Chapter 5: Results and discussion from Iteration 1**

### **5.1 Introduction**

This chapter reports the findings of the first iteration of this study. The tenets of Design Framework 1, which was derived from the literature review and the findings from the Exploratory Study, were tested in Iteration 1. Based on the findings gathered from this iteration, the framework was refined in order to make it more comprehensive and detailed to address the weaknesses observed. The current chapter first reports on the context where the iteration was conducted and the participants. In testing each conjecture in Design Framework 1, the writing of this chapter begins with a summary of how the iteration was conducted and a summary and analysis of the findings. The chapter then proceeds with a discussion of the refinement of Design Framework 1. All findings presented are supported with relevant quotations gathered during the interviews and images captured during the iteration from the online entries. Quotations considered important but not essential to the argument have been annotated and included in Appendix M. This chapter ends with a brief conclusion on the main findings of this iteration and how they were taken forward to the next iteration.

### **5.2 Context of the iteration**

The iteration was conducted in Exeter, United Kingdom, with participants who were undergraduates of the University of Exeter. Since the study needed to be conducted in an environment that has a good network infrastructure, the University of Exeter was chosen as the setting in order to minimize any Internet accessibility problem, as the participants mostly used the free Wi-fi service provided by the university whenever they were on the university premises. This

iteration only required the standard smartphones and tools of Facebook, two technologies that all participants of this study had access to and were very familiar with. To connect to the Internet, they either used the free Wi-fi service from the university, the Wi-fi from their homes or data from their own smart mobile device.

The iteration took place over four weeks but, coincidentally, it was conducted during a time when most participants had deadlines for assignments and tests. It was difficult to delay the iteration to a time where all participants were free from assignments, tests and deadlines, as the iteration had to take place during a university academic year. All the participants refused to take part in this iteration if it was conducted during term break because they went away for holidays and did not want to be disturbed during term break. Before this iteration was conducted, they were briefed that the activities in this iteration were designed in a way that considered the participants' busy daily schedules as university students. All participants were aware that their participation in this study did not require them to have frequent face-to-face meetings but rather utilized a range of mobile technologies and Web 2.0 tools, with the result that they were willing to take part in the study. The participants also agreed to take part in this iteration because they wanted to learn the topic - Professional Communication Skills at the Workplace - taught during the workshop in this iteration. It was interesting to discover how this group of participants used various technologies and means of communication to communicate with each other to do the assignments given, while they had to prioritize their tests and assignments during the period of time in which this iteration was conducted. The condition of not being able to have frequent face-to-face meetings but to communicate virtually with group members tested the affordances of

smartphones and Facebook to be used at any time and in any place available to the participants.

### 5.3 Participants of this iteration

**Table 9: Facebook Group members in Iteration 1**

Facebook Group	Members				
Kak Nomi Research Group	Name	AR	AL	DE	AH
	Gender	Male	Female	Male	Female
	Age	21	22	22	21
	Course	Business and Management	Physics	Engineering	Law
Bank Case	Name	AZL	LS	IZ	BH
	Gender	Male	Female	Female	Male
	Age	21	22	22	22
	Course	Engineering	Business and Management	Physics	Law
Group 1	Name	IL	AI	FD	YT
	Gender	Female	Female	Male	Female
	Age	22	22	22	21
	Course	Business and Management	Business and Management	Law	Physics

Sizzling Damia Corporation	Name	SYE	DM	AZ	EM	LE
	Gender	Male	Female	Female	Male	Male
	Age	21	22	22	21	22
	Course	Engineering	Physics	Physics	Law	Law

All 17 participants were Malaysian students and speakers of English as a second language. As can be seen in Table 9, they were taking various courses such as Business and Management, Engineering, Physics, and Law, and were either 21 or 22 years old. All of them lived close to the University of Exeter and most were not housemates although they studied the same courses. These participants were high achievers in terms of their academic proficiency because they were carefully selected to receive scholarships from various agencies in Malaysia before they pursued their studies at the University of Exeter. Based on their academic results and my experience of knowing them for one year, I observed that all of them were motivated learners and were committed to their studies. I chose them to be the participants in this iteration because they were all active users of smartphones and Facebook for learning. In order to ascertain whether they were active users of the technologies, I met all the potential participants face-to-face. In the meeting, I explained about my research before I invited them to be my participants. After understanding what my research was about and my expectations of them, 18 participants volunteered to take part in this study; however, half way through the iteration, one student withdrew. As can be seen in Table 6, all 17 participants in this iteration were divided into four groups. They created their own Facebook Groups; three groups consisted of four members each, and one group consisted of five members. No incentive

was offered to the participants except the opportunity to take the Professional Communication Skills at the Workplace lesson, which would be useful for them when they started working, and free meals during the workshop.

#### **5.4 Procedure of Iteration 1.**

To investigate the affordances of smartphones and Facebook, the participants first attended the Professional Communication Skills at the Workplace workshop. The learning content of the workshop was adapted from a certified 'Professional Communication Skills' subject offered to undergraduates by a public university in Malaysia. I was very familiar with the contents of the subject because I taught the subject for two years. For this research, I adapted some content from the subject because it was relevant to prepare the participants of this study before they started working. To suit the objectives of this research, task-based group assignments were designed that required the searching for and sharing of information, discussion on an online platform, and preparation for group presentations. Although it was anticipated that the participants would be using their own smartphones and Facebook to do the assignments, the design of the tasks increased the likelihood that a broad range of ways of utilizing the web and mobile learning would be observed. Participants were free to use their laptops and desktop computers to do their postings instead of just using their smartphones, if this was more convenient for them. Although they were expected to have more communication online, they could also decide to have face-to-face meetings with their group mates to discuss the assignments given. This was due to the fact that, although this study aimed to focus on the affordance of smartphones and Facebook in enhancing collaborative learning among learners of ESL, it also investigated how different means of technologies and communications help to create continuity of learning.

The participants were given two tasks. The first task required them to conduct a meeting between a marketing team and customers: the marketing team had to introduce and convince the customers about their product or service. The second task required the participants to conduct a meeting between a Domestic Enquiry Team and a board of directors of a company: it was discovered that an employee had used the company's money for his own purposes so the Domestic Enquiry team was assigned to investigate the matter. In the meeting, the Domestic Enquiry team needed to present the case to all the directors for them to decide the actions that needed to be taken with the employee. The outcome of the assignment for both tasks was group presentations. In the presentation, the participants were expected to use a variety of media (images, audio and video) to attract audience attention. The participants were given two weeks to prepare for the presentation, after attending the workshop. The collaborative activities did not require the students to limit themselves to specific technologies and means of communication, but they were encouraged to be creative in their presentation.

As the iteration was conducted while most of the students had their own personal study commitments, this iteration tested the affordances of their smartphones to allow them to search for and share information, and to communicate with each other while they were on the go and while they were not able to meet each other face-to-face. So, the choice of suitable technologies and means of communication was entirely their decision. On the presentation day, professionals who were related to the areas of presentation judged the participants' presentations. An element of assessment was included on the presentation day to motivate participants to perform well in their work.

After getting the assignments at the end of the workshop, all the students decided to create a Facebook Group for each group (refer to Table 6). They also invited me to be a member of their group. As the teacher, I assisted the participants by asking about their progress, posting relevant videos, encouraging their effort and responding to participants' discussions on their Facebook Group Walls. There was no research funding to supply participants (students) and myself as researcher (who also acted as the teacher) with appropriate smartphones. So, throughout the iteration, everybody used their own smart mobile devices and paid the cost of the 3G data and the wireless Internet connection at home by themselves. When they were on the University of Exeter premises everybody used the free Wi-fi service provided. After they presented their work, participants were interviewed in order to get feedback on the effectiveness of the intervention.

#### **5.4.1 Findings of Iteration 1.**

Possible findings for the research questions in this study are mapped in the form of conjectures being tested. Following the logic of DBR methodology, the conjectures about learning (Design Framework 1) were first tested in Iteration 1. Then, evaluation was carried out to see whether each conjecture was supported or not, and how it should be revised. Narrative explanations of how each conjecture of this iteration was tested and their findings are explained below.

**Research Question 1: What are the affordances of integrating the tools of smartphones and Facebook into the teaching and learning of English for ESL learners?**

To answer the research questions above, the conjectures below were tested.

**1. Learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their own individual devices.**

**2. Learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook.**

**3. Learner and knowledge-centred tasks that prompt students to use applications from their smart mobile devices and to explore the tools of Web 2.0 will motivate them to learn and participate.**

**4. Minimum face-to-face meeting with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information.**

For Research Question 1, explanations of how the conjectures were related to the questions were offered in relation to the pedagogical affordances discovered. Through the requirements of the tasks given in this iteration, the pedagogical affordances of smartphones and Facebook are summarized in Table 10. The overview of the result which includes the table of codes, with code definitions, number of sources and references (retrieved from NVIVO data) that is related to research question 1 can be seen in Appendix M.

**Table 10: Summary of pedagogical affordances of smartphones and Facebook**

<b>Participants' activities</b>	<b>Pedagogy</b>
Find information and videos that give ideas for doing the assignments.	Scaffolding learners' needs.
Make postings on Facebook group walls to update members on groups' progress.  Comment on the postings by group members of Facebook group walls.	Asynchronous communication Collaboration and support.
Record videos, upload them through Youtube and share them on Facebook group walls.	Multimedia  Data and resource capturing Collaboration.
Capture and upload images and video of ideas and events, and then share them on Facebook Group walls and personal text messages.	Rich data sharing.
Edit online presentation slides on Prezi together by contacting each other via smartphones.  Discuss with group members how to do the assignments via Facebook Messenger, Whatsapp and iMessage.	Synchronous communication Collaboration and support.
Course notices and support from the teacher on announcements on Facebook group walls.	Scaffolding, teacher feedback.

In relation to the scaffolding of learners' needs affordance, the conjecture being tested was that learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their own individual devices. Regarding individual efforts to contribute to the group work, most participants used their smart mobile devices, such as smartphones and tablets, at any time they were free to find information and videos that could contribute ideas for them to do the assignments. All participants believed that their smartphones and tablets provided scaffolding that catered for their needs

because they were used to find information throughout the iteration. They searched for online news and videos individually before doing any group discussion to give themselves ideas about how they should do the tasks. This individual searching for ideas was important to all participants because they wanted to contribute their ideas to their groups. Then, after gathering some ideas, they started sharing and discussing them with their group mates through virtual platforms.

The next pedagogical affordance found related to asynchronous communication, collaboration and support. There was evidence of this affordance in this iteration when the participants decided to have a platform to meet and conduct discussion virtually. The asynchronous discussion on the platform of Facebook Groups did not require a prompt reply from each other but the platform was important for recording any activity of discussion by each member. This was the reason why all participants opted to create a Facebook Group for every group. Here, the conjecture that learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook was tested. Participants met on Facebook to arrange face-to-face meetings, post postings on Facebook Group walls to update their individual progress, and to comment on each other's postings as a way of showing their support for each other. The comments and postings did not require participants to respond synchronously but they were important because the platform served as one of the means of communication between all group members. The majority of the participants reported that the support that they gained through communication via smartphone and Facebook with their group members and the teacher was important to motivate them to do the tasks assigned.

The next pedagogical affordances found related to data and resource capturing and collaboration, and also multimedia. As the assignment required the students to be creative in order to capture the audience's attention in their presentations, all group members were excited about using videos and images. The assignment which required the use of multimedia in smartphones and Web 2.0 tools tested the following conjecture: learner and knowledge-centred learning tasks that prompt students to use applications from their smart mobile devices and to explore the tools of Web 2.0 will motivate them to learn and participate. For example, in Figure 6 below, DM contributed by designing a company's logo using an application from her smartphone, then she added the logo to their presentation slides in Prezi. She also searched for suitable background music for their group video to attract audience attention. Finally, she shared her work on her Facebook Group for her friends to view and to comment.

**Damia Othman**  
20 March 2013

I've done my bit of the introduction and have added our company's logo on Prezi. Hope you guys can add your bit as well soon! 😊  
<http://www.youtube.com/watch?v=kAyOTIzbqak&feature=youtu.be>

**Sizzling Corporation**  
An introduction video to a marketing group assignment Music: Blue by Big Bang. It does not belong to me.  
YOUTUBE.COM

Like · Comment · Share

✓ Seen by everyone

**Rabihah Ab Hadi** love the background music 😊  
20 March 2013 at 17:52 · Like · 1

**Damia Othman** haha thank you.. kalo suara damia je nnt xde org nak dgr kot. LOL  
20 March 2013 at 18:42 · Like

**Nurhasmiza Sazalli** good! good!good!  
21 March 2013 at 10:28 · Like

Write a comment...

### **Figure 6: DM's post on Facebook Group**

The next pedagogical affordance found related to rich data sharing. While the participants were on the go, they accessed their Facebook accounts via their smartphones and tablets from time to time. From these mobile devices, any information found was shared instantly with the group. The devices offered rich data sharing because participants could also share information personally with group members via Facebook Messenger and other personal texting applications such as Whatsapp and iMessage.

Another pedagogical affordance found in this iteration was synchronous communication, collaboration and support. A conjecture related to this affordance was the following: minimum face-to-face meeting with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information. Three groups used Microsoft PowerPoint software to prepare the presentation slides but they rarely met face-to-face because they communicated with each other via Facebook Messenger, Whatsapp and iMessage to discuss how to prepare the slides. On the other hand, Damia Sizzling Group, instead of using PowerPoint, used 'Prezi' as the platform for their group to create online presentation slides. They prepared and edited the slides using laptops but, in order to view the slides while they were on the go, they used their smartphones and tablets. To edit the slides with their group mates, they collaborated with each other by conducting a discussion via phone calls and text messages.

The final pedagogical affordances of smartphones and Facebook found in this iteration relate to scaffolding and teacher feedback given to participants. As the teacher joined all of the participants' Facebook Groups, she also used the

platform to make announcements of course notices and to support the students in producing quality work.

**Research Question 1a. What factors influence the pedagogical affordances of the combination of smartphones and Facebook to enhance the learning of English for ESL learners?**

To answer the research question above, the following conjectures were tested:

**1. Iterations that are conducted with learners and teachers who use suitable smart mobile devices and are located in an environment that has good access to the Internet can minimize the problems of accessibility to the web.**

This iteration was conducted in Exeter, specifically inside and around the premises of the University of Exeter, which had good Internet access. As all participants and I live very near to the university area, we had few Internet problems during the iteration because the location where this study took place had a good network infrastructure. The setting was purposefully chosen to ensure that the participants maximized the benefits of the free Wi-fi connection provided by the university and the good 3G connection that participants and I received via our smart mobile devices. All participants who volunteered to be part of this study were selected based on the criteria that they should be using suitable smartphones to participate in this study. They were also chosen if they considered themselves to be active users of smart mobile devices and Web 2.0 tools and used the technologies for their studies and also for leisure.

*Findings:*

The overview of the result which includes the table of codes, with code definitions, number of sources and references (retrieved from NVIVO data) that is related to research question 1a can be seen in Appendix N. All 17 participants reported that they had no problem undertaking information searching and sharing in this iteration because they owned advanced smartphones or tablets and there was no problem with the Internet connection in their devices. All agreed that they made full use of the good Internet speed in the university, in their homes and in the city centre to do the tasks while they were on the go. They used the 3G service from their smart mobile devices, the Wi-fi connection when they were at home and also the free Wi-fi service when they were in the university premises. Table 11 shows the range of smart mobile devices that the participants used for this iteration. LE was the only participant who did not have a smartphone but he used his tablet to be connected with the others in this iteration.

**Table 11: Types of smart mobile devices used by participants**

<b>Participants</b>	<b>Smartphone</b>	<b>Tablet</b>
<b>DM</b>	Samsung S3	
<b>AZ</b>	iPhone 4S	
<b>SYE</b>	iPhone 4S	
<b>EM</b>	BBZ10	
<b>BH</b>	BB 9900	
<b>AZL</b>	iPhone 4S	
<b>IZ</b>	BB9900	BB Playbook
<b>LS</b>	iPhone 5	
<b>AI</b>	iPhone 5	
<b>FD</b>	HTC Wildfire	
<b>IL</b>	iPhone 4S	
<b>LE</b>		iPad 3
<b>YT</b>	iPhone 4S	
<b>AH</b>	iPhone 4S	
<b>AL</b>	iPhone 4S	iPad 3
<b>AR</b>	Samsung S2	
<b>DE</b>	iPhone 4	

As the teacher, I also had no problem related to the Internet connectivity during the iteration because I used suitable smartphones and tablets to connect with the students. With regard to the most important factor that influenced the pedagogical affordances of smartphones and Facebook to be used for learning, all 17 participants strongly believed that to instantly find and share information, the affordances worked best when there was an uninterrupted Internet connection or Wi-fi to their smart mobile devices to allow them to search for and share information instantly at any time and in any place. Equally importantly, the Operating System (OS) and the memory of the devices should also be advanced so that participants could download a number of useful applications in their smartphones and tablets. The phone and tablets should also have adequate mobile broadband data coverage so that they could be used at any time and in any place. 13 participants agreed that the small screens of their smartphone were not a problem for them to access the Internet because they were used to zoom to the content. Nevertheless, as stated by FD and EM below, the appropriate choice of mobile devices was important for the participants to instantly check for information. For DM, to have quick access to information, the smartphone worked similarly to a laptop but was lighter and more accessible.

*“I would say that a smartphone is like a replacement to your laptop. You can use it when you are not with your laptop and you need to do something quick. It just makes things easier” (DM).*

The findings from this iteration confirmed the conjecture that in order to minimize problems of connectivity to the web, iterations should be conducted with learners and teachers who use suitable mobile devices and are located in an environment that has good access to the Internet.

The next conjecture that was related to the research question above was the following:

**2. Learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook.**

The affordance of smartphones and Facebook tools in the literature being tested for this design conjecture relates to the ability of the technologies to instantly find and share information for joint work. This conjecture was tested as it was expected that the participants in this iteration would be always on the go and would not be able to frequently meet each other face-to-face. Therefore, the assignment given (see Appendix D) required participants to search for and share information and to have group discussions at any time and in any convenient place. To encourage participants to use their smartphones to discuss the tasks, I ensured that every group consisted of members who were neither classmates nor coursemates in order to limit the frequency of face-to-face meeting.

*Findings:*

This was the most important affordance being coded as it was coded from all 17 participants and there were 121 references to it i.e. all the respondents mentioned this particular point a total of 121 times during the interviews. All of them agreed that they found their smartphones, tablets and Facebook useful in this iteration to search for and share information while they were on the go. A common factor, mentioned by everyone when asked why they chose Facebook as their platform of communication, was, *'It's easy. Everyone has it. Everyone is on Facebook all the time'*. Most importantly, they chose Facebook as their

meeting point because the software has its own application that can be accessed via smartphones and tablets. By downloading the Facebook application on their smartphone, they were alerted instantly when any group member shared some information and commented on any postings. As shown in Figure 7, 'Nurhasmiza Sazalli' was a member in all Facebook Groups created in this iteration. Being part of the group, I monitored their conversation and progress.

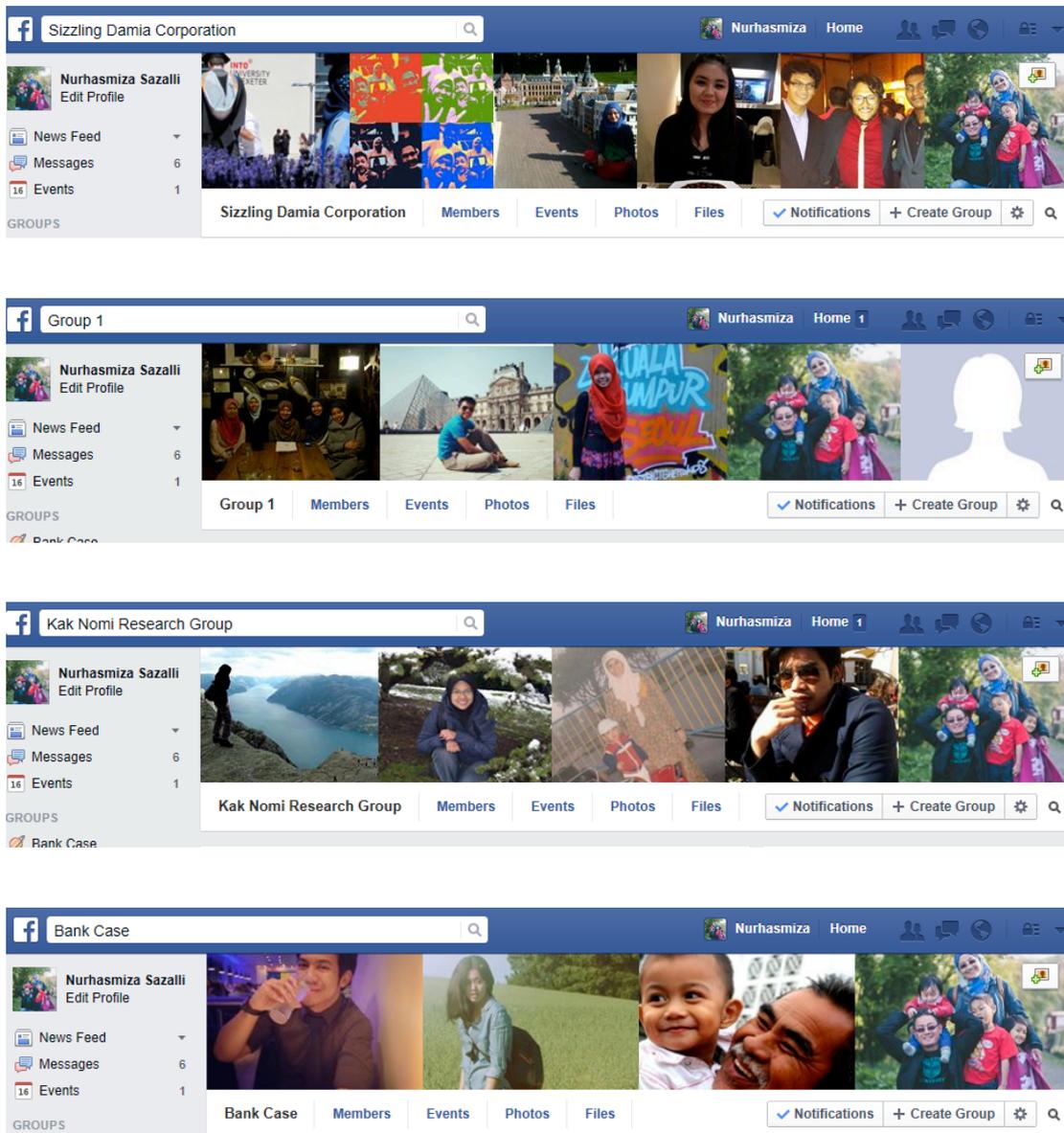


Figure 7: Facebook Groups created by all groups

While having a rest at home and after class, five participants commented that they used Facebook and smartphones to record and share ideas that suddenly came to them. The other ten participants also stated that they took their phones to bed to check on their Facebook Group's postings and to post comments and links for their group mates. On awakening, they checked their phone again to read any comments from their group mates. Participants who had tablets during this iteration (IL, LE, AZ, AL and IZ) used their devices to find and share information on Facebook in the same way that the others used their smartphones. They only used their smartphone to send text messages because it was smaller, lighter and more mobile.

LE, AZ, AH, BH, DM, SYE and EM said that if their postings on Facebook were not responded to by their friends, they texted them personally on Whatsapp to indicate the sense of urgency for their friends. DM added that unless her group members switched their smartphones off, she was confident that all her group members could be contacted because students were usually online.

To ask specific group members to do certain tasks instantly, ten participants used personal Whatsapp message and iMessage. The Whatsapp application was used among smartphone users because it was free of charge, provided that smartphone users have Internet connection. Using this application, they sent text messages, photos, images, video, and audio media messages and they could check whether the texts sent were read by the receiver with the double tick image (✓✓). Even when in the middle of their class, these 15 students stated that they did not feel disturbed when receiving text messages. Some even replied to messages, especially if they required a short reply. For example, when YT was interviewed, she told me that she received IL's message while she was having her class. She felt that IL's request was not too

demanding, so she searched for the information requested by IL and sent it to her there and then. Since her smartphone was always near to her, the reply could be made quickly. Most importantly, she confirmed that the act of reading the text message, quick information searching, and sending the link to her friend while she was having her class was not distracting.

From my observation, a positive application of using smartphones and Facebook could be seen in that most participants claimed that they were motivated to respond to the Facebook notifications and messages sent to their smartphones instantly. They stated that it was also their habit to give a quick response when they received notifications on their phones. They did not mind using the Facebook Group as a platform to communicate and share something related to their education for this iteration because they had been using Facebook Groups for their own study course. However, two participants felt that the mixture of notifications for learning and social space sent to their personal devices made them less motivated to be active in their studies because they felt that their social space had been intruded upon. As there was no control over when participants and the teacher could make postings on the Facebook Groups in this iteration, they felt a sense of obligation, or resentment, when replying to the notifications posted. These participants admitted that they blocked the notifications sent from Facebook and switched their phone to silent mode as they were bothered by the text notification alarm.

*“I was ok at the beginning but when I kept receiving notifications, I just ignored and I did not bother to read them. Then, I blocked notifications sent to my phone. That means I am not there, no longer can receive notifications” (DE).*

*“It suddenly became an obligation to me to check all the notifications. If I check and I did not do anything, the teacher would have known. With the ‘Seen’ feature, you would know who have read and who did*

*not. I don't want everybody to know that I get the notification. So I just switched of my phone" (FD).*

DE and FD only tolerated Facebook to be used as a meeting point for their groups to communicate about any face-to-face meeting to be held, to update group members on any discussion and on any decision made. They did not mind using the platform to share links and information because group members could easily access it. However, if Facebook was used as the main medium of communication, they felt that it intruded upon their social life as it used their social space platform. Especially because the notifications of new messages from Whatsapp and Facebook appeared on their smartphone screens, they were annoyed when they saw too many notifications because it contained a mixture of messages from their group mates in this iteration, other Facebook friends and other Whatsapp friends. IL, AZ, EM, and YT were also aware that using Facebook and smartphones can intrude upon students' social space so they suggested ground rules be put into place to control students' use of Facebook and their smart mobile devices for learning. In their opinion, the ground rules should limit students' and teachers' activities and time when using the social networking space.

*"I think the teacher has to set up rules first as in how the Facebook Group would work, so that they don't divert from what they are supposed to do, and don't distract other people" (AH).*

*"There should be restrictions that are agreed collectively. For example, no discussions regarding the tasks offline, students do the task until certain time every day, teacher should not post anything after some time" (AR).*

Other than ground rules, AZL, AR and LS suggested that the teacher should use other Web 2.0 tools for learning and not Facebook or other social networking platforms. They were of the opinion that, if the same platform was used for educational and social purposes, it could easily distract students'

concentration. They suggested using Wiki, teaching blogs, and Google Drive because they saw those sharing platforms as more suitable for educational purposes. If Facebook was still the choice, AI, LS and SYE suggested that both teachers and learners open a new Facebook account just for education for the next iteration. In the account meant for education, they suggested the teacher and students should not upload their personal details and photos; they were not interested in reading any social updates from the teacher that appeared on their Facebook Home page if their Facebook account was used for both education and social life.

From the findings of this iteration, there was evidence that smartphones and tablets were mainly used for instant information searching and sharing and also instant communication with group members when they were on the go, while they were free or when they needed certain information quickly. Tablets served the same purposes as smartphones but participants tended to spend more time on them because information can be seen more clearly on the screen. The size of the device was not a problem for most participants in this iteration, as they did not find it troublesome to have the device with them anywhere they went. For example, LE just put his tablet in his sling bag anywhere he went to ensure that he could use the device anytime he needed it. As information was received instantly at any time and in any place, this iteration also revealed the negative sense of obligation of smart mobile devices and Facebook. Suggestions from the respondents were considered and this issue was further investigated in the next iteration. As an adaptation from the current design conjecture, the conjecture for the next iteration is as follows:

- 1. Learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook.*
- 2. An establishment of ground rules will minimize social obligation and the intrusion effect.*

**Research Question 1b: To what extent can learning through smartphones and Facebook tools support collaborative learning, and how?**

To answer the research question above, the conjecture below was tested.

**1. Learners' online collaboration should begin from collaborative learning activities in classroom.**

Although this study investigated how smartphones and the Facebook platform can enhance collaborative learning, it was believed that collaboration among students was best when beginning from their learning in classrooms. During the workshop, a number of pair work and group work activities were conducted so that the students were used to working collaboratively with others. I noticed that, when students were given opportunities to work with partners and a larger group of students, they learnt how to share their ideas and negotiate with others and to reach group consensus. To enhance their learning and to demonstrate their understanding of the subject after attending the workshop, the participants were given group tasks to be carried out within a period of two weeks. The physical collaborations that the students had with their group during the workshop were intended to help them to have online collaboration with the same group members, as they already knew each other during the workshop.

### *Findings:*

The overview of the result which includes the table of codes, with code definitions, number of sources and references (retrieved from NVivo data) that is related to research question 1a can be seen in Appendix O. All students found that all the group activities held during the workshop were useful for them to get to know each other before they collaborated online using their smartphones and Facebook. The momentum that they had while experiencing the physical collaboration during the workshop was continued in the online collaboration. For example, using their Facebook Group, the members of Bank Case posted the storyline that they planned to present during the presentation and re-stated the tasks for every member. AZL's effort in ensuring that everybody knew what they were supposed to do during the workshop was sufficient for them to work individually.

However, for the members' of Group 1 and the Kak Nomi Research Group, although every member said that they knew what they were supposed to do, some of them had less co-ordination with other group members and they did not know how all the contributions related to each other. This was because, before the presentation day, these groups did not conduct any meeting virtually or face-to-face to finalize their roles during the presentation day. As a result, they were not able to answer some of the questions asked by the audience. From the point of view of the judges, they saw less cooperation within these 2 groups. AH, DE, AR and AL felt that they should have used the online platform to communicate with each other to confirm the roles that each member had to take. YT, IL, FD, LE and AI took for granted the idea that their group had understood what to do and that their discussion in the class (during the workshop) was sufficient to prepare them for the presentation day. Given the

chance to do the task again, they said that they would have used the online platform to discuss potential questions that might be asked by the audience. From the perspective of the teacher, I believe the participants did not see the importance of having more discussions after their conversations during the workshop. Therefore, for the next iteration, I decided to design a lesson where the physical collaboration during the face-to-face learning should explicitly direct students to do online discussion; I should design specific tasks that required students to communicate online instead of allowing them to choose what to discuss, as in this iteration. If students were aware of specific points that needed to be discussed online, I could also monitor their performance better. As an adaptation from the current design conjecture, the conjecture for next iteration was as follows:

*Learners' online collaboration should begin from collaborative learning activities in the classroom but specific learning tasks that require online collaboration using the technologies are important to allow the teacher to monitor the learners' progress..*

The next design conjecture that was related to this research question was the following:

**2. Learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their own individual devices.**

The affordances of smartphones and Facebook in the literature being tested for this conjecture relate to the ability of the technologies to facilitate learner-self initiation and control. After receiving the tasks, participants discussed in groups the information needed to do the task, how the work should be delegated within

the group, how information should be shared among group members, and the means of communication they should use to have further discussion after the workshop. After every member understood what they were supposed to do, they used their own devices to do their individual task. Then, they collaborated with other group members where they shared the parts that they had done on Facebook Group walls and commented on each other's work.

*Findings:*

After receiving the tasks during the workshop, I observed that eight of the participants instantly took their smartphones and tablets to search for information. The other nine used the desktop computers provided. After that, when all participants had some information in their hands, they started to share ideas and divide roles between members. When interviewed, the eight respondents said that the tasks given prompted them to use their own devices to search for information before they contributed to their groups. The nine participants gave the same reason, but explained that they preferred to view information on the larger desktop screen.

As all participants were familiar with their individual tasks, during the two week period, 12 participants used their smartphones to gain background knowledge on the area of their presentation while they were free. For example, IL, IZ, YT, BH AL, and FD searched for the meanings of technical terms used in the business field and also watched how businessmen do presentation of products on Youtube. AZ and AZL followed real news on Twitter social networking, to get ideas to prepare for their presentation.

Although most groups divided roles between members, there was one student who left most of the work to his group mates rather than contributing to his

group. When the group was interviewed, other members realized this and they were not happy with it. To solve the problem, AZ and Ili felt that I should give the tasks for this iteration in stages. I should determine students' individual work before I gave them the group work. Nine participants also felt the same way as they felt that the tasks given should focus on both personal and social aspects of learning. DM was satisfied with her group collaboration; she did not face the same problem because her group divided their tasks evenly. She learnt to reflect on her work and when she discussed her ideas with her friends, she appreciated their point of view because she started to see her ideas from different angles. SY, who was in the same group as DM, agreed that the individual tasks that had been divided among his group members encouraged them to be reflective before collaborating with others using virtual platforms. However, to ensure that all group work was divided evenly and that all participants performed their roles, he suggested that the teacher should determine specific tasks for every student. Instead of leaving the decision to be made by students, as in this iteration, the teacher should specify sources from the web where participants were expected to get the information. Then, participants should compare and contrast the information gathered and discuss their ideas with their friends on Facebook Group walls. When all students contributed to their group discussion, the teacher could monitor the students' progress better. Therefore, dialogic and social constructivist pedagogy should be employed as an approach that guides the process of learning among students. As an adaptation from the current design framework, Design Framework 2 will be as follows:

- 1. Learning tasks that require participants to be reflective on their work will encourage dialogic and collaborative learning among students.*

**Research question 1c: To what extent can learning through smartphones engage and motivate learners, and how?**

To answer the research questions above, the conjectures below were tested.

**1. Learning content that is directly connected to learners' needs and academic courses will motivate them to find reasons for learning.**

Participants' experience in this intervention involved taking part in two meetings for learning and another one for an interview. The first meeting was a workshop on Professional Communication Skills at the Workplace (the tentative programme of the workshop can be seen in Appendix C) and in the second meeting, students presented their group work. The workshop content was adapted from the syllabus of Professional Communication Skills in English offered for undergraduates by a university in Malaysia. The subject was chosen because its syllabus and the learning objectives were designed based on the general needs of working in Malaysia. Since all the participants were final year students and would start working in Malaysia after they graduated, in line with the conjecture above, I designed the content of the workshop to be beneficial for them so that they would be motivated to learn. Some of the content of the workshop was also based on the needs of the respondents of this iteration. An informal meeting was conducted with all the participants to know the content that they hoped to learn in the workshop and to determine their level of English proficiency. Based on the information gained during the informal meeting, I included additional input on Neuro-Linguistic Programming (NLP) in my workshop as all participants wanted to learn about it. NLP is an approach to communication, personal development, and psychotherapy; knowledge in this area is very beneficial especially for those who are going to start working. All

contents of the workshop and additional notes were uploaded in my personal tutor blog at <http://nurhasmiza.wordpress.com>.

*Findings:*

The overview of the result which includes the table of codes, with code definitions, number of sources and references (retrieved from NVivo data) that is related to research question 1a can be seen in Appendix P. As the content of the workshops in this iteration was based on the areas that the participants hoped to improve, all of them agreed that they benefitted considerably from this iteration. However, 12 of them expressed their regret at not participating actively in this iteration because they were busy with their study commitments. They admitted that they procrastinated over doing the tasks because they had to prioritize their studies. In my research field notes, I noted my disappointment when I observed that students only started to do the tasks given in the second week of the iteration. The duration of two weeks was given to them so that they could do the tasks gradually as I understood that they had their own study commitments; however, in the end most of them did the tasks at the last minute. All admitted that there was less online communication on their Facebook groups, except for the Damia Sizzling group, because the rest relied on their face-to-face communication and other means of communication. As they did the work at the last minute, they made a point to meet face-to-face one or two days before the presentation day so that they could discuss the task and reach consensus quickly rather than depending on online communication, which, they felt, had the risk of miscommunication and misinterpretation of meanings. The Group 1 and the Kak Nomi Research group members, who admitted that they relied more on face-to-face communication, purposefully came one hour early

on the presentation day so that they could finalize their roles for their presentation because they had had little communication beforehand.

All groups admitted that the learning content in this iteration was connected to their needs and that they found a reason for learning but this did not motivate them to do the tasks early. Three of them admitted that their group procrastinated over doing the tasks because they knew they could do them even at the last minute and most participants blamed this on the iteration being conducted while they were busy with their study commitments. To encourage active participation for the next iteration, all 17 participants suggested that the next iteration should take into account their timetable. They also believed that students' participation would be better if their participation awarded them credits for their own study course. I also wrote in the research field notes about the possibilities of having a different result if this iteration was conducted with my own students who got credit for their participation in the research. So, the limitation of this study was the selection of participants, as their participation in this iteration did not award marks for the course they were taking. As an adaptation from the current conjecture, the design conjecture for the next iteration will be as follows:

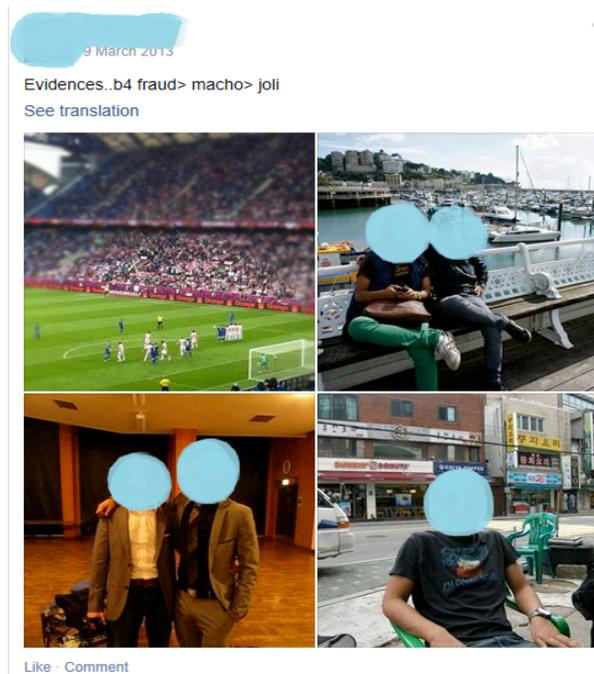
- 1. Learning content that is directly connected to learners' needs and academic courses will motivate them to find reasons for learning.*
- 2. Iterations that take into account the timetable of students will motivate students to learn and participate more.*

The next design conjecture, which was related to the research question above, was the following:

**2. Learning tasks that prompt students to use applications on their smart mobile devices and to explore the tools of Web 2.0 will motivate them to learn and participate.**

The affordance of smart mobile devices and Web 2.0 tools in the literature being tested for this design framework relates to the ability of the technologies to make lessons interesting and worthwhile because of the combination of the use of a variety of media from smart mobile devices and the tools of Web 2.0. After emphasizing important elements that one should take into account before doing a presentation in the workshop, participants in this iteration were given the liberty to explore various media applications on their smartphones and to use relevant tools of Web 2.0 to do the tasks. Since they were mostly active users of the technologies, they applied their skills in ensuring that their presentation was interesting and attractive.

All groups included videos and photos to help their audience understand their presentation better and to capture their attention. As a result, all groups produced very informative, creative and interesting pieces of work. The participants who were in charge of taking video and photos in their groups used the 'Camera' application in their smartphones. For example, AR from the Kak Nomi Research Group created a movie clip to create an example of police investigation. Using his smartphone, he took a video of a friend who pretended to be involved in a crime. He knew that the movie clip would make the audience laugh and would create interest in the presentation. This group also used photos retrieved from DE's personal Facebook account (with DE's permission) as shown in Figure 8 below. The photos were used as evidence that DE (the person who was accused of the crime) had a luxurious lifestyle before he was caught.



**Figure 8: Photos of DE that were taken from Facebook**

The audience clearly enjoyed and focused on AR's group presentation because they recognized all the faces that acted in the movie clip. Participants from other groups who were responsible for taking videos for their tasks in this iteration, such as EM, AR and AZL, stated that they were excited to take the videos because they knew that that was a fun part of learning and they were confident that it could attract the audience's attention. AZL felt that, when students were encouraged to use video for their learning, they were taught to be creative and to use various editing applications from the smartphones and this could enhance their learning. As for SYE, he believed if students were asked to choose a technology that they were confident and excited to work with, the outcome would usually be something very meaningful and effective in enhancing students' learning.

*"We were more confident and excited with our presentation when we included the video and images. We used them because we wanted our audience to like our presentation. If we were not confidence with*

*our own presentation, how can we expect that our audience to like it?"*  
(SYE).

From my observation, all participants were engaged in their learning because they were given chances to explore the technologies of the web and used various apps (applications) in their smart mobile devices. In the case of AZL and AR, both of whom had a strong interest in photography, they were excited that they could use apps that they had been exploring and learning for educational purpose in this iteration. Participant SYE was motivated because he could explore the web and choose any platform for the presentation. Instead of using PowerPoint software, he suggested that his group use 'Prezi', a tool of Web 2.0 that allows presentations to be done on a virtual canvas. In addition to their excitement in trying out Prezi, which was new to them, the Damia Sizzling group members were also engaged because the platform allowed them to share their input online and anybody from the group could edit the slides. By downloading the Prezi application to their phone, they were able to view the presentation anywhere they needed to and they texted each other using Whatsapp so that anybody who was working on the slides could make amendments.

The Bank Case group, who lost a member during the iteration, kept the momentum going because they set their own strategy and divided the tasks equally between the members. Most importantly, AZL, LS and IZ said that they were engaged and motivated in the iteration because the tasks required them to use various forms of media in their presentation. Based on the comments of the jury on the Bank Case's presentation, this group deserved to be the winner because it was noted that all of them were very committed to their work. The technologies that they used motivated them to do an excellent presentation but the cooperation between all of them was the key factor why they won. With

regard to the Bank Case and the Kak Nomi Research Group both of which used videos in their presentation, I observed that all participants seemed to be engaged with both groups' presentation.

This iteration proved that learning tasks that prompted the students to use applications from their smart mobile devices and to explore the tools of Web 2.0 motivated them to learn and participate. The participants might be familiar with some apps on their smartphones like 'Camera', but this iteration provided a venue for the apps to be effectively used to enhance learning. They were motivated because of the feeling of using a modern medium for learning and they saw its positive impact in attracting their audience when they did their presentation. Due to this high motivation, participants were also willing to learn to use new technologies that they were not familiar with, such as 'Prezi'.

**Research Question 2: How do different means of communication and different technologies help to create continuity in learning?**

To answer the research question above, the design conjecture below was tested.

**1. Minimum face-to-face meeting with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information.**

As both tasks required participants to work collaboratively with each other in conditions where they could not meet each other frequently, the affordances of smart mobile devices and Facebook were tested. They did not have a lot of opportunity to meet each other face-to-face because they were busy with their own studies. So, the tasks were designed to be flexible in allowing students to

use any technology and means of communication to communicate with each other.

*Findings:*

The overview of the result which includes the table of codes, with code definitions, number of sources and references (retrieved from NVIVO data) that is related to research question 1a can be seen in Appendix Q. To do the tasks assigned, all 17 participants used their smartphones, tablets, and laptops. Having limited face-to-face meetings, they communicated with the teacher and their group mates through Whatsapp personal text messages, iMessage text messages, personal Facebook Messenger and chatting via Facebook Group walls. To get ideas for their presentation, 17 students collaborated with each other by sharing their ideas on their Facebook Group walls. An example of a discussion thread by students on Facebook Group walls is shown in Figure 9. LS posted her ideas on the plot of the story to be presented by her Bank Case group. AZL gave his opinion and from there the plot was structurally developed and everybody was asked to do their individual parts.



**Figure 9: Participants' thread of discussion on their Facebook Group**

AZL, DM and AR texted each other and decided to use various applications from their smartphones to take photos and videos. Then, they shared their individual work on the Facebook Group to get comments from their group mates. Figure 10 shows a video taken by AZL using his smartphone. Using a specific camera application, he edited the video to make it look like a CCTV video. After all members of his group saw the video, they had a discussion about it by texting each other using iMessage.



**Azlan Latif**

23 March 2013 · Exeter

cctv



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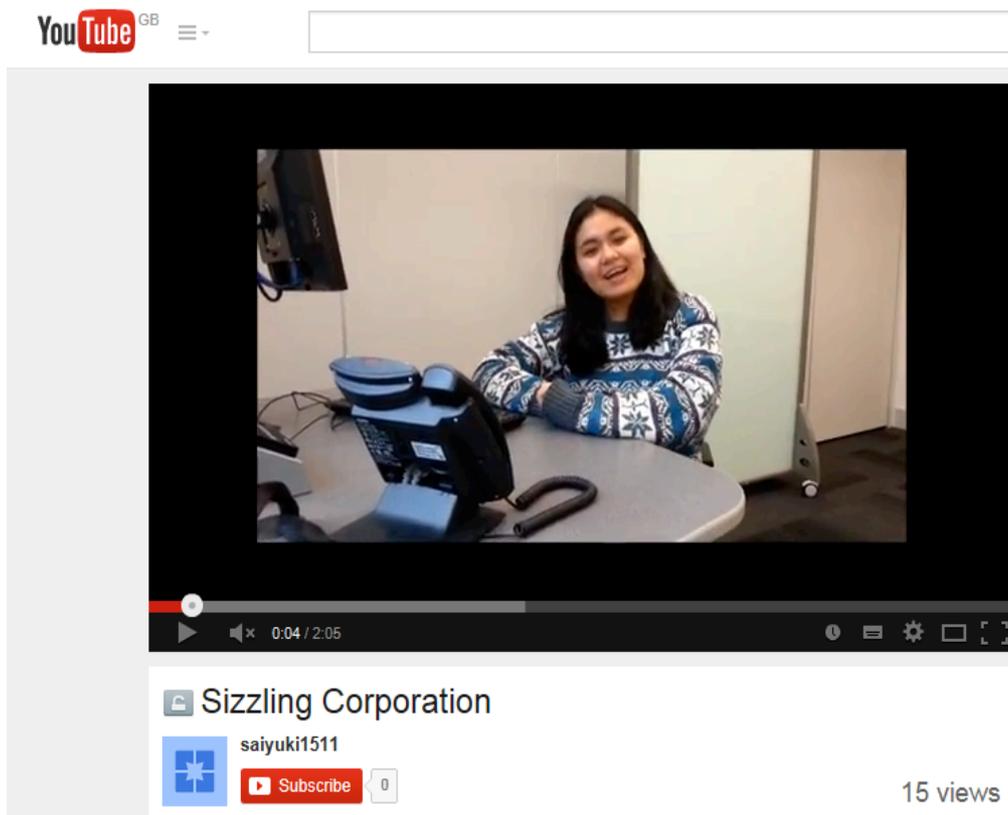
✓ Seen by everyone



Write a comment...

**Figure 10: A 'CCTV' video by AZL uploaded to his Facebook Group**

DM's group uploaded their video to Youtube, then to Facebook, as shown in Figure 11. Then, they had a virtual meeting via Facebook Messenger to decide in which part of their presentation the video should be inserted.



**Figure 11: DM's video that was uploaded to Youtube**

The findings from this iteration indicated students' various ways of collaborating with each other and their reliance on various devices, and provided evidence that they did not depend on face-to-face meetings to make decisions. However, all agreed that their use of smart mobile devices, other technologies and different means of communication depends on the needs of the learning task, urgency of their needs and the practicality of the situations. To have a serious discussion and to clarify ideas, the majority of the participants chose to have face-to-face discussion rather than depending on communication via Facebook and mobile devices.

Besides communicating using virtual platforms, nine students also sought opportunities to meet each other to discuss the tasks because they felt that seeing each other face-to-face helped them to clarify decisions made, to

demonstrate certain things, to help each other and to avoid any miscommunication problems that may happen on virtual communication platforms. Members of Damia Sizzling (except for BH and AZ) and Kak Nomi Research Group (except for DE) held a face to-face group meeting before the presentation day and they believed that when they met their group mates face-to-face, all messages were conveyed and understood better. In online communication, they highlighted that they could not see the body language and the real facial expressions of their friends, unlike when communicating face-to-face. Most members from the other two groups who did not have face-to-face meetings regretted not having the meeting. As a result they faced some miscommunication problems during the presentation.

Although smartphones and Facebook allowed instant communication at any time and in any place, face-to-face meeting still had the advantages of clearing up miscommunications and conveying messages clearly to all participants. So, the decision of when to use technologies and other means of communication should be left to the participants and this depended on the needs of the tasks. This iteration confirmed that minimum face-to-face meeting with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information. However for the next iteration, as I hoped that the students would use the online platform to learn from each other, I needed to design activities where they would see the benefits if they collaborated online. As an adaptation from the current design conjecture, the conjecture for next iteration was as follows:

- 1. Minimum face-to-face meeting with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information.*

2. *Learning tasks that allow flexibility in using smart mobile devices, other technologies and different means of communication will prompt learners to work collaboratively in various ways.*
3. *Students' use of smart mobile devices, other technologies and different means of communications depend on the needs of the learning task, urgency of their needs and the practicality of the situations.*

**Research Question 3: What are the roles of teachers when adapting the technology of Facebook and smartphones in their teaching?**

To answer the research questions above, the design conjectures below were tested.

**1. Face-to-face teaching should be conducted before learners' learning is enhanced in learning tasks that require the use of smartphones and Facebook.**

In the class, I conducted face-to-face teaching to deliver the content of the lesson and I observed participants' body language and facial expressions that indicated whether they understood my lesson or whether they required further elaborations and explanations. While I walked around the class, I also had control of the class to ensure that they concentrated during the lesson. To teach the students during the workshop, I used teaching aids such as notes on PowerPoint slides, Youtube videos, games and online quizzes as a way to enhance students' understanding and to motivate them to participate. In the workshop, they were given learner-centred activities and I played my role as a facilitator. Task-based learning tasks that required the use of smartphones and Facebook tools were given as an out-of-class activity after the participants attended the workshop.

### *Findings:*

The overview of the result which includes the table of codes, with code definitions, number of sources and references (retrieved from NVIVO data) that is related to research question 1a can be seen in Appendix R. As the teacher, I found that the face-to-face teaching conducted during the workshop was very beneficial in giving me the immediate responses of the participants. I could easily diagnose problems and give appropriate feedback to them and if a response was not clear, another, enabling the facilitation of responsive problem solving, could quickly follow one question. I also saw the advantage of face-to-face teaching in allowing participants to work in co-operation with each other, and to raise problems and questions. When I saw any of them struggling, I gave a few hints and left them to discuss the problems. Then I saw the whole group collaborating and discussing the solutions.

From the participants' perspectives, 16 of them said that the face-to-face learning helped them to understand what they were supposed to do in the tasks given. They appreciated the face-to-face interaction with the teacher while participating in the workshop because it helped them to understand the lesson better besides forming a good teacher-students relationship. They believed that, during the face-to-face teaching, the live voice that they heard and the body language that they saw helped to build a good teacher-students bond.

Commenting on the task-based activities given at the end of the workshop, although all participants felt that I played my role in facilitating their learning well during the workshop and they enjoyed the learning, they admitted that they could have completed the task given without attending the face-to-face teaching because the tasks given to them were not challenging. After observing their

presentations, I agreed that the tasks should be more challenging to suit the students' level.

All participants admitted that the use of smart mobile devices and Web 2.0 tools was due to the needs of the tasks given, not because there was any instruction from me asking them to use the technology. As they understood the aims of my research, they also expected to utilize their smart mobile devices especially their smartphones and Facebook to do the tasks given. Besides Facebook, their smartphones were also used to connect to other Web 2.0 tools. The findings from this iteration confirmed the importance of having face-to-face teaching before learners' learning is enhanced in learning tasks that require the use of smartphones and Facebook.

The next conjecture, which was related to the roles of the teacher, was the following:

**2. Assessments are important to ensure that participants take seriously the learning during the iteration.**

There was no written assessment to ascertain the extent to which the participants had mastered the learning content, so one way to indicate the application of knowledge gained during the workshop was through participants' presentations. Participants' mastery of professional communication skills at the workplace was assessed in their presentation, and a competition was held to determine the best group that managed to persuade their audience and demonstrated a good level of group cooperation. The assessment was also held because it was difficult to ensure that the participants had constant motivation to participate in this iteration as it did not form part of their study course in the university. So, to ensure that the participants took seriously the

learning during the iteration and showed some effort when preparing for the presentation, they were told that experienced panels would judge their presentations. These panels were professionals who had experience working in fields such as engineering, journalism, media and business, and were carefully selected to be able to judge and comment on the students' work. To judge the students' performance, they referred to a list of assessment criteria prepared by me (refer to Appendix E). The winner of the competition was announced on the day of the presentations.

*Findings:*

All the groups offered excellent presentations of their work. When interviewed, ten of them said that this was due to the presentation assessment as carried out by the professionals. They wanted to prove that they were capable of doing the tasks successfully, although most of them ended by doing them at the last minute. AZL, FD, AZ, EM, SYE, LE, DE and LS believed that students' participation in this iteration would be more active if it gave credits to the course they were taking. Besides the group assessment, they also felt that I should carry out individual assessments. Reflecting on his experience of using Wiki, which was used by his course lecturer, AZL suggested that I should give individual and group tasks that required discussions using an online platform. He believed that individual and group assessments were effective to ensure that learners took learning during an iteration seriously, knowing that they would be given marks for their participation. LS believed most participants left the assignments given in this iteration until the last minute because they knew that they could still get the work done. If they had individual tasks that were assessed before they did their group tasks, their motivation would be greater.

*“We did it at last minute because the task was quite easy. It did not really motivate us to do it consistently. I know I can do it even until the last minute” (LS).*

I agree with these participants; in my research field notes, I wrote that I did not see consistency in the work from most participants from the beginning. Despite the fact that they were busy with their own studies, I believe most of them left the work to be done until only a few days before their presentation because they knew they could manage to do it. If the tasks were given in stages with some small individual targets to achieve, it is likely that the students would find the iteration more meaningful as there would be a greater sense of achievement both individually and in groups. As an adaptation from the current design framework, design framework 2 will be as follows:

- 1. Individual and group assessments are important to ensure that students consider the learning during the iteration seriously.*

The next conjecture, which was related to the research question above, was the following:

**3. Teacher’s postings which ask about students’ progress and provide relevant learning input on a Facebook Group wall will facilitate students’ understanding and encourage students’ communication.**

During the two weeks of the task, I facilitated the participants in their work by joining the Facebook Groups created by each group. Every four days, I asked about their progress and I posted relevant videos that assisted them in doing their task. I also encouraged their efforts in contributing to their group and responded to their discussions on their Facebook Group.

### *Findings:*

Through Facebook Group walls, I posted six postings to each group throughout the two week iteration (ten days), asking about their progress every three days. When the students did any posting, I joined most of their conversations by giving my point of view and also encouraging them to work. In my postings, I asked about their delegation of work and their plan for the presentation. I also reminded them about the use of videos and pictures to make their presentation better, how their presentation would be assessed and the use of professional panels to assess their work. I also answered any doubts that they had, but I had the impression that all participants knew what they were supposed to do because they did not ask many questions of me on their Facebook Groups wall.

All participants felt that the guidance given by me (during the workshop and also through Facebook postings) throughout the iteration was sufficient for them to do the tasks in groups. 12 participants (FD, BH, YT, AZ, LS, DM, AI, AZL, IZ, LE, AR and AL) liked my approach of asking about their progress on the Facebook postings because, in their opinion, the postings indicated that the teacher was concerned and wanted to help them if they had any problems. No participants felt bothered by my postings throughout the iteration because they were not posted everyday.

*“I like your way of asking our progress. You were not too pushy and you encouraged us to work. When you posted, I felt that I really have to do the work. I think my group and I need this. We need to be reminded most of the time. But we don't mind getting the reminder from you because you were our teacher” (BH).*

However, most of my postings were ‘Seen’ by them with no comment. When the students were asked about the ‘Seen’ feature, they said that generally, for the context of this iteration, it simply meant that the postings were read by the group

members and, if they did not give any comment, it meant that they understood the message given and had no other question to ask. Although they left no comments, they felt that the postings pushed them to do the work and they needed that motivation to continue working. For example, after reading my posting on 20 March 2013, YT, AI, IL and AZ stated that they quickly sent personal messages to their group mates and went to their group mate's house to quickly discuss the tasks.

*“What should we do? What should we do? Kak Nomi just asked our progress Facebook. I was panic, and I asked these questions to my group mates right after you asked our progress on our FB Group wall. I went to Ili's room straightaway to do the task with her” (YT).*

Besides using Facebook Groups, eight participants suggested the teacher should use Whatsapp groups as another channel of communication. They saw the platform as particularly relevant for iterations held over a longer period of time because teachers and students could communicate and respond to certain issues raised instantly. AI said she felt closer to her friends and teachers if she communicated with them via Whatsapp. AZ felt that the communication on the Whatsapp group was more personal as compared to the communication on Facebook Group wall because the texts can only be read from their personal smartphones. Texts on Whatsapp are generally shorter than Facebook postings and can be replied to instantly. In comparison, postings on Facebook can be read from other devices with larger screens, such as tablets, laptops and desktop computers. With larger screens, the posts were usually longer and when they were used to inform students about certain issues, most students did not feel the need to reply or notify me that they had received the messages. As an adaptation from the current design conjecture, the conjecture for the next iteration was as follows:

1. *Teacher's postings which ask about students' progress and provide relevant learning input on a Facebook Group wall will facilitate students' understanding, encourage students' communication and motivate students to work on the learning task given.*
2. *Teachers should facilitate students' understanding and encourage students' involvement in tasks that require active involvement of students in online discussion.*
3. *A Whatsapp Group used as a medium of discussion will ensure important messages are instantly received.*

The next conjecture, which was related to the roles of teachers, was the following:

**4. Teachers' familiarity with possible smart mobile applications, Web 2.0 tools and software used will help the planning and teaching of lessons for the iterations.**

In order to be able to model the pedagogical use of smart mobile applications and Web 2.0 tools, I familiarized myself with how to use smartphones and tablets and how to access Facebook from those devices. I learnt how to share links from various sources like blogs and Youtube to Facebook, and how to make postings and attract a particular person's attention by tagging their names. I learnt how to create Facebook Groups and Pages and I also joined various education groups on Facebook including those created by the participants in this iteration. During the iteration, all my postings and comments on my respondents' Facebook Groups were made from my smartphone at no specific time and location but, with my familiarity in using the combination of technologies, I planned every posting that I had so that students did not feel

burdened or felt that I was forcing them to do the tasks. That was why I did not make a daily posting on the students' Facebook Group Walls; most of my postings were only to ask about their progress and offered my help if they needed it. I also did not tag any names when making postings as I tried to make it general for everyone.

*Findings:*

All participants felt that I had sufficient knowledge of using basic features of Facebook and smartphones, but ten of them hoped that I could suggest that participants use other applications and tools of Web 2.0 for learning rather than using Facebook. For this iteration, they believed that Facebook should not be used for information sharing because they believed that the software was meant for entertainment and social life rather than education. In their opinion, a platform strictly for education and not mixed with a social space would ensure that there was no delay in communication when they discussed the tasks. There were a lot of distractions on Facebook so, while working on the slides, they preferred to communicate via Whatsapp and phone calls. As AR and YT said, as Facebook was meant for social space and entertainment, their attention was easily diverted for other purposes while working on the slides if they communicated via Facebook.

*"It was difficult if we chat through Facebook. Our work will be delayed. While waiting for our friends to reply, I definitely would watch some videos, read my other friends' postings, and I would also make postings. Unlike chatting via Whatsapp or make phone calls, we don't waste our time. Just make a call, ask my friends, I got the answer, then I quickly do my work" (AR).*

*"If I was on Facebook while doing the work, I tend to watch videos and read my friends' updates while waiting for their reply on Facebook Messenger. So I had to switch it off. I just called my friends, asked them how should I do the slides, then my work was done" (YT).*

Instead of using a Facebook Group, AR suggested that the next iteration should use Google Drive to assist document sharing among students. LE, SYE and DM suggested that I teach students to use Prezi and PowerPoint Online so that participants could work collaboratively with each other while they were working on the slides online. DE and AL suggested the use of SlideShare as it worked the same way as PowerPoint Online. With Prezi, SlideShare and PowerPoint Online, the participants felt that they could do their work better, faster and more efficiently because these software would allow them to work on the slides collaboratively with others. To work collaboratively on their slides, they communicated using phone calls and Whatsapp rather than chatting via Facebook.

In my research field notes, I wrote that I learnt a lot of new relevant smartphone and tablet applications, software and cloud-based presentation tools used by the students during this iteration. I had never heard about Prezi and SlideShare before conducting this iteration and I was so happy to learn about these new technologies. Help from the participants in explaining how the technologies work was very useful as they had been using them as part of their education. The experience in this iteration suggest that teachers should continuously explore possible smartphones and tablets applications and Web 2.0 software that can be used for educational purposes because these technologies are relevant to the current generation. This iteration proved the conjectured that Facebook was a suitable sharing platform that encouraged active communication among participants but the findings also indicated that participants had other options when collaborating online because they saw Facebook as a distraction. Therefore, to plan lessons for teaching, students should be taught in the ways they say that they learn. This iteration also

confirmed the conjecture that teachers' familiarity with possible smart mobile applications, Web 2.0 tools and software used will help the planning and teaching of lessons.

### **5.5 Assessment and discussion to produce a revised design framework**

The findings from this iteration confirmed the positive affordances of mobile learning and social networking in enhancing teaching and learning. Due to the nature of the requirements in the tasks given, all respondents used their smartphones and tablets and the social networking site Facebook to do the tasks. This iteration proved that investigations of the affordances of mobile learning and Web 2.0 tools depended on the nature of activities given during the iteration. In this iteration, the use of smartphones and tablets was observed to support the tasks given. As these smart mobile devices were the participants' personal belongings, they had total control of when and where to do the activities and to discuss them with their group mates as the devices provided access at any time and in any place through portable/wireless delivery mechanisms. Using the various applications found in the gadgets, most participants produced a very informative, creative and interesting piece of work. Participants also suggested that the tasks should be done individually and in stages before they were expected to combine and discuss their work in groups because they had less confidence that their friends would do their work for their group. To encourage better participation, it was also suggested in this iteration that the participants' performance would be different and better if they got credits for the course they were taking by participating in this iteration. Suitable forms of assessment were also suggested to ensure participants' continuous commitment to the iteration.

Based on my observation and the students' input during the interviews, most participants were excited to be collaborative in their learning as they could use various kinds of multimedia in their presentations. They were motivated to use smartphones, tablets, Facebook and other tools of Web 2.0 not just because these technologies were up-to-date and relevant to them but also because they believed that they helped considerably in enhancing their learning. Facebook Groups was found to be a suitable platform for students to share their work as it provided an interpersonal and social communication network between students, allowing them to communicate and also to promote their work. However, the findings of this iteration indicated that for those learning activities that required communication among participants, there were other better solutions for sharing platforms than Facebook Groups. While working on their slides, communication via Facebook tools had the tendency to delay work as compared to communication via phone calls and Whatsapp text messages, because participants' attention was diverted to the entertainment and social space of Facebook.

Through investigating this combination of mobile learning with social networking, a powerful social obligation effect in the combination has been discovered. In this iteration, most participants admitted that they were motivated to respond to the notifications received (from Facebook postings) as soon as possible because they knew that they would not do it later if they procrastinated. As well as motivating, the social obligation effect can also have some negative consequences for learning. Some students were uncomfortable receiving notifications about the research on their mobile phones and they experienced this as an intrusion into their social space. The notifications were ignored, especially if the participants were in the midst of doing something important and

there were also a number of them who felt that too many notifications were sent and they changed their phone setting so that they did not receive any notifications about their work on their phone. To overcome this problem in the next iteration, there should be an implementation of ground rules, an agreement between the teacher and the students of how much work and participation are expected from both parties, and when participants should stop contacting each other (including the teacher) using Facebook and text messages.

Another issue that was related to the negative affordance of the technologies was that, since the work could be done at any time and in any place, nearly all participants admitted that they completed the work assigned at the last minute. The participants were given two weeks to do the tasks but, based on their postings and discussions in their Facebook Groups, most only started to do the work at the end of the second week. They only started to be serious in their work when there were postings from the teacher on their Facebook Group walls, asking about their progress. This finding indicated that the participants still depended on the teacher to remind them and to keep monitoring them using the social networking platform. They particularly worried if their names were being tagged on Facebook postings but tagging the students' name on Facebook proved to encourage individual students to do their work quicker.

The findings of this iteration so far suggest that the importance of the social obligation effect should be considered for the design of mobile learning with social-networking. It was suggested that it was not just mobile learning but also the integration of mobile learning and Web 2.0 tools (Facebook) that led to the social obligation effect because it involved participants' personal social network and learning. As this study researched the pedagogical affordances of mobile learning integrated with Facebook, it aimed to explain the situations where it

was not good to use the technologies, when to use it, when not to use it and also how to use it for teachers.

The next stage of this study focused on exploring further the motivating power of social obligation in combination with mobile learning. Particularly, the design for the next iteration focused on how teachers should create a motivating and supportive online learning environment; it investigated how many notifications were just right, how much was too much and how the activities should be designed to explicitly demonstrate collaborative work among students. The next iteration also explored how all negative aspects of mobile learning and social networking raised in this iteration could be addressed by exploring ways in which pedagogical designs for mobile learning with social networking can take the negative aspects into account in order to avoid their negative consequences and make best use of their positive consequences. Focusing more on pedagogical issues, the next iteration investigated how mobile learning teaching that incorporated the idea of social obligation should be conducted.

## **5.6 Conclusion.**

Overall, the affordances of smart mobile devices and Facebook tools, which were tested in this study, confirmed the conjectures on the abilities of these technologies to enhance the collaborative learning of English among ESL learners. However, respondents' uses of the technologies were shaped by the learning activities that they were engaged in and this iteration found that teachers' roles were important in facilitating students' understanding. The findings from the iterations in this study also revealed that the integration of mobile learning and Facebook tools had the effect of giving a sense of

obligation to their users to respond to notifications that were sent to their mobile devices, which can be both positive and negative for engagement and learning.

Table 12 shows the refinement of design conjectures from the first to the second iteration. The first column listed all the conjectures tested in iteration 1. The second column consists of suggestions for revisions of the conjectures. For columns with (  ), this symbol indicates that the conjectures have been tested (in Iteration 1) and can be suggested for the next design framework without any revision. Columns without the double tick symbols consist of conjectures that have been refined.

**Table 12: Refinement of design conjectures in Iteration 1**

Design Framework 1	Suggestions/ Adaptation
Iterations that are conducted with learners and teachers who use suitable smart mobile devices and are located in an environment that has good access to the Internet can minimize the problems of accessibility to the web.	
Learning content that is directly connected to learners' needs will motivate them to find reason for learning.	 Iterations that take into account the timetable of students will motivate students to learn and participate more.
Learners' online collaboration should begin from collaborative learning activities in the classroom.	Learners' online collaboration should begin from collaborative learning activities in the classroom but specific learning tasks that require online collaboration using the technologies are important to allow the teacher to monitor the learners' progress..
Learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their own individual devices.	 Learning tasks that required participants to be reflective on their work will encourage dialogic and collaborative learning among students.

<p>Learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook.</p>	 <p>An establishment of ground rules will minimize social obligation and intrusion effect.</p>
<p>Learning tasks that prompt students to use applications from their smart mobile devices and to explore the tools of Web 2.0 will motivate them to learn and participate.</p>	
<p>Assessments are important to ensure that participants take the learning during the iteration seriously.</p>	<p>Individual and group assessments are important to ensure that students take the learning during the iteration seriously.</p>
<p>Face-to-face teaching should be conducted before learners' learning is enhanced in learning tasks that require the use of smartphones and Facebook.</p>	
<p>Teacher's postings, which ask students' progress and provide relevant learning input on a Facebook Group wall will facilitate students' understanding and encourage students' communication.</p>	 <p>Teachers should facilitate students' understanding and encourage students' involvement in tasks that require active involvement of students in online discussion.</p> <p>A Whatsapp Group used as a medium of discussion will ensure important messages to be instantly received.</p>
<p>Teachers' familiarity with possible smart mobile applications, Web 2.0 tools and software used will help the planning and teaching of the lesson for the iterations.</p>	
<p>Minimum face-to-face meeting with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information.</p>	 <p>Learning tasks that allow flexibility in using Smart mobile devices, other technologies and different means of communication will prompt learners to work collaboratively in various ways.</p> <p>Students' use of smart mobile devices, other technologies and different means of communication depend on the needs of the learning task, the urgency of their needs and the practicality of the situations.</p>

The next iteration of this ongoing design-based research explores how to make the social obligation effect of mobile learning and social networking positive for

learning and how to avoid their potential negative consequences. The next chapter narrates how Iteration 2 was conducted and describes the findings.

## **Chapter 6: Results and discussion from Iteration 2**

### **6.1 Introduction**

This chapter reports the findings of the second iteration of this study. Based on the findings gathered from the first iteration, the framework that informed the iteration was refined into a more comprehensive and detailed one to address the weaknesses observed. Through investigating the combination of mobile learning with social networking in the first iteration, a powerful social obligation effect in the combination was discovered. This pedagogical issue was further investigated in this iteration with particular focus on how the motivating power of social obligation, in combination with mobile learning, should be addressed. Some of the conjectures that had been proven in Iteration 1 were not tested because they were not relevant to the learning content in Iteration 2. With a new set of participants, new learning content and new learning outcomes, the design of this iteration focused particularly on how teachers should create a motivating and supportive online learning environment with consideration of the social obligation issue when using the combination of smart mobile devices and Facebook. In exploring ways in which pedagogical designs for mobile learning with social networking can take the negative aspects into account and in order to avoid its negative consequences and make best use of its positive consequences, this iteration investigated how many notifications were just right, how much was too much and how the activities should be designed to explicitly demonstrate collaborative work among students. In relation to the suggestions given from the previous iteration, this iteration also investigated how the respondents' experience contributed to dialogic learning.

This chapter first reports the context of and the participants in the iteration, the ethical issues involved, and the methods used to collect data. In testing each conjecture in Design Framework 2, it continues with a summary of how the iteration was conducted and a summary and an analysis of the findings before it concludes with a refinement of Design Framework 2. All findings presented are supported with relevant quotations gathered during the interviews and images captured during the iteration. Quotations considered important but not essential to the argument have been annotated and included in Appendix N. The chapter ends with a final brief conclusion on the main findings of this iteration and how the outcomes fed into further iterations to test and refine the resultant design frameworks.

## **6.2 Revised design framework**

Essential components of the design framework for this second iteration are refined design principles that inform practice. They directly guided the process of designing an intervention programme to test the revised framework. Due to the flexibility of design-based research methodology, this iteration responded to the lessons learnt in prior attempts and the issue of social obligation when using a combination of smartphones and Facebook in teaching and learning. This refinement process, which aimed to fix the weaknesses arising from the previous implementation, was the major feature distinguishing the design study in this iteration.

## **6.3 Context of the iteration**

The study was conducted in Exeter, United Kingdom, with participants who were postgraduates of the University of Exeter. The iteration took place over three weeks, during an academic year of the university. In this iteration, all

participants attended a workshop on Academic Writing and were required to do assignments that integrated the use of Facebook tools, namely Facebook Messenger, a Facebook Group and a Whatsapp group text messaging application. All participants had just started their research phase and they had deadlines to submit their writing to their research supervisors while this iteration took place. Knowing that participating in this iteration would give them the benefit of improving their writing, eight volunteered to take part. However, three weeks was the maximum duration that they could commit to because they were busy with their research and other commitments. During the iteration, the participants worked from home and also from the university.

#### 6.4 Participants of this iteration

**Table 13: Demographic data of participants in Iteration 2 (n=8)**

Name	JOY	SHA	ZAI	ATI	SAI	SYA	AIR	NAN
Gender	Female	Female	Female	Female	Female	Male	Female	Female
Age	28	40	35	28	29	28	27	26
Course	Business and Management	Business and Management	Sports Medicine	Mathematics	Islamic studies	Public Admin	Educa-tion	Educa-tion

As can be seen in Table 13, eight participants in this iteration were all postgraduate students taking various courses such as Business and Management, Mathematics, Public Administration, Islamic studies, and Education. Their age range was between 25 and 40. They were selected to be part of this iteration due to the various backgrounds that they came from: six of them were lecturers teaching in various universities in Malaysia, while the other two were working as administrators. While this iteration was conducted, all the

participants were studying at the University of Exeter. It was interesting to get the opinion of participants from various age groups, backgrounds and experience of using smart mobile devices and Web 2.0 tools for teaching and learning in this iteration because it focused on aspects raised in the previous iteration, mainly the issue of social obligation in using smart mobile devices and Facebook in enhancing teaching and learning. The findings from this iteration were also significant because, as most of the participants were lecturers, their point of view on the affordances of mobile learning was based on their reflection on and experience of teaching using the technology. The design of the learning content was to suit the needs of the participants. In order to ensure that the participants gave their commitment during the iteration, only those who really wanted to improve their writing skills were selected to be part of the iteration.

## **6.5 Ethics**

Before the iteration was conducted, the participants received an explanation of the study objectives, how this iteration was to be conducted, all the processes in which they were to be engaged, why their participation was necessary, how it would be used, and to whom and how it would be reported. They were informed of their right to withdraw from the study while it was being conducted. Then, prior to the research getting underway, those who agreed to take part in this iteration were required to sign the voluntarily informed consent form which indicated that they understood and agreed to their participation without any duress. As one of the technology tools used in this iteration was Facebook, all participants were advised to create a new Facebook account if they chose not to use their current Facebook account. In the new account, they were advised not to include all of their personal details and that they could delete the account

once the iteration ended. However, none of the respondents created a new Facebook account for this iteration but used their present accounts.

## **6.6 Findings for Iteration 2: How Iteration 2 was conducted and its findings**

### **6.6.1 Collaboration with practitioners to produce a plan for Iteration 2**

I took a long time to design this iteration. In my research field notes, I expressed my feelings about not having ideas to conduct this iteration and how I needed to discuss this matter with English as Second Language teachers to get their ideas and opinions. The work in progress of this study was also presented at the MLEARN 2015 conference held in Istanbul, Turkey to get informative feedback from authors involved in mobile learning research (refer to Appendix O for the paper presented). In relation to DBR methodology, which emphasized collaboration between practitioner and researchers, I contacted practitioners to ask for their opinions about how this iteration should be conducted. Atkinson & Hammersley (2007 p.14) say that practitioners “are part of the social world that they are studying”, so for this iteration, the practitioners selected were lecturers teaching English language subjects in various universities in Malaysia who had experience of using mobile technologies and Facebook in their teaching. They shared their ideas on how this iteration should take place and their efforts to minimize the social intrusion issue. All the practitioners were approached using Facebook Messenger and electronic mail. Discussions held with these teachers touched on the issues below:

- a. ESL students' problems in writing as the content subject focused in Iteration 2 was Academic Writing.

- b. Their view on the use of mobile learning and Web 2.0 tools for teaching and learning.
- c. Their practices of using the technologies in teaching (if any) and how they solved any issue regarding the use of the technologies in teaching and learning processes.
- d. Their opinion on how the issue of social obligation in using personal mobile devices and Facebook might be addressed.

Based on the discussions with all the ESL teachers, I decided to conduct an academic writing skills workshop with a group of selected postgraduates. The teaching was delivered by me face-to-face for seven hours, touching on important aspects of academic writing and how writing can be improved (refer to Appendix H for the workshop programme). Participants were taught how to write cohesive sentences and paragraphs, writing topic sentences, developing styles in writing such as the use of appropriate vocabulary and sentence structures, and also learning how to proof-read their writing. All exercises were done individually, in pairs and in groups and there was considerable student and teacher discussion during the workshop. At the end of the workshop, participants were given two different assignments to be done weekly for three weeks from April 7 to April 27, 2014 (refer to Appendix I).

Every week, participants were asked to produce a piece of academic writing of 300 words: an introduction section for the first week; parts of the main text body in the second week; and a conclusion section in the third week. Then, they were asked to exchange their writing with their partners and assess their partners' work before they submitted the writing to me to be checked. I thought of adopting the method used by Shih (2011) that utilized Facebook for learners to

do peer assessment of their writing, and which required participants to post their short composition on Facebook walls and receive comments from their friends. Nevertheless, the approach was not suitable for this iteration because, in my opinion, texts of 350 words to be posted every week by every student were too long to be posted on Facebook walls. Rather than having a number of students to read and give comments, in this iteration, I assigned the task to be done in pairs and participants sent the writing that they had checked to me via electronic mail. Every week, participants changed their partners so that they could read writings from various people. In this peer assessment activity, participants typed their writings using Microsoft Word and they were encouraged to check their partners' work using the 'Track Changes' tool.

The second task of the week was a group discussion. Utilizing Facebook Messenger, all participants met online to discuss any problems that they had in academic writing, particularly problems that were related to their writing assignment every week. As the teacher, I used the venue to give general comments on their writing for the week and we discussed solutions to the problems together. Facebook Messenger provided synchronous communication between all participants and me as the teacher; we discussed issues such as how to be critical when writing, how to organize writing and how to be persuasive in writing. As their teacher, I chose Facebook Messenger to synchronously chat with the students because I needed to discuss their writing with them after I had read it each week. I needed to get prompt replies from them and I wanted everybody to benefit by participating in the weekly discussion. All the participants liked the idea of having the synchronous communication and they appreciated that they learnt from each other on the informal platform. Most importantly, Facebook Messenger was chosen because

the communication was private to those who joined the discussion, compared to a Facebook Group wall, where any discussion held is more public and can be read by any members of the Facebook Group. For the purpose of this study, all Facebook Groups created were closed groups so any postings on the walls could only be read by the group members.

### **6.6.2 Conjectures tested in this iteration and the findings gathered**

The design of this iteration and all the activities conducted were to test the conjectures below. Similarly to Iteration 1, the conjectures tested were related to the research questions of this study. However, for this iteration, the conjectures were not tested to answer all the research questions. This was because this iteration focused on the issues which emerged from Iteration 1. Based on the findings of this iteration, the conjectures were refined to be tested in future studies.

#### **Research Question 1c: To what extent can learning through smartphones engage and motivate learners, and how?**

##### **1. Learning content that is directly connected to learners' needs and academic courses will motivate them to find reasons for learning.**

In ensuring that the content of the workshop was related to the needs of the participants, an informal discussion was held with the participants to identify aspects of academic writing that they hoped to learn before this iteration took place. All the aspects that they suggested were the common problematic areas in academic writing among Malaysian students as suggested by the lecturers that I contacted before this iteration took place. Based on my years of experience of teaching academic writing in one university in Malaysia, I developed the content and planned suitable activities based on the suggested

areas. The participants were motivated when taking part in the iteration because the learning content catered to their needs.

*Findings:*

All eight participants stated that they were motivated to participate in this iteration because they were all in the midst of doing their writing tasks in their postgraduate courses and research. JOY, SHA, ZAI, ATI, SAI and SYA admitted during the interview that they wanted someone to check their writing, but before getting anybody to do that, they wanted to learn how to check their own work. It was a long time since these postgraduates had done any writing for academic purposes, so they needed to refresh their memory of the skills. Their urgent need to learn was indicated when JOY, SHA and ZAI requested the workshop be one month earlier than the actual date. Two weeks before the workshop was held, JOY also personally came to meet me, asking me to teach her some aspects of academic writing because she urgently wanted to learn.

From my observation, I saw that all the respondents were motivated throughout the three week iteration because they showed great efforts to do the tasks assigned. Except for JOY and SAI, the others submitted their writing first to their partners, and then the writings checked by them to me, on time every week. In the weekly online discussion, except for JOY and SAI, the participants were punctual and active during the discussion. SHA strongly felt that learners' motivation in the learning in this iteration was due to the benefits that they gained. As all the participants of this iteration were carefully chosen, the majority of them stated that they were motivated to participate and were happy that they could get feedback from their peers and the teacher on their writing. By the end of the three weeks, each participant's writing of about 1000 words

had been checked by three different friends and also by the teacher. These were the advantages gained by the participants by participating in this iteration: besides improving their writing skills, parts of their writing were checked by their friends and the teacher. ZAI, SYA, AIR, ATI, SAI, JOY and NAN had to submit their writings to their supervisors and lecturers during the iteration so they took the opportunity of participating in this iteration to get someone to check their writing before submitting.

*“Although about 1000 words of my writings was checked during the iteration, I think it was still better than it was submitted to my lecturer without being proofread by anybody” (NAN).*

To increase motivation in learning, SHA, ZAI, ATI, NAN, AIR and SYA suggested that the next iteration be conducted with students whose participation was formally assessed in the course they were taking. They believed students' attitudes were different if the learning was part of their course and if they were formally assessed.

*“You should do this iteration with your students in a course that requires 20% of students' participation online. Then, they have no choice but to be active, do their assignments and give their ideas online” (SHA).*

As an adaptation from the current conjecture, the conjecture for the next iteration was as follows:

- 1. Learning content that is directly connected to learners' needs and academic courses will motivate them to find reasons for learning.*
- 2. Students' participation in iterations is better if their participation is formally assessed.*

**2. Iterations that take into account the timetable of students will motivate students to learn and participate more.**

After selecting participants for this iteration, I contacted them several times to propose suitable dates to conduct the iteration, taking into account the timetable of participants. All eight participants agreed on certain dates and showed good commitment except for JOY and SAI, who did not submit their writing assignments in the third week to be checked by their partners (SHA and ZAI). JOY also did not participate in the weekly online discussion and SAI participated only once.

I believe that I would have had more power in influencing my participants to actively participate if the next iteration had been conducted with participants who were my own students, where participating in my iteration would be part of their course and they would be awarded credits for their participation. However, the experience in this iteration proved the importance of taking into account the timetable of participants as I managed to get a good response from the majority of the participants. This iteration supported the conjecture that iterations that take into account the timetable of students will motivate students to learn and participate more.

### **3. Individual and group assessments are important to ensure that students take the learning during iteration seriously.**

After the workshop, participants were given two tasks. Task 1 was an assignment to peer-check their friends' writing. Then, I assessed the writing. I did not grade their writing but I gave constructive comments and highlighted areas that the students needed to improve. In Task 2, I conducted weekly online discussions with the participants using Facebook Messenger to give general comments on the participants' writing for the week and to discuss how students' weaknesses in writing could be improved. Students' discussions on this

platform were not graded because the activity was conducted to reflect what the students had done for the week.

*Findings:*

For Task 1, all participants admitted that they were concerned when letting their friends check their writing but they were more concerned when sending their work to me; they took the comments by the teacher more seriously than the comments by their friends because of the expertise of the teacher in terms of academic writing skills in the English language. All also admitted that, although I did not grade their writing, they still felt that submitting their work to be checked and receiving comments from me was a form of assessment. For them, the comments given helped to show their strengths and areas of improvements.

SHA and NAN were of the opinion that, although my way of assessing their individual writing for Task 1 motivated the students to take the learning during the iteration seriously, it could be improved if the iteration was longer than three weeks. With a longer duration of learning, they hoped to learn more aspects of academic writing and to do more practice before their writing was assessed. 300 words of weekly writing and about 1000 words for the three weeks of iteration was too short to judge overall proficiency of the students. ZAI agreed with SHA and NAN because the writings that she read were chunks of paragraphs taken from ATI's writing so she was unable to see any development of ideas in the three paragraphs sent to her. For SAI, SYA and JOY, it was also difficult for them to assess their friends' writing because all of them came from different courses. I agree with the comments made by the participants because, as the teacher who assessed their writing, there were times when I did not understand the content, and I hoped to read more

explanation but I could not because I set the limit of 300 words per week. Therefore, I noted in my research field notes that the next iteration should be conducted over a longer period, sufficient practice should be given to students and participants should come from similar background courses.

As a reflection after conducting this iteration, I believed that an iteration that focused on academic writing skills should probably last about six months to see any development of writing in participants and to allow for sufficient practice. AIR, SHA and ATI suggested that activities for the next iteration should include students producing a piece of work in groups and their work being assessed in order to motivate students to participate actively. I noted in my research field notes that it was challenging for me to ask students to produce a piece of writing together and assess them because writing is mainly an individual task. If students were asked to produce a writing piece collaboratively, their group efforts should be assessed using creative ways that reflect their group effort and their learning progress as far as learning objectives are concerned. As an adaptation from the current conjecture, the conjecture for next iteration was as follows:

*1. Individual and group assessments are important to ensure that students take the learning during the iteration seriously but the evaluation technique should be innovative in indicating their effort and whether they are making progress as far as the learning objectives are concerned.*

*2. A longer iteration held with groups of students from similar courses/background is important to assess the effectiveness of the iteration.*

**Research Question 2: How do different means of communication and different technologies help to create continuity of learning?**

**1. Students' use of smart mobile devices, other technologies and different means of communication depends on the needs of the learning task, the urgency of their needs and the practicality of the situations.**

For document sharing for Task 1, participants were instructed to send the writing to the teacher via electronic mail (e-mail). They could do the peer-checking activity individually or they could choose to discuss it with their partners face-to-face. For Task 2, all were required to use Facebook Messenger to conduct the online discussion. This iteration was conducted in a setting where the Internet connection was good and the choice to be online using smartphones, tablets, laptop or computer was not determined by the teacher. Participants also had the liberty to participate in the discussion from any location.

*Findings:*

To do Task 1, all participants typed their writing using Microsoft Word software on their laptops. To send the documents, they used electronic mail. None of them used their smartphones and tablets for writing and checking their friends' work because using a laptop was more comfortable for them. Everybody did their peer-checking task individually because they did not see the need of doing so with their partners, except for JOY and SYA, who conducted a face-to-face meeting to check their work together because they found that it was faster and easier for them to explain their writings face-to-face. As both felt that they were not good at academic writing, they felt that they needed to help each other to do the task. SYA needed to see the facial expressions of the people he was discussing with and did not rely on messages typed on the screen of any technology. Therefore, to do Task 1, he preferred to meet JOY because he

anticipated that JOY might not understand the context and jargon that he used in his writing.

Commenting on the use of e-mails as a way of sending their writings and getting the feedback from their friends and teacher, AIR, NAN, ZAI and SYA suggested using other sharing tools of Web 2.0 such as Google Drive, iCloud and Dropbox because they wanted to read more comments on their friends' writing in this iteration. Instead of sending the writing via email, sharing platforms should be used because they can store files and allow real time collaboration from users to work on documents and the files can be reached from any smartphone, tablet, or computer. For AIR and ZAI, the use of these platforms that were specifically for education also helped to overcome the problem of intrusion into students' personal social space. For them, the use of social networking sites like Facebook to share documents and conduct discussion was still limited in terms of the size of documents shared as compared to sharing platforms like Google Drive. This suggestion was considered to be tested in the next iteration. From what was said by AIR below, it is clear that she saw the potential of Google Drive sharing platform to allow more opportunities for collaborative learning during real time.

*"I feel that the Google Drive is better in sharing multiple documents to multiple people. It is so convenient. You don't need emails. You can quickly invite others to view, download, and collaborate on all the files you want during real time. Wherever you go, your files follow" (AIR).*

In Task 2, all participants used laptops or personal desktops to participate in the conversation because they felt that their smartphones were not reliable in terms of Internet connection. For example, AIR went to the university library to use the computers there, while the others used their laptops in the university, at home and university hostels where they had confidence in the Internet connections.

AIR, SYA, SAI, and ZAI added that the small screen factor of their smartphones made them choose to use laptops and university computers because they wanted to get maximum input during the discussion. SHA believed that the Internet was the most important tool needed by students to participate in Task 2 so she used the most handy device that she had and chose suitable locations that she believed had the best and most stable Internet connection. To ensure that she got the most from the online chatting, since the discussion in Task 2 was held at specific dates and times, before the activity began, she prepared herself by ensuring that her laptop and university desktop computer were ready to be used for the activity.

*“It was at a specific time so I ensured that my laptop was ready with a stable Internet connection before the chatting began. It’s an important activity so I don’t rely on my phone because I’m afraid that there was a sudden Internet problem with it. I would also be interrupted when there was a call coming in” (SHA).*

For Task 2, participants’ decision to use laptops and desktop computers over their smartphones proved that students’ trust in mobile technologies was still low because they felt that there were still uncertainties about the Internet connection when using the devices. The small screen factor of smartphones was another deterrent factor. As this discussion activity was held at a specific time and day, all of them chose to use laptops and desktops over smartphones because they did not want to take the risk of losing connection while the activity took place. They also considered the small screen size, small keyboards for typing and other factors that might interrupt their learning if they used their smartphones for the activity.

From this iteration, I learnt that the sharing platforms of Web 2.0 such as Google Drive should be used to allow more collaborative learning among students because they can share files and documents conveniently in

comparison to Facebook. But for synchronous online discussion to take place, Facebook Messenger and Skype were a good option. In terms of the use of suitable devices, students' use of smart mobile devices, other technologies and different means of communications depends on the needs of the learning task, the urgency of their needs and the practicality of the situations.

### **Research Question 3: What are the roles of teachers when adapting the technology of smartphones and Facebook in their teaching?**

#### **1. An establishment of ground rules will minimize the social obligation and intrusion effect.**

The ground rules set in this iteration (refer to Appendix J) were to solve the social intrusion issue as raised in Iteration 1. I wrote in my research field notes that I hoped the rules did not make the participants feel disturbed by participating in this iteration and that they could continue with their daily writing work in a more effective way because they could apply the knowledge they learnt in their writing. I set the limit of words, content of the writing, duration of time for checking their peers' writing and specific days and times to submit their writing to their peers and me. Participants were also not supposed to discuss or do any work related to the iteration after a certain time of the day to avoid them feeling that the assignments given intruded on their rest time. They had the right not to respond after 6pm to any message sent by me or their friends on Facebook or Whatsapp that were related to the iteration.

#### *Findings:*

When interviewed, all participants felt that the ground rules were important in ensuring that they did not spend too much time in this iteration. SHA, ZAI, ATI, SYA, SAI, NAN and AIR agreed with the limit of 300 words and the one-hour

duration for checking peers' writing weekly because it was a manageable amount of words and time for them. These participants sent writings of around that limit of words and they mostly spent about one hour when checking their peers' work. Only JOY consistently sent writings longer than the word limit although I frequently reminded all participants that they only needed to check 300 words and could ignore the remaining words. When JOY's partners were asked about her work, they stated that they had a difficult time checking her work, not just because she wrote more than 300 words, but also because they could not understand her writing. After spending about two hours trying to understand her writing, one of her partners felt guilty about not being able to give comments on her work. As the teacher, I also found JOY's writings difficult to understand. From my point of view, she did not apply the knowledge learnt during the workshop. She might not have gained a lot during the workshop because she was one hour late on the day. As a reflection on this situation, I think I needed to be firmer on the rules that I set as they could have caused discomfort to other participants. Punctuality in attending class is the most important thing that I needed to stress in the next iteration to ensure that my respondents gained as much as they could during the learning. I should also continue using a Whatsapp Group or Facebook Group to remind my respondents of specific ground rules that I predicted might not be followed by respondents.

Regarding the limitation of using smartphones and Facebook to contact each other and not doing any work for the iteration after 6pm, all participants felt that the rules were good to ensure that the learning activity did not intrude into their social space. SYA said that they were mainly meant *"to protect the teachers from being accused of intruding students' social space and not much on*

*students*” because, in their opinion, nobody can determine when students should be using their computers and mobile technologies and when they should not. SAI, AIR, NAN, JOY and SYA admitted that, although they were forbidden to do the work after 6pm everyday, they did not follow this rule. This was because they had to prioritize other work to be done first. For these students, using computers and smart mobile devices was part of their life as a student; thus learning through the technologies did not violate their social life.

In terms of receiving notifications from their smartphones, SHA, JOY, SAI, NAN, SYA and ATI felt that the use of mobile learning and Facebook in this iteration did not intrude into their social space. When they received notifications of Facebook postings and text reminders in Whatsapp from me, they did not feel that they had the obligation to reply to every single posting and message because they saw that the postings made were mainly to inform or to remind them of the tasks. They also did not feel disturbed because the postings and messages were not sent every day. These participants were positive about the idea of Facebook Group being used to enhance learning because the number of members was small and they knew each other. Throughout the iteration, nine postings were made on the Facebook wall. Five were from the teacher, three from SHA and one from ZAI. The teacher’s postings were to remind the students to do the work and also to share some information regarding academic writing. SHA shared a link on grammar and how to write theoretical frameworks and ZAI made a posting on the group wall to communicate with the teacher because her phone was broken. SHA said that when she posted information to the Facebook Group, she did not expect all members to comment on her postings because all she wanted to do was share the information. Furthermore, there was no requirement for participants to comment on every post made by

each other in this iteration. Six members of the group saw all her postings but none of them left a comment, as shown in Figure 12 below. In SHA's opinion, unless it was required in a course that students' active online communication was a priority, teachers should not expect students to comment on all the postings made. She also felt that her postings did not violate others' social space because she believed her friends could choose not to read or to read her postings any time they wanted to.

When the seven participants were asked about SHA's posting, they admitted that they acknowledged her effort, they found her postings useful but they did not feel obliged to make any comment unless they had something to clarify regarding the information posted. Until the day they were interviewed, only NAN clicked the link shared by SHA to read the posting on grammar and the rest said that they would check the link out if they needed it in the future. Figure 12 shows the posting by SHA on Facebook group which was a note beneficial for academic writing.

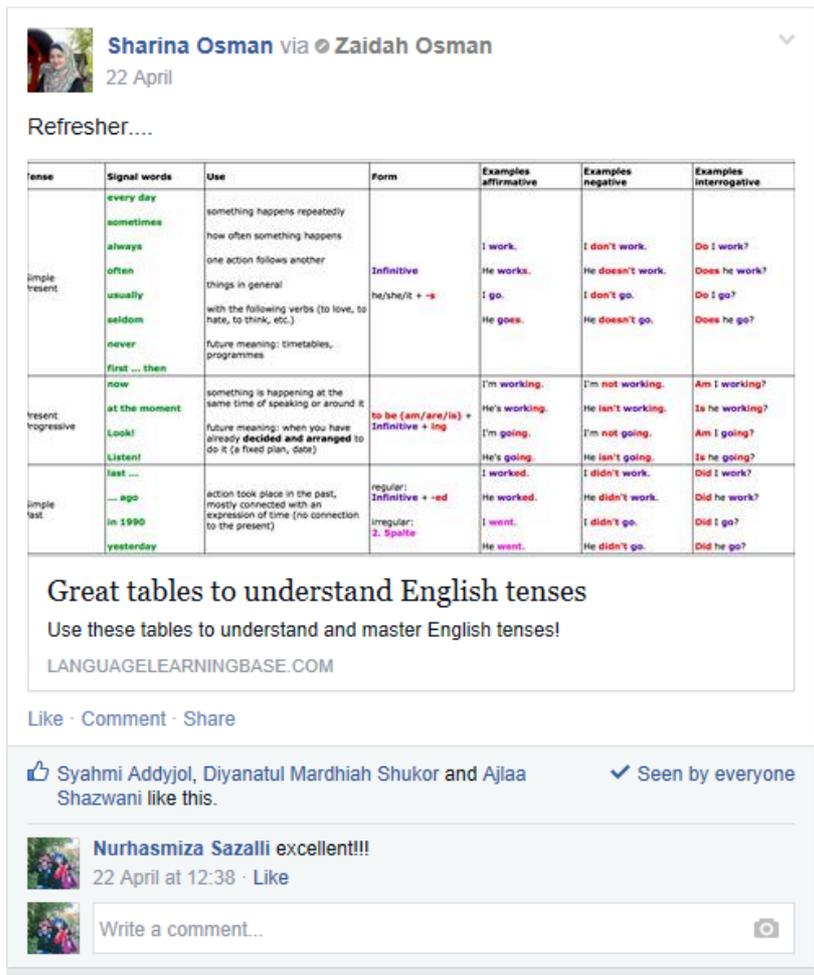


Figure 12: A posting by SHA on Facebook Group

ZAI and AIR felt that the use of mobile learning and Facebook intruded on their social space although the ground rules were implemented. AIR felt that way because she had other educational commitments while participating in this iteration and she wanted to do well in all commitments that she had. She believed that if she had no other commitments, she would not react the same way and she would be more relaxed when receiving the messages. Especially when reading long messages, she said that it made her feel that she had so much to do in a short period of time.

*“I was in a mid of focusing on my work, suddenly I received your Whatsapp message. Argghh!!!..I had to finish my work but I need to do your work as well. That was very stressful for me” (AIR).*

ZAI got distracted with the ringing alerts from her phone every time Facebook and Whatsapp notifications were sent to her smartphone. So, when participating in this iteration, she was not comfortable because she saw that the notifications on her phone consisted of messages from her friends, family and also for important matters related to her education. She felt that she was not flexible like the others who did not mind having social and education matters on one platform. For her, Facebook and Whatsapp applications were always meant for entertainment and for social activities but not for education. If both platforms were used for education, she found it hard to keep her focus on her studies because she saw Facebook as a source of distraction. She admitted that when she logged on to her Facebook to read postings on 'Normy's Academic Writing' group, she only spent a short time there but she spent a longer time on the site when she switched to read other postings which were related to her social life on her personal Facebook account.

*"Maybe because I am more towards a person who use my left side of brain. I am more analytical, so I am more rigid, I am not flexible. I think people who are flexible, they don't mind using the platform for various purposes. They can tolerate easily but not for me. Education is for education. Entertainment is for entertainment" (ZAI).*

Both AIR and ZAI saw that the technologies of mobile Web 2.0 tools helped for instant sharing of information and communication, but for formal learning they suggested not using Facebook but other platforms that separated social and educational purposes. JOY, SYA, SAI, ATI, SHA and NAN also agreed with the suggestion by AIR and ZAI and they admitted that there were times when they spent too much of their time on Facebook for social life and entertainment rather than for education.

*"Most of us were hooked to the social networking site because we could access to it via our smartphones. I've been wanting to delete the*

*Facebook application in my phone but I did not do it because I knew it will be difficult for me to easily access to Facebook then” (JOY).*

To overcome the problem of social intrusion when using Facebook and smartphone for educational purposes, SHA, SYA, JOY, ATI, AIR, ZAI and NAN emphasized the importance of having mutual agreement between teachers and students before any technology should be used for learning in the next iteration. As Facebook was generally used for students’ social space, they should decide whether to use their own personal account or create another separate account for education. For all of them, a Facebook Group can be used as a meeting point because most students nowadays have their own Facebook accounts. If participants could not be contacted via their smartphones, they might be able to be reached via their Facebook. However, as highlighted by ZAI and AIR, a teacher should not assume that every student can tolerate the use of Facebook for education, although most of them are on Facebook most of the time.

As an adaptation from the current conjecture, the conjecture for the next iteration was as follows:

- 1. The establishment of ground rules will minimize the social obligation and intrusion effect.*
  - 2. Agreement between teachers and students about whether to use Facebook and other means of communication is important in order to overcome the social obligation issue.*
- 2. Learners’ online collaboration should begin from collaborative learning activities in the classroom but specific learning tasks that require online collaboration using the technologies are important for monitoring purposes.**

Most of the learning activities during the workshop required students to carry out discussions with their groups and their pairs. They were designed to help students to know each other and develop mutual understanding before they should proceed to be collaborative using online platforms. Especially for Task 2, the assignment required participants to share their ideas and learn with each other (refer to Appendix I).

*Findings:*

From my observation, no participants had any problem when they were asked to do the pair and group activities during the workshop. In the interview, all of them also said that they found the group activities held during the workshop useful and they were eager to do the tasks in the iteration. SHA, AIR, NAN, ZAI and ATI especially appreciated when they were asked to peer-check their friends' writings during the workshop because it helped them to do Task 1. They felt that it was a difficult task because they did not know what to check at the beginning. However, after several practices were given and they could discuss how to do them with their groups, they were happy because they felt that they accomplished something during the workshop. SYA highlighted that he was excited that he learnt a lot on the day, not just from the teacher but also from his friends.

*"I am a perfectionist person when it comes to work but for academic writing, I have lack of knowledge on it. I like it very much during the workshop because you allowed us to learn together from friends. You were very approachable, we could ask anything that we were not sure of" (SYA).*

All participants felt that there was a continuous momentum in working collaboratively in this iteration. It began from their collaboration during the workshop, and ended in the online discussion via Facebook Messenger in Task

2. However, the discussion activity using the Facebook Messenger platform did not necessarily require participants to use their smartphones and tablets. Except for NAN, who used smartphone and tablet, the other participants preferred desktop computers and laptops: due to the nature of the learning activity, the participants preferred to view the discussions on the larger screen these tools offered. They only used their smartphone to read the thread of discussions after the discussion took place. They referred to the discussion while they were doing their writing assignments because there were useful academic writing points discussed there. As all participants in this study felt that there was continuous collaboration between them throughout the iteration, this iteration confirmed the conjecture that learning activities that involve physical collaboration between students in the classroom should direct them to do specific learning tasks that require online collaboration using Facebook platforms. Students' choice of devices for the collaborative learning activity depends on the nature of the learning and the affordances of the devices in helping learners to learn effectively.

### **3. Learning tasks that require participants to reflect on their work will encourage dialogic and collaborative learning among students.**

In Task 1, students were asked to apply the knowledge that they gained in the workshop to check their peer's writing (refer to Appendix I). In Task 2, students and teacher discussed common errors in writing based on specified areas every week. I took the lead in sharing how the errors can be solved and the students shared their own ideas as well in order to help each other. Both tasks encouraged participants to reflect on their work and the written comments received from the teacher. Using the platform of Facebook Messenger, everyone was given the opportunity to raise any points that they were not sure

of, to be discussed with all students and the teacher. When they shared their ideas and communicated with others, the learning activity encouraged dialogic and collaborative learning among students.

*Findings:*

All eight participants found the iteration effective in making them reflect more on their work. It began from the learning and discussion that they had in the classroom. SHA, ZAI, NAN, ATI, SYA, AIR and SAI emphasized that the experience made them more concerned about their mistakes when they did their weekly writing of 300 words. This iteration was limited in showing student' improvement in proficiency but the majority of the participants felt that they were more aware of important elements of academic writing after the iteration. For example, after doing both tasks for three weeks, SHA had a metaphorical image of organized clothes in a cupboard to reflect a good piece of writing.

*“It’s like someone who arranged all her clothes nicely in a cupboard. Every section is arranged according to colours and seasons. That’s how I see my writing should be like now. Organized. Easy to be read and understood. Not to confuse my readers” (SHA).*

ZAI, SHA, ATI, SYA and NAN believed that reading their friends' work made them reflect on their writing too. Now, they were more aware of different styles of writing and they also learnt from each other when reading good written work by their partners. SHA and NAN admitted that ZAI and ATI's styles were different from theirs because they did scientific research. At certain times, SHA could not understand ZAI's writing because it was full of scientific jargon and required considerable background knowledge in the area. However, with the knowledge gained in this iteration, SHA could see the development of ideas in ZAI's writing and she was happy that she could give her comments on how ZAI's writing could be made clearer. As for ZAI, she emphasized that although

SHA's writing was from a social science background, she learnt a lot from her style and she took notes to be applied in her writing.

*"I take SHA's writing as a good example. I can see her good structure of writing. Her connections from one sentence to another sentence, from word to word, she linked from one sentence to another sentence using appropriate word. And from one paragraph to another paragraph, she linked them very well. I think I'm still lacking in that aspect especially from sentence to sentence. Connections. So I learnt a lot from hers especially" (ZAI).*

Although most respondents stated that they learnt a lot when reading their peers' writing, none of them said that they read their peers' comments when their writing (that had been checked by their peers) was returned to them. SHA, ZAI, AIR, NAN, SYA and ATI felt that the level of proficiency between them was the same and since they were still in the process of learning, they treasured the comments by the teacher more than those made by their friends.

*"I only read the teacher's comments because she's the expert. For me and my friends, we are still learning. So I don't rely on my friends' comments" (SHA).*

This finding indicated that the participants appreciated the learning more from the teacher rather than from their friends. This situation may have happened because of the short duration of time for this iteration. Held over only three weeks, the participants did not have enough confidence in their friends' proficiency when they commented on their work. The next iteration should be held for longer, with activities that engaged students in more multiple dialogues for various language learning purposes with a high degree of peer-support, communication and collaboration.

Other than that, SYA raised the issue that the teacher mostly dominated the discussion in Task 2. Other participants also felt the same way but they had no problem with that because they were looking forward to receiving feedback from the teacher on their writing. As the teacher, I felt that it would be better if the

online conversation activity was held over longer than 30 minutes because I wanted to give more opportunities to participants to give their ideas. However, I realized that the participants were not comfortable having the discussion last longer than 30 minutes. While Task 2 was conducted during the iteration, none of them continued to ask more questions at 29 minutes and all of them stopped communicating after 30 minutes of discussion. When they were interviewed, all admitted that they could only spend 30 minutes because they felt that the discussion would otherwise be too long. As the discussion was held on the participants' social platform, they tended to divert their attention to other purposes. This situation suggested further evidence of intrusion of social space so, for the next iteration, I decided to limit the discussion to 30 minutes but the activity would be more focused on student-based learning rather than the teacher giving all the input. In my research field notes, I noted that for next iteration, within the agreed duration of time, I would plan the discussion to be actively participated in by students. I should act as a facilitator, share experience and manage interactions, without dominating the learning discussions. With that, they would be engaged in multiple dialogues and have a high degree of peer support and collaboration using the online platform. As an adaptation from the current conjecture, the conjecture for next iteration was as follows:

- 1. Learning tasks that require participants to reflect on their work will encourage dialogic and collaborative learning among students.*
- 2. The teacher should act as a facilitator to facilitate learning, share experience, and manage interactions without dominating the learning discussion.*

3. *There should be a balance between the teacher's instructional guidance and the learners' personal freedom to learn constructively.*

**4. Face-to-face teaching should be conducted before learners' learning is enhanced in learning tasks that require the use of smart mobile devices and Web 2.0.**

The teaching during the workshop was delivered face-to-face for four hours, touching on important aspects of academic writing and how students' writing can be improved. Pair work and group activities were given during the workshop and the teacher facilitated each pair and group while they did the activities. After the workshop, learning was enhanced via assignments that utilized smartphones and Facebook. Participants could also use other technology and means of communication to do the assignments. I created the 'Normy's Academic Writing' Facebook Group and the 'Academic Writing' Whatsapp Group, both of which could be accessed via students' smart mobile devices. The groups were the channels of communication between me as the teacher and all participants. Announcements, reminders and extra notes on academic writing were posted on 'Normy's Academic Writing Group'. The same reminders were also given via the Whatsapp Group. Both platforms provided were also used by respondents to raise any problem that they had while doing the assignments, especially for Task 1. Task 2 specifically used Facebook Messenger for the teacher and participants to discuss ways to solve problems in academic writing.

*Findings:*

All participants said that the most important factor in managing to do both tasks successfully was the face-to-face teaching from the teacher. For Task 1, they

managed to peer-check their friends' writing because they understood the lesson given by the teacher well. All admitted that they were more conscious, critical and reflective of their own writing after the iteration and they learnt these skills while checking their friends' writing and applying the lessons taught by the teacher. Their understanding of the lesson during the workshop also helped them to participate in the discussion for Task 2. For example, ATI said that she understood terms like 'thesis statement' as discussed during the online discussion because the teacher emphasized it during the workshop.

*"While writing, I always remember 'thesis statement', 'thesis statement' that you emphasized during the face-to-face teaching. I remember your teaching more than the online conversation via Facebook Messenger" (ATI).*

After understanding the lesson from the face-to-face teaching, all participants felt that the learning momentum was continued via the Whatsapp text messages and Facebook postings from the teacher because they made them continuously think about the tasks. For ATI, SYA and NAN, this was not a negative affordance of the technologies because, when they got ideas related to the task while they were on the go, they quickly recorded them in their smartphones. All participants suggested that the Facebook Group should include more postings, not just from the teacher but also from them. With postings that were related to only academic writing skills, they said that these were a good source of reference for all the group members. SHA, as an active user of the web and smart mobile devices, felt that it was a waste for the generation today if they did not utilize the combination because it contributed to life-long learning. She agreed with the use of a Facebook Group in this iteration because the participants can learn from the postings made by the group members and share their ideas there.

Commenting on the effectiveness of the discussion via Facebook Messenger, all found that it was effective in driving the learning momentum that they had from the workshop to the time when they did their writing individually after the iteration. After this iteration ended, except for JOY, the other seven participants in this iteration recalled that there had been few times when they referred to the Facebook Messenger discussion while doing their writing. For the kind of teaching and learning content in this iteration, it was found that the teacher played an important role in providing learning content face-to-face before students' learning could be enhanced with the use of smart mobile technologies and Facebook and other means of communications. Therefore, this iteration confirmed the conjecture that face-to-face teaching should be conducted before learners' learning is enhanced in learning tasks that require the use of smart mobile devices and Web 2.0. Teachers' roles were still very pertinent in ensuring that learning content was delivered to participants before any technologies could be used to enhance learning.

**5. Teachers should facilitate students' understanding and encourage students' involvement in tasks that require the active involvement of students in online discussion.**

Neither task specified that students should use the Facebook Group and Whatsapp Group created to actively discuss the tasks because they were created mainly to facilitate students' understanding and to encourage them to raise any points on academic writing that they were not sure of. I also encouraged them to use personal Whatsapp text messages if they had any personal problem related to the task. However, for Task 2, students were expected to be active in the online discussion to share their thoughts and to learn collaboratively with others.

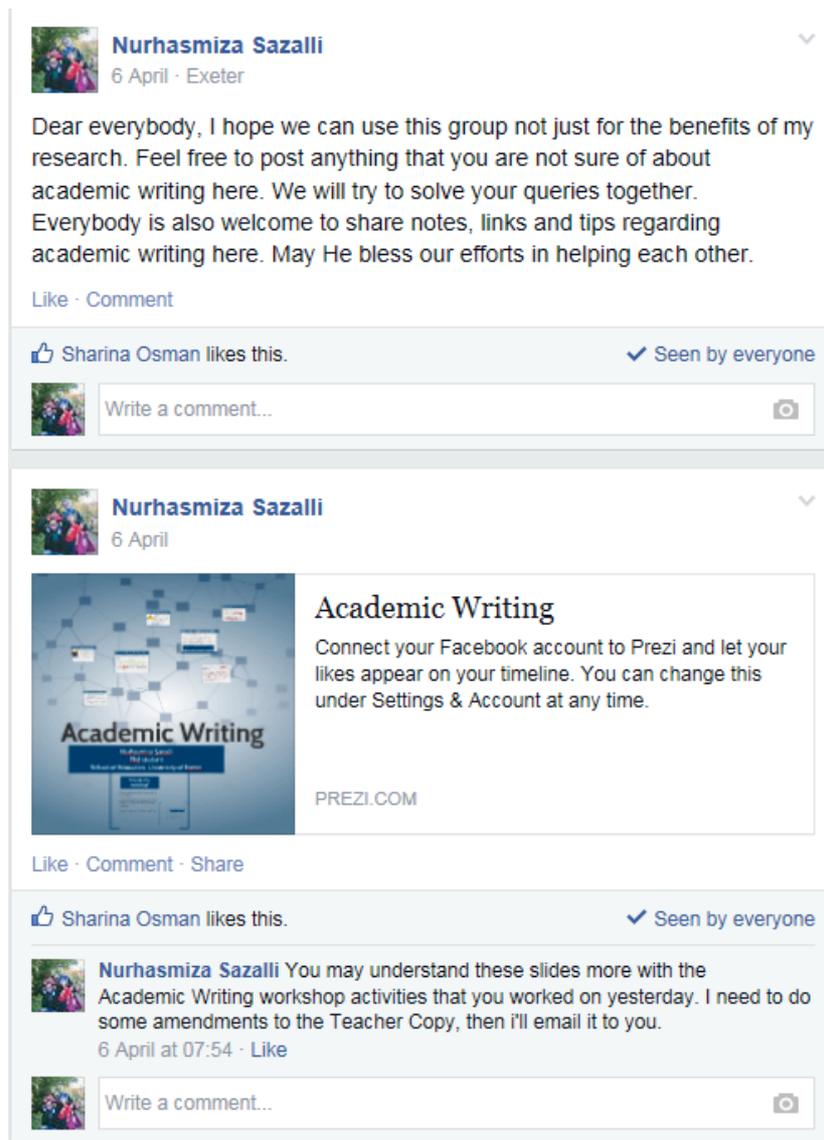
### *Findings:*

Throughout the three weeks, none of the participants used both the Whatsapp Group and the Facebook Group to ask questions related to academic writing. All of them felt that both platforms were effectively used to convey information, to remind them of what should be done and to recall the lesson learnt. All admitted that they were clear on what to do and they only responded to the postings and messages if they had questions to ask or had something to share. As can be seen in Figure 13, the Whatsapp Group was only used by the participants to inform the teacher that they had completed the work or could not do the task the week. SAI informed the teacher (the dialogue in the first two white boxes) through the Whatsapp group that she could not submit her work to SYA on time because she had a conference to attend. Since SYA could not check SAI's writing, he used the platform to ask the teacher whether he should then just send his work to the teacher (the dialogue in the last two white boxes).



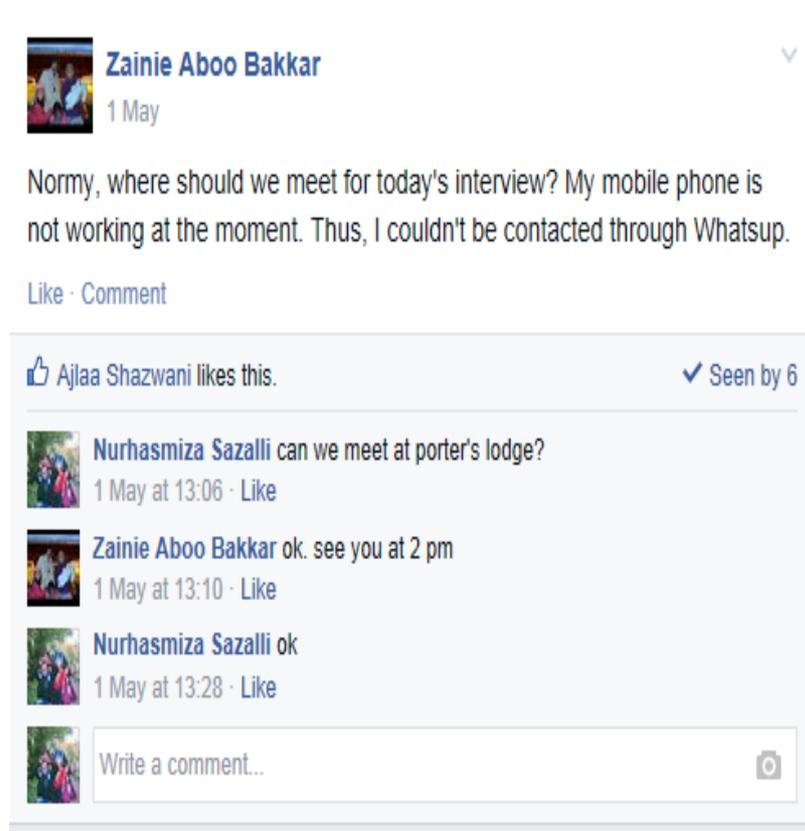
**Figure 13: Communication between SAI, SHA and the teacher on Whatsapp Group**

Figure 14 contains two postings on the Facebook Group wall. The first one introduced all members to the group and suggested they use the platform to share any problems regarding academic writing. In the second posting, I shared my teaching slides from the workshop with the group. Both Facebook postings were 'Seen by everyone'; SHA 'likes' one of those but nobody left a comment.



**Figure 14: Postings by the teacher on Facebook Group**

In Figure 15, ZAI used the Facebook Group to communicate with the teacher because her smartphone was broken. When ZAI was asked why she used the platform to communicate with the teacher, she said that this was the reaching-out affordance of Facebook and it was another source of communication on top of smartphones. Although the message might not be instantly read by the teacher, she was confident that the message was read because she believed that everybody was on Facebook all the time, especially those who downloaded its mobile application onto their smartphones or tablets.



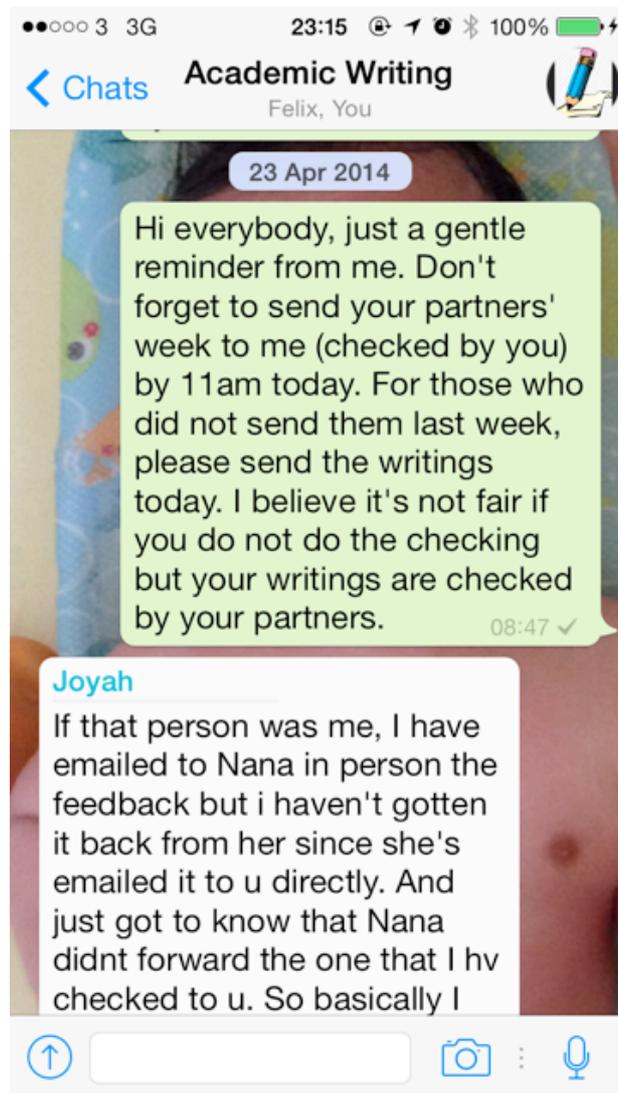
**Figure 15: ZAI's postinon Facebook Group**

Although there was less communication on both platforms provided, all participants were happy and satisfied that the platforms of communications were provided for them during the iteration; the platforms made them feel that the teacher welcomed discussion and was ready to solve any issue raised by the students, especially if they faced any difficulty. Task 1 did not require active participation on the online platform; nevertheless, SHA, ATI, SYA, NAN, AIR and ZAI also said that they did not communicate actively there because everybody was busy checking their peers' writing (Task 1). For them, the most important thing about completing Task 1 was to submit their work to the teacher. For these participants, the comments from the teacher were the most important factor with regard to informing them of their strengths and areas for

improvement in their writing. For JOY and SAI, their very minimal participation was due to other commitments.

Other than that, SYA, ATI, SHA and NAN admitted that they had some difficulty in checking their friends' writing but they were worried that if they posted sentences or phrases from their friends' essays to any of the group platform, this would embarrass their friends. I noted in my research field notes that I appreciated that these students' informed me about this issue, which was another potential danger of using the social media platform found during this iteration. I noted in my field notes that in the next iteration I would need to ask for their agreement to post their sentences onto the platform because it was a public platform or I should not use it at all because it might embarrass the students. Another option to solve this problem would be to encourage participants to communicate with me personally using personal Whatsapp or Facebook Messenger.

During this iteration, there was a moment when JOY raised her dissatisfaction with the text message that I sent to Whatsapp Group, asking all participants to submit their work. In the text message (refer to Figure 16), I asked everybody to send their work to their partners and also me. I took the Whatsapp platform as a venue for me to give a group announcement instead of giving a personal message to everybody.

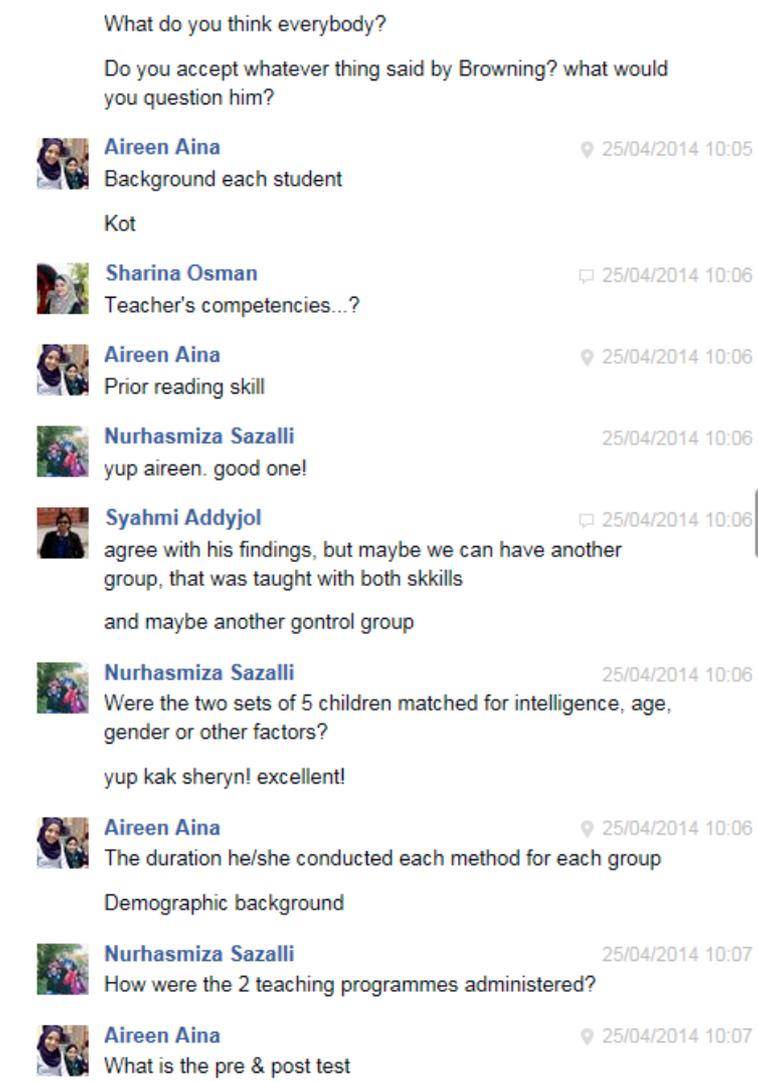


**Figure 16: A reminder from the teacher via Whatsapp Group**

However, JOY thought that the text should not be given to the group but should be given personally to all students. She believed that the teacher should not find it difficult to send a personal message because there were only eight participants in this iteration. As the teacher, I felt that my action of sending the reminder message to the group was right because sending a message to the group meant I needed the same information to be delivered instantly to all my participants. As a teacher, it has always been my practice to remind my students to submit their work in my class. So, I believed I was doing the same thing in this iteration as I used the Whatsapp Group as the platform to reach all

my students. If there were still students who did not submit the work, then I would ask them to hand in the work personally via personal Whatsapp text. Since JOY raised that point, this finding indicated the possibility of messages sent over Whatsapp creating misunderstanding in the receivers. I wondered whether the informal platform of using smart mobile devices had changed a common teaching practice or students' expectations, too. This issue was further discussed with the other participants personally. SHA, ZAI, NAN, SYA, ATI and SAI did not feel that the particular announcement should be given personally and my action of announcing it to the group was right as it could save time. Nevertheless, SYA emphasized that writing the announcement may have stirred some emotion because he was aware that JOY could not finish her work in the final week of the iteration. Furthermore, reading a text could lead to different interpretations, whereas an announcement given in class would likely not be misunderstood.

For Task 2, there was active participation among most participants throughout the iteration. For example, as can be seen in Figure 17 below, after I illustrated a scenario and asked 'What do you think everybody? Do you accept whatever thing said by Browning? What would you question him?', within two minutes (from 10.05 to 10.07), AIR, SHA and SYA responded actively to the question posted. This kind of active response was common in other topics of discussion throughout the three week iteration. SHA, SYA, NAN, AIR, ZAI and ATI communicated actively during the activities because they saw that this activity provided a good chance for them to ask each other questions and to share ideas. They also wanted to maximize the use of the 30 minute discussion to benefit their writing.



**Figure 17: Participants' active discussion on Facebook Messenger**

This iteration indicated that the teacher's role in facilitating students' understanding and encouraging communication should be maintained. Since the communication platform was public, there should be some caution in the language used to avoid misunderstanding. Other than that, the use of a platform for personal communication between teacher and students should also be continued. As an adaptation from the current conjecture, the conjecture for next iteration was as follows:

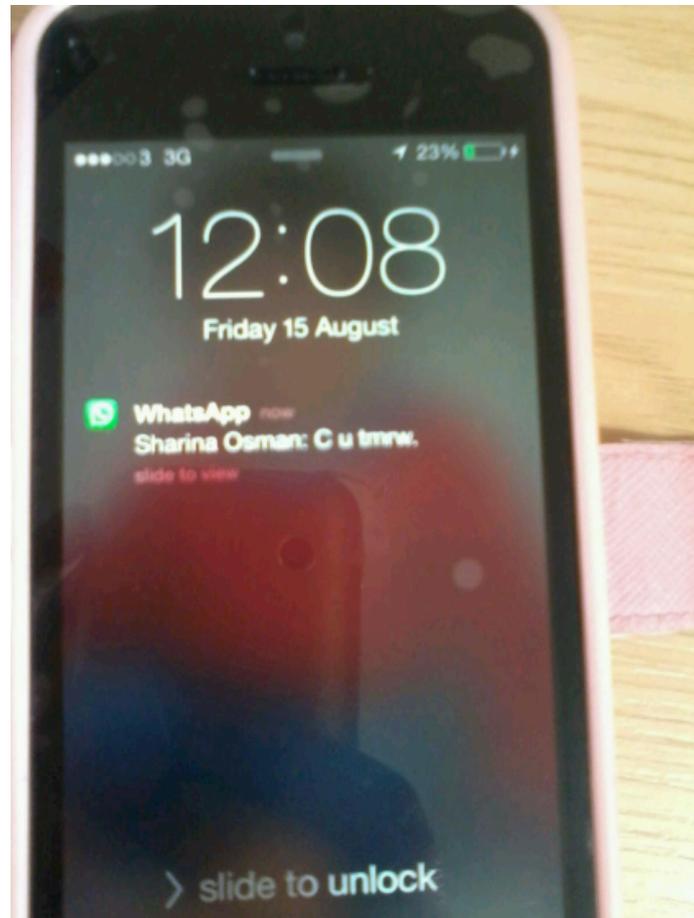
1. *Teachers should facilitate students' understanding and encourage students' involvement in online discussion that requires students' active participation.*
2. *Issues that are not suitable to be discussed on social platforms should be discussed using individual Whatsapp texts and individual Facebook messages.*

**6. A Whatsapp Group used as a medium of discussion will ensure that important messages are instantly received.**

Throughout the three week iteration, 15 Whatsapp messages were sent to the 'Academic Writing Whatsapp Group' by the teacher. The messages consisted of reminders on how both Task 1 and Task 2 should be done, their foci for every week, and when they should be submitted. I also used the platform to make arrangements for interviews with the respondents. All participants agreed with the use of the platform to convey information to the group and for messages to be instantly received.

There was no rule specifying a word limit for participants and the teacher to obey when typing messages on the Whatsapp Group, but when they were asked to comment on suitable lengths of text that would make them read the messages instantly, all admitted that they read any message instantly if they were short and if they were holding their phones when the messages were sent. Most smartphones had notifications on their screen once messages were received. For example, for iPhone users, they could read the messages instantly by just glancing at their phone if the message was very short, as in Figure 18 below. They did not have to slide the screen and open the message box because, for every short message, the notification that appeared on the

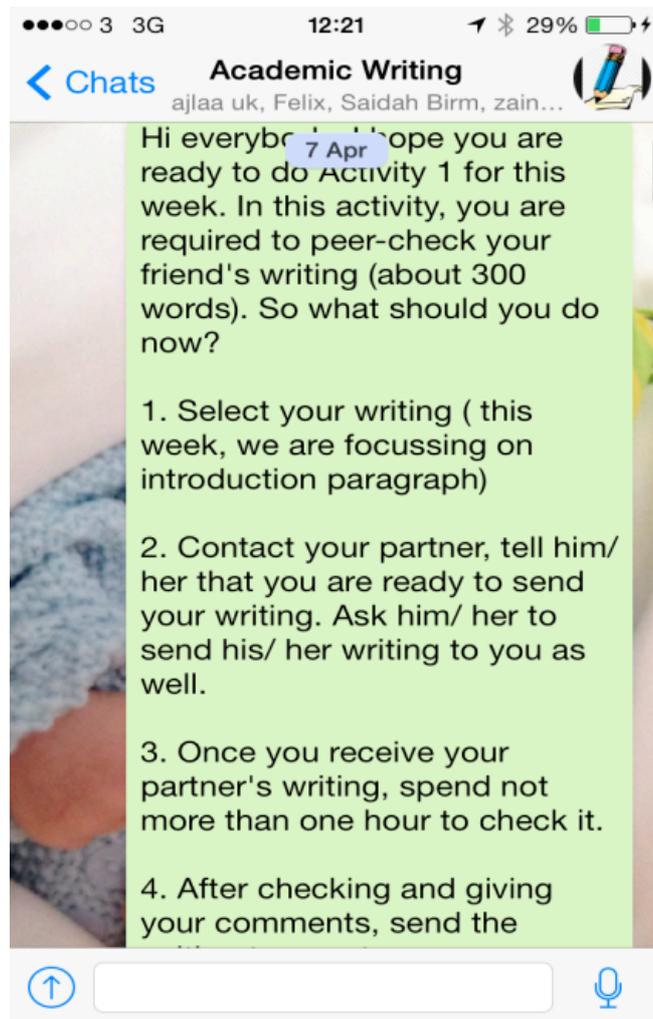
phone was enough for them to know the content of the message. In the message, SHA sent the text 'C u tmrw' to the teacher: an abbreviated version of 'see you tomorrow'.



**Figure 18: A text notification on an iPhone smartphone screen**

A suitable length of text that would prompt everybody to read the messages quickly, according to all participants, was between 1 and 30 words. However, according to NAN, SYA, AIR, ZAI, and SHA, the urgency of reading a text message depended a great deal on the time the message was sent, the importance of the content to the receivers, interest in the content shared by the sender and also the length of the message. SHA stressed that the instant reading of messages also depended on the sender of the message. In all education groups that she joined, she was particularly interested in reading

messages from her friends, who shared useful information that helped her in her PhD research. In this iteration, she admitted that she quickly read the messages sent through the 'Academic Writing' Whatsapp group because she knew that they were important, but if the messages were long, she just looked at the first and the second line of the texts: if these text lines made her think that the message was important and urgently needed to be read, then she would read it, but if not, she read it later. SHA, ZAI, ATI, JOY and AIR also admitted that they procrastinated in reading the texts if they were too long. Specifically, for them, messages that needed to be scrolled down when retrieved were considered long, as shown in Figure 19 below. The text was the longest text sent by the teacher to the Academic Writing Whatsapp Group. On 7 April, I reminded the students of what they were supposed to do for Task 1. These participants did not read the text instantly because they knew what they were supposed to do but they appreciated that the text was sent because they referred to it if they forgot what to do. However, they suggested that for other messages that needed to be read instantly, messages sent via Whatsapp should be limited to 30 words.



**Figure 19: A long text message on Whatsapp Group**

SYA, who also joined various groups, shared his personal experience of using the Whatsapp Group in his work place. Previously, he used to work with politicians and leaders so receiving Whatsapp text messages throughout the day and night was a common occurrence. He understood that there are times when senders need to send messages to their receivers when they get ideas about certain things. Although the messages may not require an urgent reply, this situation may still be disturbing to the receivers especially when receiving text messages with loud ringing alert in the evening. So, SYA suggested that teachers should explore the settings of the Whatsapp application, which was

upgraded in May 2014. In the new settings, senders can set a specific time of day for receivers to receive their messages although the text messages are actually sent a few hours earlier. For SYA, this may help to reduce the social intrusion issue as the teacher can control the time text messages are to be received in the Whatsapp Group. This iteration proved the importance of using the Whatsapp Group to ensure that important messages are received instantly. As an adaptation from the current conjecture, the conjecture for next iteration would be as follows:

- 1. A Whatsapp Group used as a medium of discussion will ensure that important messages are instantly received.*
- 2. Texts sent via Whatsapp should not be so long that they require more than a few times of scrolling down if they need to be read instantly.*

**7. Teachers' familiarity with possible smartphones and tablets' applications, Web 2.0 tools, and software will help the lesson planning in iterations.**

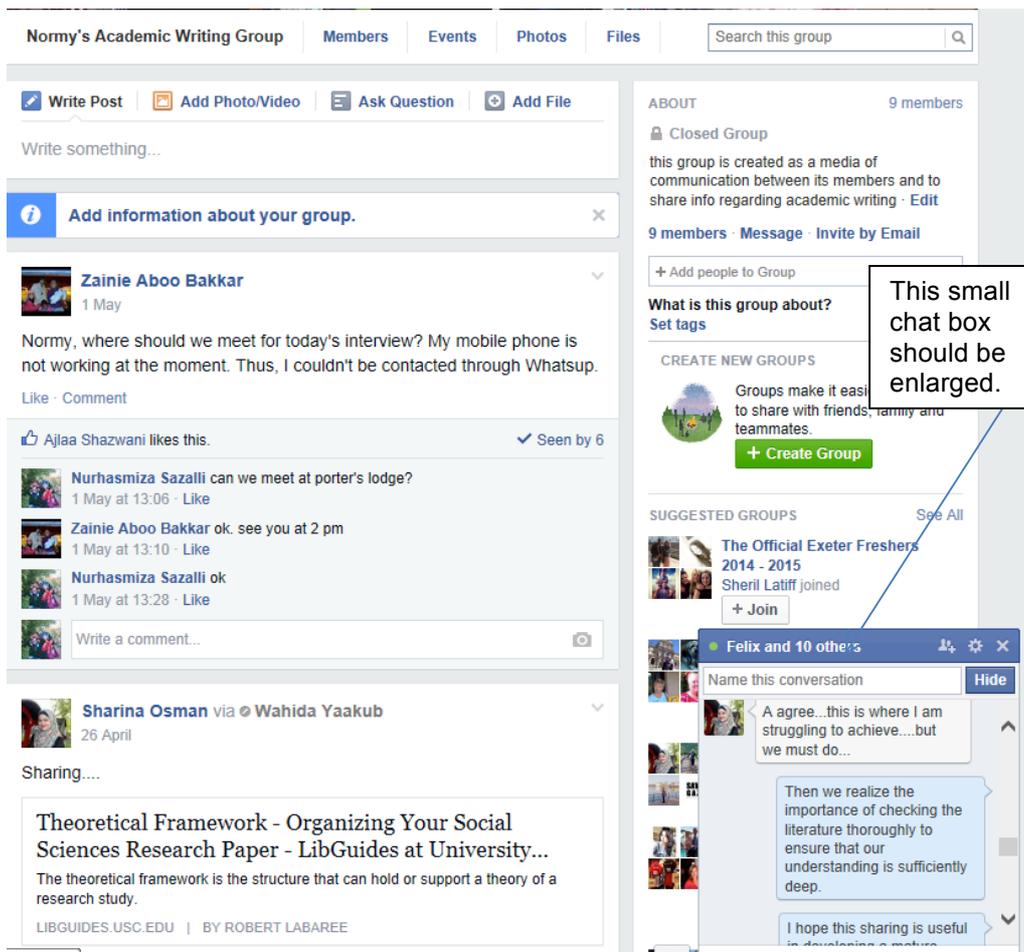
I made myself familiar with possible tools to be used during this iteration such as Whatsapp Groups, Facebook Groups and Facebook Messenger to prepare the lesson for this iteration. To check students' writing, I used the 'Track Change' tool from Microsoft Word.

*Finding:*

I had no problem in using all the tools to make postings, send messages and conduct online discussion during the iteration. However, I realized that I took it for granted that the participants also knew how to use the tools. For Task 1, none of the participants had any problem with the use of Facebook and

Whatsapp as a means of communication in this iteration. However, with regard to checking writing using the 'Track Change' facility in Microsoft Word, ATI, JOY and SAI claimed that they did not know how to use it. Not knowing how to use the facility was not a main problem in this iteration because using the facility was not essential to check the writing, but all participants realized the importance of learning how to use it because they were aware that all their supervisors also used the same facility when checking their writings. They therefore suggested the teacher give a short briefing on how to use the facility in the next iteration if participants were asked to peer-check their friends' writing again. From this iteration, I learnt that the teacher should anticipate the problems faced by the participants if the learning activity required them to use other technologies besides their mobile devices.

For Task 2, although all participants said that they were familiar with the use of Facebook facilities, there was an unforeseen problem in using Facebook Messenger that was only discovered during the interview. ATI and NAN were not able to follow all the conversations quickly because they did not realize that they should have clicked the button 'see full conversation' in the setting facility when chatting via Facebook message. As shown by the arrow in Figure 20, they used a small chat box and, as a result, they could not follow the conversation when the chatting pace was fast between all members.



**Figure 20: Small chat box of Facebook chat tool**

This was an unforeseen problem that I could have solved if I had reminded all students to use a desktop computer or laptop and also to click the 'See full conversation' button to enlarge the chatting box. The chat screen should be enlarged as shown in Figure 21.



**Figure 21: Big chat box on Facebook Messenger**

Therefore, for the design of the next iteration, a teacher should anticipate any problems faced by the participants if one of the learning activities requires the students to chat with each other using Facebook Message.

The findings of this iteration proved the importance of teachers being familiar and updated with smart mobile applications and also other technologies that can enhance their teaching as technologies change significantly over time. Teachers should also provide sufficient training for the technologies to be used

by students before they are used. As an adaptation from the current conjecture, the conjectures for next iteration were as follows:

1. Teachers' familiarity with possible smart mobile applications, Web 2.0 tools and software used will help the planning and teaching of lessons.
2. Sufficient training in the use of technologies that students will be expected to use should be given to ensure a smooth learning experience.

### 6.7 Conclusion

Table 14 summarizes the development of design conjectures tested in this iteration. The first column lists all the conjectures tested in this iteration. The second column consists of suggestions for revisions for conjectures from column 1. For boxes with (  ), this symbol indicates that the conjectures were tested and could be suggested as the next design framework without any revision.

**Table 14: Refinement of design conjectures in Iteration 2**

Design Framework 2	Suggestions/ Adaptation
Learning content that is directly connected to learners' needs and academic courses will motivate them to find reasons for learning.	 Students' participation in iterations is better if their participation is formally assessed.
Iterations that take into account the timetable of students will motivate students to learn and participate more.	
Individual and group assessments are important to ensure that students take the learning during iterations seriously.	Individual and group assessments are important to ensure that students take the learning during iterations seriously but the evaluation technique should be innovative in indicating their effort and whether they are making progress as far as

	<p>learning objectives are concerned.</p> <p>A longer iteration held with a group of students from similar courses/ background is important to assess the effectiveness of iterations.</p>
<p>The establishment of ground rules will minimize the social obligation and intrusion effect.</p>	 <p>An agreement between teachers and students whether to use Facebook and other means of communication is important in order to overcome the social obligation issue.</p>
<p>Learners' online collaboration should begin from collaborative learning activities in the classroom but specific learning tasks that require online collaboration using the technologies are important for monitoring purposes.</p>	
<p>Learning tasks that require participants to reflect on their work will encourage dialogic and collaborative learning among students.</p>	 <p>The teacher should act as a facilitator to facilitate learning, share experience, and manage interactions without dominating the learning discussion.</p> <p>There should be a balance between teacher's instructional guidance and learners' personal freedom to learn constructively.</p>
<p>Students' use of smart mobile devices, other technologies and different means of communication depend on the needs of the learning task, the urgency of their needs and the practicality of the situations.</p>	
<p>Face-to-face teaching should be conducted before learners' learning is enhanced in learning tasks that require the use of smart mobile devices and Web 2.0.</p>	
<p>Teachers should facilitate students' understanding and encourage students' involvement in tasks that require active involvement of students in online discussion.</p>	 <p>Issues that are not suitable for discussion on social platforms should be discussed individually on Whatsapp text or Facebook</p>

	Messenger.
A Whatsapp Group used as a medium of discussion will ensure important messages are instantly received.	 <p>Texts sent via Whatsapp should not be so long that they require more than few times of scrolling down if they need to be read instantly.</p>
Teachers' familiarity with possible smart mobile applications, Web 2.0 tools and software used will help the planning and teaching of lessons.	 <p>Sufficient training in the use of technologies that students will be expected to use should be given to ensure a smooth learning experience.</p>

The findings of this iteration showed that the issue of social obligation when using smart mobile devices and Facebook can be addressed if the teacher pays particular attention to it when designing the lesson and activities for the iteration. A motivating and supportive learning environment was created in both tasks in this iteration and the choice of technologies investigated was closed to the participants. However, all participants admitted that the most important factor that made them feel obliged to respond and participate was the significance of the iteration to them. In this iteration, all participants were carefully selected in that they were students who wanted to get the benefits of improving their writing skills. They agreed that they gained by participating in this iteration but they also admitted that their participation would be greater if participating in this iteration gave them credits for the course they were taking and if they were assessed for using the technologies. An iteration that is held over a longer period, and which takes into account the timetable of participants, would also produce different results.

The implementation of ground rules in this iteration was to limit the students' use of the technologies so that they did not spend too much of their time on the tasks assigned. All participants agreed with the ground rules as they wanted to see a line that differentiated their uses of technologies for educational and social purposes. Facebook was still seen as a platform for social and entertainment purposes, so most participants suggested using other sharing tools of Web 2.0 that helped to distinguish the use of platforms for educational and other purposes. Since Facebook is a public platform, the respondents were conscious of the kinds of information posted on the wall. In this iteration, it was raised that posting sentences or phrases that contained mistakes by the participants was something that insulted their friends, so this issue needed to be considered in the next iteration to avoid humiliation. The findings of this iteration also uncovered the importance of agreement between the teacher and the students in deciding suitable platforms of communication between them. Although Facebook was well known among all students, its uses for education were still controversial, especially if it did not award credits to students.

Overall, based on the activities designed in this iteration, the findings revealed that the use of smart mobile devices and Facebook created opportunities for the types of learning that are seen as important to 'life-long learning'. The potential of smart mobile devices and Facebook could be seen to carry the learning momentum to students when they were outside their classroom. By joining relevant Facebook Groups and chatting using the Facebook Messenger platform on educational matters, students maintained their learning outside the classroom in a more relaxed way. Through Task 2, all participants felt that it can be used as a meeting point to discuss anything related to education but that the technologies should only be used after the teacher delivered face-to-face the

main teaching content. It was also important for the teacher to act as a facilitator and be the manager of the online interaction, rather than dominating the learning discussion. This is to encourage more dialogic and social constructivist learning.

In investigating the issue of social obligation and intrusion into one's personal space, besides using the Facebook Group, this study also used a Whatsapp Group as a channel of communication during the iteration. It particularly investigated factors that caused delay in messages being read. It was found that a suitable length of text message that ensured prompt reading was between 1 and 30 words. However, urgency of reading the messages also depended on the importance of the messages to the receivers, the time when the messages were sent and also from whom the messages were sent. Messages that required a few times of scrolling were considered long and were not read instantly, especially if they were forwarded messages.

The findings of this study also highlighted the importance of the teacher predicting the technologies to be used by the participants and providing training for those that were not familiar. The teacher should also not take for granted that students could use all the technologies although they claimed that they were good at them. In this iteration, the teacher discovered too late (during the interview) that some respondents had a problem viewing all the online discussion; this affected their participation.

Lastly, to test the affordances of smartphones and Facebook and to see whether the combination could enhance collaborative learning among students, this iteration confirmed that it depended on the nature of the activities designed

by the teacher. Affordances of the combination could be tested if the activities designed required the use of specific applications of the technologies.

This chapter has presented how Iteration 2 was conducted and its main findings. The evaluation of all design conjectures proposed has been made in both iterations conducted to produce the final design framework of this study. The next chapter will present the refined design framework, discuss the significance of all the findings in relation to the literature and revisit the research questions of this study.

## **Chapter 7: Discussion**

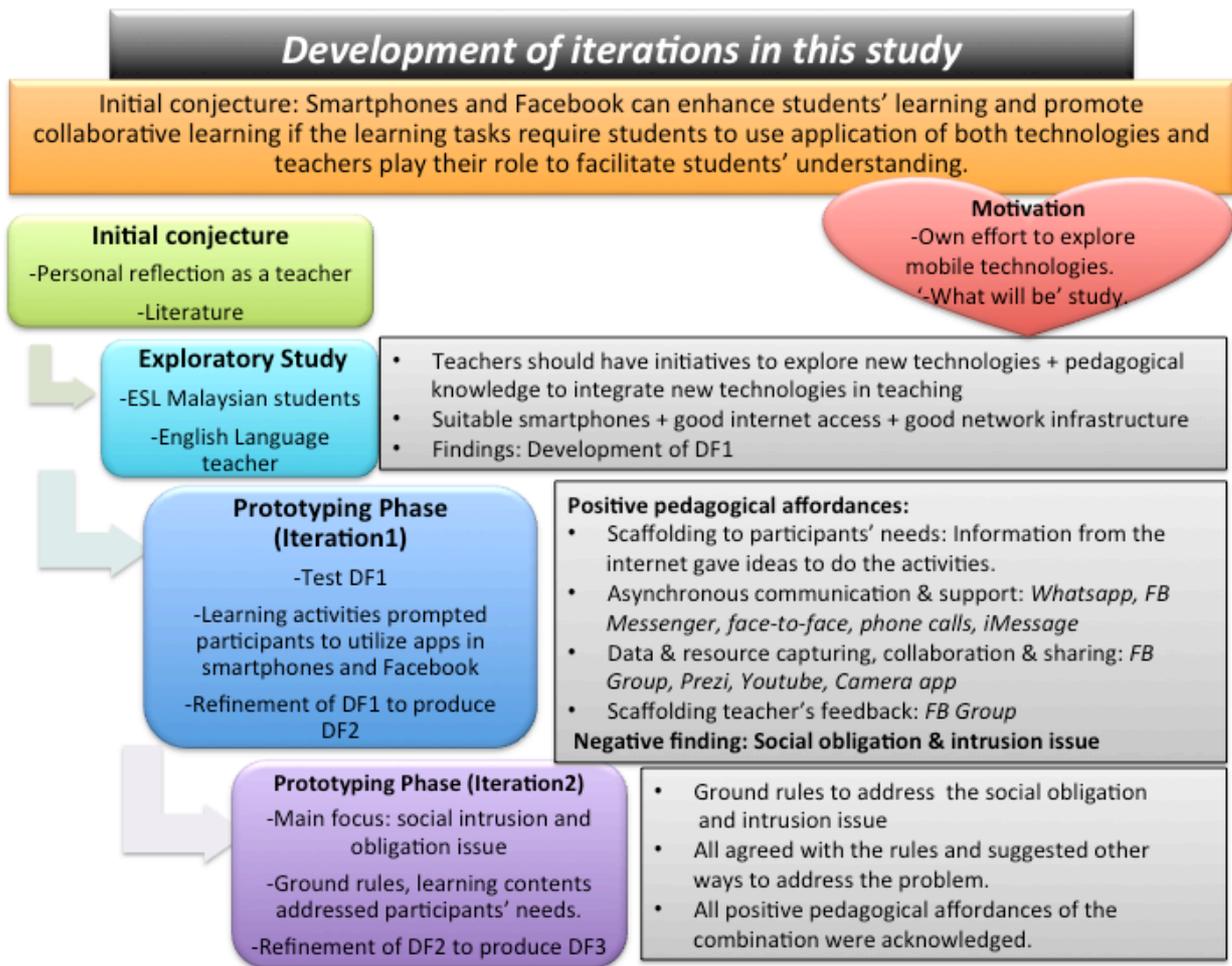
### **7.1 Introduction**

This chapter is the beginning of the final part of the thesis in which I discuss the significance of the findings in relation to the literature and revisit the research questions. In this chapter, I discuss how the intervention and the theoretical frameworks were developed throughout the research. In keeping with the pragmatic goal of design-based research which aims to contribute to contextually-sensitive design principles and theories (Wang & Hannafin, 2005), this chapter also highlights the development of both theory and practice for the use of mobile learning and Facebook for the benefit of teachers.

This chapter has three main sections. The first section reviews how the interventions developed over the trials. The development of the iterations in this study is presented in Figure 22. After that, the development of design principles throughout the study and their significance to the literature are discussed before the final design principles of this study are presented. The final design framework of this study is compared to the conceptual framework developed initially. It is worth mentioning here that, in the wider sense of educational enquiry, the generated design framework is not final and is still open for further investigation and modification based on other cycles of interventions in future research. The final framework produced in this study is the output developed from my reflection as a teacher, the literature review and from the empirical data from the two interventions.

The next section of this chapter revisits the research questions and presents the answers to them. The final section covers issues which emerged through the research process, which are worth investigating for future research.

## 7.2 Reviewing the development of the iterations



**Figure 22: Development of iterations in this study**

As shown in Figure 22, the motivation for this study stems from my own continuous efforts to explore the possibilities of new technologies that can benefit my teaching of English in the context of ESL students. I was also motivated to conduct this study because it is a 'what will be' study. Had this study been conducted in Malaysia, a setting that had minimum Internet connection, problems could have arisen, because of the developing nature of the network infrastructure in the country. The mobile technologies investigated in this study required the use of uninterrupted Internet via participants' smart mobile devices, mobile Internet Data and also from their surroundings (Wi-Fi);

the issue was resolved by conducting the study in a country that is more superior in terms of internet coverage, tariffs and bandwidth. As it was expected that Malaysia, an emerging and developing country, was on its way to improving its network infrastructure for smart mobile devices users to access the mobile web conveniently, this study was of relevance as it studied future practice for Malaysian students in the country. A further reason for this study was the suggestion in the literature that among the reasons for teachers' reluctance in using the technologies was their lack of competence and confidence in adapting to new technologies in teaching. It therefore investigated how lessons that adapted mobile technologies of smartphones and Facebook should be taught in raising teachers' confidence and competence to adapt new technologies in teaching.

### **Initial conjectures**

The initial and fundamental conjecture of this study was that smartphones and Facebook can enhance students' learning and promote collaborative learning if the learning tasks require students to use the applications of both technologies and teachers play their roles in facilitating students' understanding. This initial conjecture derived from my personal reflection as a teacher and from the theories of mobile learning proposed by Sharples, Taylor, & Vavoula (2007) and critical factors for the implementation of mobile learning and Facebook to enhance students' learning outlined by Cochrane (2010). I was interested in investigating the pedagogical affordances of smartphones and Facebook to enhance students' learning in the context of ESL learners from Malaysia because from my point of view, I believed that if these ubiquitous technologies can enhance students learning, teachers should make the effort to investigate how the new technologies might be useful for students.

They should teach using the ways their students learn so investigations should be made to study how they can be adapted in teaching.

### **Exploratory Stage**

In this stage, I tested my assumption about the possibilities of smartphone and Facebook technologies to enhance learning by asking English language teachers teaching in Malaysia about the pedagogical possibilities and constraints of using smart mobile devices and Facebook. To know about the state of the network infrastructure in Malaysia, I interviewed a telecommunication engineer from the country. All the teachers had a positive view of the affordances of both technologies to enhance students' learning because they believed the technologies were very close to students. While teaching, they saw that their students searched for the meaning of words, and found information utilizing smartphones. The teachers also saw the potential of Facebook to encourage collaborative learning and to motivate students to practice using English language outside classroom. They raised common obstacles to using both technologies such as cost, access, gadgets, lack of competency and confidence among teachers. All the teachers also stressed the unreliable Internet connectivity when using mobile devices to connect to the web, especially in rural areas in Malaysia, so they suggested that an iteration that further investigated pedagogical affordances of smartphones and Facebook should be conducted in areas that have good network infrastructure. Even if this study was conducted in urban areas in Malaysia, the teachers could not guarantee a promising Internet connectivity.

Besides the teachers and the engineer, I also explored my assumptions about the possibilities of smartphones and Facebook for learning with a group of ESL learners

who were studying in the UK. These students had gained benefits from mobile and Internet technologies to support their learning in this country. The findings from the exploratory phase led to a refinement of the initial conjectures to produce Design Framework 1 (DF1). Together with the refinement of the design conjectures, I developed a lesson plan that integrated the use of smartphones and Facebook to be tested in Iteration 1.

### **Prototyping Phase: Iteration 1**

Iteration 1 was conducted based on the principles that underpin Design Framework 1, theories of mobile learning from the literature, and the findings from the exploratory study. In this iteration, participants first attended a face-to-face workshop with the teacher (me) (see Chapter 5). To test the affordances of smartphones and Facebook, they were given assignments that required information searching, information sharing and active collaboration from all group members.

The assignments were designed in a way that required participants to exploit the media-rich and image-capture capabilities of the smart mobile technologies in their hands. So, they utilized various applications in their smartphones and tablets to do the assignments. Applications that allowed them to retrieve current news, search for information, view videos, record video, capture photos and upload information to the web were found to be the most useful for this assignment. To have further discussion about the assignments, other than using the Facebook Group platform to have a group discussion, the participants in this iteration also used other modes of personal communication, namely personal Whatsapp text messaging, iMessage text messaging and Facebook Messenger. Three out of the four groups also had face-to-face discussions because they felt that they could make better decisions and

clarifications when meeting their friends face-to-face. Positive findings from this iteration related to the pedagogical affordances of the combination of technologies. They scaffolded the learners' needs when they needed to find information and videos to get ideas to do the assignments. Furthermore, the combination offered asynchronous and synchronous communication, collaboration and support through Facebook groups, Facebook messenger, Whatsapp, iMessage, face-to-face meetings, phone calls and Prezi. They also provided data and resource capturing and sharing via the use of Facebook groups, Prezi, Youtube and camera applications for photos and videos, besides offering scaffolding via the teachers' feedback on the Facebook Group. Klopfer et al. (2002) suggested that learning tools lead to learning culture. This was confirmed through findings of this iteration because the participants' decisions about the technologies to be used to do the learning activities stemmed from their familiarity with and comfort in using the tools. They used other technologies of Web 2.0 rather than just Facebook because they were useful for the tasks given.

One interesting finding from this iteration was that, although the majority of participants felt that it was natural for students to use Facebook and smart mobile devices for learning and acknowledged the affordances of the combination in enhancing their learning, some of them raised the issue that the combination had also intruded upon their social space during the iteration. Although this issue was raised at the end of the interview session with FD and DE (see chapter 5), it was taken into consideration to be further investigated in the next iteration. Based on the feedback from the participants in Iteration 1, some of the conjectures were revised to produce Design Framework 2 (DF2).

## **Prototyping Phase: Iteration 2**

Based on the findings gathered from Iteration 1, Design Framework 1 was refined into a more comprehensive and detailed one to produce Design Framework 2. As Iteration 1 discovered a powerful social obligation effect in the combination of mobile learning with social networking, this pedagogical issue was further investigated in Iteration 2 (see chapter 6). This iteration focused on how the issue should be addressed with a new set of participants, new learning content and new learning outcomes. In order to avoid this negative consequence of mobile learning and Facebook, this iteration focused on how to make best use of its positive consequences besides investigating how lessons should be designed to explicitly demonstrate collaborative work among students. A set of ground rules was imposed to limit students' use of Facebook and smart mobile devices for this iteration.

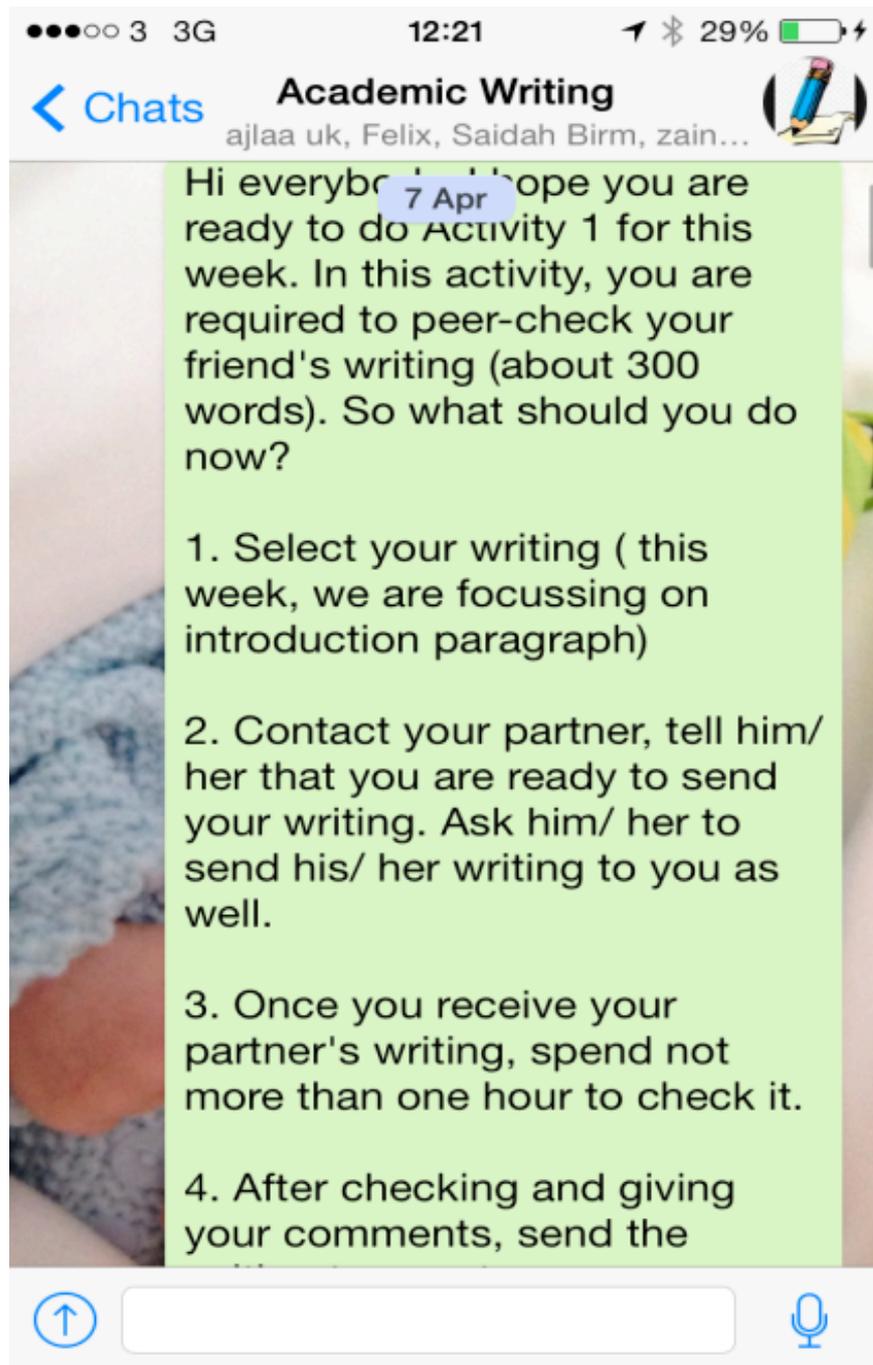
In terms of the participants' performance in the tasks assigned, all of them put considerable effort into ensuring that they applied the knowledge learnt during the workshop in their work. Most acknowledged the use of Whatsapp Group and Facebook Group as the meeting platform for all participants and the teacher, and few felt that their social space had been violated. They did not feel disturbed, because the postings and messages were not sent every day. They agreed that the ground rules were effective in limiting both participants' and teacher's use of smartphones and Facebook for educational purposes but generally they felt that the rules were mainly intended to protect the teachers rather than the students. This was because students felt that nobody can determine when students should be using their computers and mobile technologies and when they should not. They used the technologies to do the tasks at any time and in any place they were free, although the ground rules set certain times to do the work. Only two participants were uneasy

with the use of smartphones and Facebook for learning in this iteration. The ringing alert when receiving text messages and Facebook notification during times when they were busy with their own work bothered them and intruded into the respondents' social space. As for the others, as they felt that the combination had been part of their life, they strongly felt that it would not intrude into students' social space if the use of the combination awarded them credits for the subject course they were studying. If this were the case, they would not mind and would tolerate the intrusion. Other evidence found in this study was that all participants in both iterations chose to use their personal Facebook account and not to set up private ones, despite my recommendation to do so. Their comments indicated the relationship between how much students value the learning and their feelings about the social intrusion issue. The more the use of the technology benefits them, the lesser it intrudes into their social space.

Nevertheless, the participants were aware of the possibility of the social intrusion issue when using smartphones and Facebook technology; therefore, to overcome the social intrusion issue, all participants in both iterations recognized the importance of having mutual agreement between teachers and students before any technology was used for learning in the following iteration. They suggested that teachers should not assume that every student can tolerate the use of Facebook for education, even though most of them used the technologies every day. As the website was originally created as a social networking tool among its users, it may contain information that was personal to students and their friends. Teachers should therefore also consider suggesting that students create a separate account for learning to avoid any problem related to privacy. For all participants, a Facebook Group can be used as a meeting point because most students nowadays have their own Facebook accounts. If

participants could not be contacted via their smartphones, they might be able to be reached via their Facebook accounts.

The culture of the participants, how they used the technology to communicate, and the role of the teacher who was also the researcher in this study might also have had an impact on their perception on intrusion. Having had the experience of teaching ESL learners from Malaysia, I observed that the participants in this study still uphold Asia's culture of respecting the elders. They treated me as a teacher whom they respected, addressed me as 'Kak Normy' (Sister Normy), and they tried their best to do all the tasks without any argument. When communicating with me, they also communicated formally and politely. Part of the reason why they behaved in such a manner could be because of the way I interacted with them online, which might have brought a formal element to a conventionally informal communication platform. One example can be seen in the Whatsapp text below in Figure 23: the tone of the message was very formal and the sentences were full sentences, not typed in short forms, as is usually the case with text messages on informal communication platforms. I did not intend to create a formal atmosphere when I typed the messages but this was the unintentional result, possibly because I am used to using more formal English language when communicating with students; as a teacher, I believe that I should demonstrate good use of the language.



**Figure 23: A formal element from the teacher's text message**

As this research utilizes students' social platforms, many of the conjectures about the role of the teacher indicate a role which is less didactic and which implies a more equal power relationship (for example, the references to facilitation and agreement with students). However, besides the formal element of interaction on the informal

communication platform, the usual classroom practices which I transported into online communication (for example, my reminders to hand in the students' work) may have conflicted with the didactic roles of the teacher that I tried to implement. This is another reason why there was a tension of expectation that might have impacted on the participants' perceptions on intrusion. I could term myself a 'digital immigrant' (White & Le Cornu, 2011), in that I am still learning how to adopt the new aspects of technology. White & Le Cornu (2011) applied the term 'digital immigrants' to those who were not born into the digital world but are interested in utilizing the technology in their lives. As they are excited about and keen to adopt many aspects of the new technology, according to White & Le Cornu (2011 p.2), 'digital immigrants' "always retain to some degree, their "accent", that is their foot in the past.

### **7.3 Development of the design frameworks in this study.**

In view of the complex interplay between participants' learning experiences and the technology and pedagogy involved, the DBR methodology (Brown, 1992) adopted in this study stresses the interdependence of design elements and the importance of examining issues derived through redefining processes. The rich and relevant data is analyzed with consideration of the various interacting factors that shape the learning envisaged. The iterative refining processes help to improve the design and share the development of the pedagogy (Erickson, 1986).

This section elaborates on how the design frameworks of this study were developed from the Exploratory Study, Iteration 1, and finally Iteration 2. The elaboration is made based on the development of design frameworks as illustrated in Table 15.

The first column of the table consists of DF 1 (Design Framework 1). The design conjectures derived from the Exploratory Study and were tested in Iteration 1. Based on the findings from this iteration, some of the conjectures were refined to be re-tested in Iteration 2.

The second column illustrates DF 2 (Design Framework 2). As one of the main findings from Iteration 1 was the issue of social obligation, some conjectures set for Iteration 2 investigated the issue further. Some conjectures that had been proven in Iteration 1 were not tested in Iteration 2 due to the nature of the learning content in the iteration but some were tested for reconfirmation.

The third column shows DF3 (Design Framework 3). It consists of all conjectures that were refined and confirmed in this study. Based on the findings from the Exploratory Phase, Iteration 1 and Iteration 2, Design Framework 3 is the main contribution of this study where it suggests guidelines for teachers to adopt the use of smartphones and Facebook to enhance the teaching and learning of English for English as a Second Language speakers.

**Table 15: Development of design frameworks in this study**

DF1 (findings from Exploratory Study)	DF 2 (findings from Iteration 1)	DF3 (findings from Iteration 2)
Iterations should be conducted with learners and teachers who use suitable mobile devices and are located in an environment that has good access to the Internet.	Iterations should be conducted with learners and teachers who use suitable mobile devices and are located in an environment that has good access to the Internet.	Iterations that are conducted with learners and teachers who use suitable smart mobile devices and are located in an environment that has good access to the Internet can minimize the problems of accessibility to the web.
Learning content that is directly connected to learners' needs will motivate them to find reasons for learning.	<p>Learning content that is directly connected to learners' needs and academic courses will motivate them to find reasons for learning.</p> <p>Iterations that take into account the timetable of students will motivate students to learn and participate more.</p>	<p>Learning content that is directly connected to learners' needs and academic courses will motivate them to find reasons for learning.</p> <p>Iterations that take into account the timetable of students will motivate students to learn and participate more.</p>
Assessments are important to ensure that participants consider the learning during the iteration seriously.	<p>Assessments are important to ensure that participants consider the learning during the iteration seriously.</p> <p>Individual and group assessments are important to ensure that students consider the learning during the iteration seriously.</p>	<p>Individual and group assessments are important to ensure that students take the learning during the iteration seriously but the evaluation technique should be innovative in indicating their effort and whether they are making progress as far as learning objectives are concerned.</p> <p>A longer iteration held with group of students from similar courses/ backgrounds is important to assess the effectiveness of the iteration.</p>
Face-to-face teaching should be conducted before learners' learning is enhanced in learning tasks that require the use of smartphones and Facebook.	Face-to-face teaching should be conducted before learners' learning is enhanced in learning tasks that require the use of smartphones and Facebook.	Face-to-face teaching should be conducted before learners' learning is enhanced in learning tasks that require the use of smartphones and Facebook.
Learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their devices.	Learning tasks that require participants to be reflective over their work will encourage dialogic and collaborative learning among students.	<p>Learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their devices.</p> <p>Learning tasks that require participants to be reflective about their work will encourage dialogic and collaborative learning among</p>

		<p>students.</p> <p>The teacher should act as a facilitator to facilitate learning, share experience, and manage interactions without dominating the learning discussion.</p> <p>There should be a balance between the teacher's instructional guidance and the learners' personal freedom to learn constructively.</p>
Learners' online collaboration should begin from collaborative learning activities in classroom.	<p>Learners' online collaboration should begin from collaborative learning activities in classroom.</p> <p>Learners' online collaboration should begin from collaborative learning activities in classroom but specific learning tasks that require online collaboration using the technologies are important to allow the teacher to allow the teacher to monitor the learners' progress.</p>	Learners' online collaboration should begin from collaborative learning activities in classroom but specific learning tasks that require online collaboration using the technologies are important to allow the teacher to monitor the learners' progress.
Minimum face-to-face meeting with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information.	<p>Minimum face-to-face meeting with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information.</p> <p>Students' use of smart mobile devices, other technologies and different means of communication depend on the needs of the learning task, urgency of their needs and practicality of situations.</p>	<p>Minimum face-to-face meeting with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information.</p> <p>Students' use of smart mobile devices, other technologies and different means of communication depend on the needs of the learning task, urgency of their needs and practicality of situations.</p>
Teacher's postings which ask students' progress and provide relevant learning input on a Facebook Group wall will facilitate students' understanding and encourage students' communication.	Whatsapp Group used as a medium of discussion will ensure important messages are instantly received.	<p>Teacher's postings which ask students' progress and provide relevant learning input on a Facebook Group wall will facilitate students' understanding and encourage students' communication.</p> <p>A Whatsapp Group used as a medium of discussion will ensure important messages are instantly received.</p> <p>Issues that are not suitable to be discussed on social platforms should be discussed using individual Whatsapp text and individual Facebook Messenger.</p>

		<p>Texts sent via Whatsapp should not be so long that they require more than few times of scrolling down if they need to be read instantly.</p>
<p>Learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook.</p>	<p>An establishment of ground rules will minimize social obligation and intrusion effect.</p>	<p>Learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook.</p> <p>An establishment of grounded rules will minimize social obligation and intrusion effect.</p> <p>Agreement between teachers and students whether to use Facebook and other means of communication is important in order to overcome the social obligation issue.</p>
<p>Teachers' familiarity with possible smart mobile applications, Web 2.0 tools and software used will help the planning and teaching of the lesson for the iteration.</p>		<p>Teachers' familiarity with possible smart mobile applications, Web 2.0 tools and software used will help the planning and teaching of the lesson for the iteration..</p> <p>Sufficient training to use any technologies expected to be used by participants should be given to ensure a smooth learning experience.</p> <p>Teachers should oversee the problems faced by the participants if the learning activity required them to use other technologies besides their mobile devices.</p>
<p>Learning tasks that allow flexibility in using smart mobile devices, other technologies and different means of communication will prompt learners to work collaboratively in various ways.</p>	<p>Learning tasks that allow flexibility in using smart mobile devices, other technologies and different means of communication will prompt learners to work collaboratively in various ways.</p>	<p>Learning tasks that allow flexibility in using smart mobile devices, other technologies and different means of communication will prompt learners to work collaboratively in various ways</p>
<p>Learning tasks that prompt students to use applications on their smart mobile devices and to explore the tools of Web 2.0 will motivate them to learn and participate.</p>		<p>Learning tasks that prompt students to use applications on their smart mobile devices and to explore the tools of Web 2.0 will motivate them to learn and participate.</p>

**Conjecture 1: Iterations that are conducted with learners and teachers who use suitable smart mobile devices and are located in an environment that has good access to the Internet can minimize the problems of accessibility to the web.**

This conjecture was first tested in the first iteration, then in the second one. The importance of the appropriate choice of devices and reliable Internet access was proven essential in both iterations because, since both groups of respondents and the teacher used a suitable choice of smart mobile devices that could connect to the Internet with ease, all mobile learning activities related to the use of the technologies were conducted successfully. The Internet was not originally used for teaching (Ellram & Easton, 1999) but is now a significant means of course content delivery and interaction (Page, 2006). When connected to the Internet, the participants of this study accessed Facebook Groups, Facebook Messenger, Whatsapp text messaging, iMessage text messaging, Youtube, and searched for current news from their smartphones. They had no problem accessing these applications because all devices used were advanced in terms of having a large bandwidth that allowed high speed and capacity for searching, downloading, and uploading information. All had touchscreen-based direct finger input instead of keyboards, and web browsing through Wi-fi and 4G. With these features, participants and teachers can quickly search, retrieve, record and share information at any time and in any place; the good connectivity of Internet where both iterations were conducted supported the use of the smart handheld features. As this study was conducted in a setting that had stable Internet connection, the findings suggested the relevance of Traxler's (2007) statement that the application of mobile learning based on the affordances and culture in developed countries would have been different due to the massive, static

and stable resources there as compared to developing countries. Findings of this study would have been different if it had been conducted in the Malaysian higher education environment, as this study confirmed that iterations needed to be conducted with learners and teachers who used an appropriate choice of mobile devices and were located in an environment that had good network infrastructure.

**Conjecture 2: Learning content that is directly connected to learners' needs will motivate them to find reason for learning.**

This conjecture was first tested in Iteration 1, then it was tested in Iteration 2. Vogel, Kennedy, & Kwok (2009) claimed that students' motivation plays a significant role in engaging and sustaining students' use of mobile devices for learning purposes. To motivate learners to be engaged in the study, the learning content was selected to be relevant to both groups of participants. As Kember, Ho, & Hong (2008) found, the relevance could be established through showing how theory can be applied in practice, establishing relevance to local cases, relating material to everyday applications, or finding applications in current newsworthy issues. Participants in Iteration 1 found the learning contents of the 'Professional Communications Skills at the Workplace' workshop useful as they would be entering the working world about four months after the iteration ended. In Iteration 2, all the participants were postgraduates who were in the middle of their research writing phase, so they agreed that they found the iteration useful in improving their writing. As learning content that is connected to learners' needs is important to motivate learners to learn, this design conjecture was confirmed in this study.

**Conjecture 3: Iterations that take into account the timetable of students will motivate students to learn and participate more.**

This conjecture derived from the findings that tested Conjecture 2 in Iteration 1. Although all participants in Iteration 1 found the learning content useful, they suggested that the next iteration should take into account the timetable of participants in order to motivate them to learn and participate more. Among the reasons why most of them procrastinated over doing the tasks assigned was because they were busy with their own study commitments. Feedback from the participants was therefore taken into consideration for Iteration 2. The conjecture above was tested in Iteration 2, where the iteration was conducted during a period that was suitable for the respondents. Generally, all participants showed good response and co-operation during the iteration, but since participation in the iteration was voluntary, some still did not give full co-operation due to their own study commitments.

**Conjecture 4: Assessments are important to ensure that participants take the learning during the iteration seriously.**

This conjecture was tested in Iteration 1 in finding the kinds of assessment that should be used when learning involved online platforms and collaboration. In Iteration 1, experienced panels judged the students' group work, which was in a form of a presentation. Malone & Lepper (1987) proposed that, through direct competition as held in this iteration, individuals may view their behaviour as externally controlled and experience some pressure to win. The participants in Iteration 1 admitted that the competition motivated them to work, but some individuals did not collaborate well. This situation happened because there was no individual assessment. In

Iteration 2, the participants showed more commitment because their writing was assessed individually, not just by their friends but also by the teacher. The findings of this iteration confirmed that technology, however ubiquitous, powerful, or attractive, is still merely a tool for enabling learning (Tamim et. al, 2011). Assessment is still pertinent to engage and facilitate students' learning (So & Ching, 2011) to ensure that participants take the learning during the iteration seriously.

**Conjecture 5: Individual and group assessments are important to ensure that students take the learning during iteration seriously.**

As suggested by participants in Iteration 1, this conjecture was tested in Iteration 2 with particular focus on individual assessment. However, due to the nature of the learning activity in Iteration 2, which focused on academic writing, no group assessment was conducted as all the writing was done individually. One of the assignments given in Iteration 2 required students to check their friends' writings but they found this difficult because they were from different course backgrounds. This was a limitation of Iteration 2 as it was conducted with participants from various courses. Although all of them were postgraduates and were in the midst of writing their research, the way they did academic writing varied in a number of aspects. Therefore, the next iteration needed to consider having participants from similar courses, preferably within the expertise of the teacher, as this would ease the process of assessment. In addition, I reflected that I still relied on the traditional way of assessing students' individual writing in Iteration 2. As teaching and learning in both iterations of this research utilized mobile learning facilities, the learning experience in a future iteration would be better if the next studies could explore more innovative ways of assessing students' work to check whether they were making

progress as far as the learning objectives were concerned. Therefore, for the next iteration, design conjecture 6 is proposed:

**Conjecture 6: Individual and group assessments are important to ensure that students take the learning during the iteration seriously but the evaluation technique should be innovative in indicating their effort and whether they are making progress as far as the learning objectives are concerned.**

In Iteration 1, participants were motivated to participate in the iteration because they had group assessment through their group presentation. To encourage individual participation, individual assessment was suggested. Considering this suggestion, this design conjecture was implemented in Iteration 2. The assessment carried out indicated the participants' progress as far as the learning objectives of the lesson were concerned. There was no group assessment in Iteration 2 but the design of the learning activity, which used online chatting, was seen as an innovative effort to encourage the participants to share their thoughts and learn from each other. Findings from both iterations confirmed that innovative techniques of assessment to assess learning that utilize mobile platforms are something to be explored by researchers, but it also depends on the suitability of the content of the lesson in an iteration.

**Conjecture 7: A longer iteration held with a group of students from similar courses/ backgrounds is important to assess the effectiveness of the iteration.**

This conjecture was derived after Conjecture 6 was tested. Another aspect learnt from Iteration 2 was the importance of having a longer duration for an iteration in order to assess the development of the writing skills of the participants. This was a limitation of this study, because Iteration 2 could not be conducted over more than

three weeks. The respondents could not commit to a long duration, and the study had to be completed within the time limit given to complete my PhD research. Having participants from different course backgrounds also affected the assessment of their writing. As not all of them were in the same subject area as me (Education), my comments on their work did not relate to the subject content but just to the general mechanics and structures of their writing. Although all of them found my comments and their peers' comments useful, all admitted that they still valued the comments from their research supervisors more because they were the experts in their field. Other than that, although participants in both iterations were given some level of pressure to produce good work because they were assessed, it was observed that their participation would have been better if participation in this study had formed part of the course they were taking. This was a limitation of this study because it was conducted while I was having my study leave, thus I did not have any formal class to teach. Instead of conducting informal assessments as in both of these iterations, the next iteration should be conducted in a formal teaching course taught by the teacher.

**Conjecture 8: Face-to-face teaching should be conducted before learners' learning is enhanced in learning tasks that require the use of smartphones and Facebook.**

This conjecture was designed because I believed that there was a need for me, as the teacher, to give face-to-face input of the learning content to the learners before they were assigned any take-home tasks that required them to use any handheld device. I believe that after teachers play their role in teaching the main learning content, they should encourage students to further explore the knowledge by assigning tasks that utilize applications in mobile devices. This design conjecture

was tested in both iterations. Most respondents in both iterations agreed on the need for learning face-to-face in the class from the teacher as it helped them to understand the learning content better. Face-to-face contact also plays a significant part in the process of socialisation (Jones & Peachey, 2005). In the current study, the blend of face-to-face and online learning produced positive outcomes in enhancing participants' learning: as supported by Collopy & Arnold (2009), online facilities had the benefit of providing additional connections, spaces and resources, while the face-to-face time allowed for developing a deeper level of comprehension through interactions where the participants synthesized and constructed knowledge, generated links to larger topics, and discussed applications in the real world. Especially in Iteration 1, the participants admitted that they valued the face-to-face learning because they could discuss issues related to workplace communication openly and they could get prompt responses from other participants and the teacher. They also valued the online platform provided after the class because they could continue their learning at home where at the same time still being connected with their friends.

The finding of this study also supported Saunders & Werner's (2002) conclusion that the effectiveness of blended learning depends on audience and subject matter. The majority of the respondents in Iteration 1 felt that they could do the assignments given even without attending the workshop because they were easy: they just needed to know what they were supposed to do and relied on the online communication with their group members. However, most still acknowledged that the face-to-face teaching helped them to understand the learning content better. For participants in Iteration 2, all admitted that they really needed the face-to-face teaching as the subject content was complicated and required a great deal of

interaction with the teacher before they were asked to discuss it on the online platform. Thus, blended learning was found to be the best fit, particularly for participants in this iteration, because of the nature of the learning content they received. The findings from this study indicate that the more complicated the subject matter, the more it requires face-to-face teaching because the teacher can better explain and facilitate for the students rather than relying on other sources. This conjecture was proposed to be part of Design Framework 3.

**Conjecture 9: Learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their own individual devices.**

This conjecture was included in Iteration 1 to test the affordances of smart mobile devices, particularly smartphones and tablets, in assisting participants to do the assignments given. Once they received the group assignment questions and were asked to discuss how the tasks should be divided among them, all participants were found to use devices readily available in their hands to search for information. A significant number of the students also used the desktop computers provided to search for information. With the information in their hands, they made sure they were well prepared before starting any discussion with their group mates. The nature of the activity in Iteration 2 did not require students to use their own individual device to facilitate the joint construction of knowledge with others, so this conjecture was not tested in the second iteration. However, this design conjecture is proposed to be part of Design Framework 3 because it was shown in this study that once learners knew what they were supposed to do, they used their own device to find relevant information so that they could contribute to their group.

**Conjecture 10: Learning tasks that require participants to be reflective about their work will encourage dialogic and collaborative learning among students.**

Based on the assessment from Iteration 1, Iteration 2 was designed in a way that granted the participants the personal freedom to reflect on their learning, to have personal construction of knowledge, to do the task individually, and to have social interaction with others on virtual platforms. All participants reported that both individual/ reflective and social collaborative activities in the iteration were effective for the personal and social aspect of learning. They found the dialogic and collaborative learning experience in Iteration 2 useful in helping them to improve their writing skills because they could reflect on their weaknesses and strengths while the discussion took place, and they could ask the teacher and their friends pertinent questions while participating in the online chatting. In this regard, the online spaces helped to extend the learning experience to outside the classroom by opening more dialogues that fostered language practice. This finding suggested the possibilities of a web-mediated learning environment in encouraging dialogic and collaborative learning among learners and the activities designed were able to encourage dialogic learning among participants. Learning activities using the environment were planned in a way that required socio-constructivist/collaborative approaches that highlight learners' active roles and open new spaces for dialogue (Wegerif, 2009). The pedagogy of this study supported Wegerif's (2009) argument that it is the multi-dimensional meaning space of the web that facilitates meaningful learning, as well as Woo and Reeves's (2007) argument that meaningful interaction should be created using the web 2.0 platform based on a socio-constructivist framework. Majority of the participants of this study admitted that they appreciated the collaborative learning experience when using the combination of Facebook tools

(Facebook Group and Facebook Messenger), other web 2.0 tools such as Youtube and Prezi and also smartphone applications (Whatsapp, photos) when participating in this study. To encourage more participation, future research should be undertaken over a longer period so that more learning activities that encourage dialogic and collaborative learning can be observed. Furthermore, the ideas for conjecture 11, and 12 as shown below, derived from Iteration 2, proposing important roles that a teacher should play to encourage dialogic and collaborative learning among students.

**Conjecture 11: The teacher should act as a facilitator to facilitate learning, share experience, and manage interactions without dominating the learning discussion.**

This design conjecture was derived after conjecture 10 was tested, as a reflection on the online discussion activity using Facebook Messenger in Iteration 2. From a social constructivist perspective, online discussions create opportunities for the participants to construct meanings together and integrate new knowledge into their prior experiences (Rourke & Anderson, 2002). The discussions also serve as a platform for both participants and teacher to interact in a social environment without boundaries of time and distance, promoting students' critical thinking and helping students to reflect on their ideas (Brooks & Jeong, 2006; Hew & Cheung, 2008; Wang, 2008). The literature has also identified problems related to online discussions, such as limited student participation (Hewitt, 2005); inadequate critical analysis of peers' ideas (Rourke & Anderson, 2002); and lack of motivation, commitment, and time, and failure to communicate effectively (Brooks & Jeong, 2006). Some of these problems were found in the current study because, as the teacher who managed the discussion, I realized that the participants were not active

in raising points to be discussed with the others. I encouraged them by posing questions to share their ideas but most of the time their answers were short and they seemed to wait for more input from me. Due to students' lack of effort in raising points to be discussed during the online chatting, I tended to dominate the discussion by giving additional input for the students to improve their writing. Although the respondents felt that the online discussion activity was helpful, I was not satisfied because I was hoping that the students would be more active when doing online discussion. Rovai (2007) said that instructors' domination during online discussion may result in an instructor-centered discussion, suppressing students' active participation. Therefore the next iteration would highlight that a teacher should act as a facilitator to facilitate learning, share experience, and manage interactions without dominating the learning discussion.

**Conjecture 12: There should be a balance between teacher's instructional guidance and learners' personal freedom to learn constructively.**

This design conjecture was derived after conjecture 10 was tested. From the experience of conducting Iteration 2, I reflected that I should plan the discussion activity in a way that required the participants to learn constructively with the others, rather than me dominating their discussions. Participants should feel that they have the freedom to search for information and discuss any issue related to the learning on the online platform rather than expecting the teacher to instruct them in everything necessary for their learning.

**Conjecture 13: Learners' online collaboration should begin from collaborative learning activities in the classroom.**

This conjecture was tested in Iteration 1 before it was adapted for Iteration 2. As the teacher, I believed that the physical collaboration that students experienced during the class helped them to build rapport with each other, thus helping them to work collaboratively online. For Iteration 1, the participants had no problem working collaboratively during the class but I realised it was a mistake to give the assignment questions for them to discuss face-to-face in the class. As a result, most groups finalized their roles for the assignments in the class and did not use the online platform to have further discussion as I had expected them to do. When this issue was discussed during the interview, most participants felt that there was less need for them to re-discuss on the online platform what had been discussed face-to-face. For the majority of them, everything had been finalized during the discussion so they just needed to do what they were supposed to do. To demonstrate the development of online collaboration, the participants suggested that the assignment questions be given after they left the workshop; they would then use the means that they had to discuss with their peers. As an adaptation of this conjecture, for Iteration 2, face-to-face physical collaboration during the workshop was maintained to encourage continuous collaboration between learners online. Participants' suggestions from Iteration 1 were considered, so the assignment questions for Iteration 2 were given after the workshop. However, there was no agreement amongst the participants in Iteration 2 that the assignment questions should be given after the workshop, because only after they knew what they had to do would they decide whether to continue participating in this iteration or not; in fact, two participants decided not to take part because they felt that they could not commit to it.

In terms of the effectiveness of collaborative learning through online platforms, both iterations demonstrated the possibilities of teamwork via virtual learning experience.

The Facebook Group thread discussions in Iteration 1 and online chat through Facebook Messenger in Iteration 2 built a sense of belonging (Aviv, 2000) and nurtured positive interpersonal relationships, particularly because the participants were engaged in goal-oriented group work (Davis, 1997). The group activities were also in alignment with established pedagogical knowledge that students learn best through social interactions. Moving from the momentum of learning from face-to-face in the class, the online platform provided every participant with opportunities to participate, thereby creating a more democratic environment (McDonald, 2002). Based on social learning theory, participants will have high self-efficacy, confidence, and higher motivation to complete a task when they know they will have assistance from their peers (Cheng & Ku, 2009). This was found especially in Iteration 1 as the participants felt motivated to do the tasks given when they received assistance from their peers through the Facebook Groups and personal Whatsapp texts between group members.

**Conjecture 14: Learners' online collaboration should begin from collaborative learning activities in the classroom but specific learning tasks that require online collaboration using specific technologies are important to allow the teacher to monitor the learners' progress.**

This conjecture was refined from conjecture 10. It maintained the importance of encouraging learners to collaborate during learning activities in the classroom before they collaborate via online platforms. Rather than giving the learners freedom to use the online platform in any way that they thought was helpful for them to do the assignments, as in Iteration 1, participants in Iteration 2 had a specific learning activity that required them to learn collaboratively with others using the Facebook platform. Facebook Messenger was used as a platform to conduct online

discussions between the teacher and participants, and the participants reported that they benefitted a great deal from the activity. They specifically felt that the discussion on the platform was an effective way to learn collaboratively with each other, and especially from the teacher. They were less shy about asking questions because they felt that the teacher understood their needs as the topics of discussion suggested by the teacher were relevant to the problems that they faced. To encourage collaborative learning, the findings of this study suggest that, before conducting any teaching that uses online platforms, teachers should plan suitable teaching content/topics to be discussed with students. While having the discussion within the specific time allocated, it was also very important that various ideas from learners were valued.

This study also revealed the importance of conducting learning activities that required learners to use specific tools, as in Iteration 2, because it helped teachers to research the effectiveness of the tool for teaching and learning activity and to monitor students' learning. When compared with Iteration 1, their learning was not easily monitored, as the teacher did not know whether all the participants really understood what they were supposed to do because they did not discuss everything in their Facebook Group. It is proposed that this design conjecture form part of Design Framework 3.

**Conjecture 15: Minimum face-to-face meeting with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information.**

This conjecture was only tested in Iteration 1 due to the nature of the activities given and the context of the participants, who seldom met with each other face-to-face.

The participants admitted that they relied on the communication on the platform of Facebook and Whatsapp text applications especially when they needed to have instant clarification on certain matters. By using text messaging applications, they quickly updated their group members on any matter related to their group work.

**Conjecture 16: Students' use of smart mobile devices, other technologies and different means of communication depends on the needs of the learning task, urgency of their needs and the practicality of the situations.**

This design conjecture was derived after conjecture 15 was tested. It was confirmed and proposed for Design Framework 3. In the online discussion activity held in Iteration 2, the participants were not directed to use specific mobile devices. The activity was set to allow the students to join from any location and to use any device that they were comfortable with. Before the discussion activity took place, all participants (except for one) made the effort to use devices that they thought had the most stable Internet connection. They chose laptops and desktop computers over their smartphones and tablets because they wanted to minimize any risk of losing the learning experience, which was conducted in real time. Smartphones were only used to read the thread of online discussion for revision purposes. The findings from this study confirmed the conjecture that participants' choice of technology depends on the needs of the learning task, urgency of their needs and the practicality of the situation. This finding also suggested the nature of today's learning: that learners can flexibly shift between mobile and immobile devices. Learning was found to be a process which was no longer linear and did not require learners to focus on only one resource or single mode of learning, because "the reality is that the most effective designs for learning include a variety of media, combinations of modalities, levels of interactivity, learner characteristics, and pedagogy based on a complex set of

circumstances” (Fadel et. al, 2008 p.14). Thus, the most relevant approach for mobile learning should involve learner control and, challenged by suitable levels of complexity, provoke the user’s curiosity and allow them to engage in active learning conversation. In addition, learning activities should focus on engaging learners with various applications of technology.

**Conjecture 17: Teacher’s postings on Facebook Group Walls will facilitate students’ understanding and encourage students’ communication.**

This conjecture was tested in Iteration 1 because there was a need for the participants to discuss and share ideas for their presentation on online platforms, namely Facebook Groups. To encourage their active participation, the teacher posted information and asked for reports on the students’ progress on the Walls of their Facebook Groups. The effort proved to work as all the participants reported that the teachers’ postings motivated and pushed them to start working on their tasks. They felt that they were being monitored so they made some effort to start posting and discussing the tasks to show that they were doing their work. This conjecture was not tested in Iteration 2 although a Facebook Group was also set up in the iteration. As participants in the iteration were not expected to have active discussion on their Facebook Group Walls, it was observed that their communication on the platform was very minimal.

**Conjecture 18: A Whatsapp Group used as a medium of discussion will ensure that important messages are instantly received.**

This conjecture was tested in Iteration 2. It was suggested by the respondents in Iteration 1 that, in order to ensure that messages, especially those from the teacher, were received instantly by the students, a Whatsapp Group was a better platform

than communicating via Facebook Groups. Through the use of text messages via this smartphone application, this study found that the communication was faster when compared to the communication via Facebook. Although Facebook was also one of the apps on smartphones, the sense of urgency to reply to Whatsapp text messages resulted in faster response compared with the thread of discussions in Facebook. The simple operation, low cost, availability and immediacy (Bouhnik & Deshen, 2014) of responding and replying via this platform were found to be the reason why the participants in this study suggested this app should be used in any iteration that requires a quick means of communication between teachers and students and continuation of learning beyond class hours. Bouhnik & Deshen (2014) added that the creation of a pleasant environment and an in-depth acquaintance with fellow students had a positive influence upon the manner of conversation.

**Conjecture 19: Texts sent via Whatsapp should not be so long that they require more than few times of scrolling down if they need to be read instantly.**

This conjecture was derived from Iteration 2 as it revealed the optimum length of personal text messages that were instantly read. Church and de Oliveira (2013 p.360) listed the reasons why Whatsapp is a better choice for quick means of communication when compared to other means: “the low cost of the application combined with the ability to send an unlimited number of messages, immediacy, the desire to feel a part of the trend since their acquaintances have already adopted the application, the capacity to conduct an on-going conversation with many friends simultaneously, the knitting together of a community of friends or family, and a sense of privacy relative to other social networks”. Although Whatsapp may be a better means of communication, according to the finding of this iteration, participants suggested types and lengths for texts in Whatsapp messages that prompted them to

give an immediate response or just to take note without giving any reply. The texts should not be so long that they require more than a few times of scrolling down if they need to be read urgently.

**Design conjecture 20: Issues that are not suitable for discussion on social platforms should be discussed individually on Whatsapp texts or Facebook Messenger.**

This conjecture was derived from participants' suggestions in Iteration 2 about how to overcome the social intrusion issue and also that teachers address participants' problems individually. The majority of participants did not feel that the group messages via the Whatsapp Group and the communication thread on the Facebook Groups were disturbing in either iteration, but to ensure that students did not feel that way, they suggested that the next iteration should emphasize that personal messages from teachers or from participants should not be sent through the group communication platform. Through personal messages, especially to the teacher, participants felt less embarrassed to admit their problems.

**Conjecture 21: Learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook.**

Due to the nature of the learning activities in Iteration 1 that required students to find and share information with their group mates, this conjecture was tested only in Iteration 1. Participants in Iteration 1 did not often have opportunities to meet each other because the majority of them were neither housemates nor classmates. Therefore, the conjecture was tested as they had to rely on their smartphones and Facebook to communicate with each other most of the time during the iteration.

While tasks that required participants to communicate and find information while they were on the go prompted participants to use smartphones and Facebook, they also had the effect of creating a sense of social obligation for participants to respond and reply. This social obligation effect was found to be positive when participants did not procrastinate over doing the work but it also had negative consequences for learning because the participants felt unhappy that they felt obliged to respond. Their social life was intruded upon, especially when they saw the quantity of notifications that appeared on their smartphones. This issue was further investigated in Iteration 2, where ground rules were introduced to minimize the social obligation and intrusion effect.

**Conjecture 22: The establishment of ground rules will minimize the social obligation and intrusion effects.**

Specific rules that limited students' use of their smart mobile devices and Facebook were imposed in Iteration 2 as a consequence of the response on the issue of social obligation and intrusion raised in Iteration 1. To ensure that the participants did not feel too much of a burden in doing the writing tasks during the iteration, a limit was set of not more than 300 words weekly and they were asked not to spend more than an hour on the writing tasks. They were also asked not to do any work related to the iteration after 6pm each day. The results in Iteration 2 showed that no participants felt a burden in doing the tasks given and they felt that the rules imposed helped to ensure that the learning activities did not intrude on their social space. However, most of the rules were not obeyed. Most of the participants did not do the task before 6pm as stated in the rules because they had to prioritize their own course-related work. The majority of them also did not feel any burden that they had to respond to every message and notification sent to their smartphones and their Facebook Group.

They also did not expect everybody to comment on postings on Facebook Group every time they were sent, either by the teacher or the participants. The use of smartphones and Facebook for learning has been normal practice among university students and they acknowledged the benefits of the combination in enhancing their learning. However, as smartphones and Facebook are on a social space platform, all respondents agreed that this combination had the potential to intrude on one's social space. So, besides the ground rules, they suggested that teachers should come to an agreement with students in choosing suitable platforms to be used for learning.

**Conjecture 23: Agreement between teachers and students about whether to use Facebook and other means of communication is important in order to overcome the social obligation issue.**

This conjecture was derived after conjecture 22 was tested. In Iteration 2, the participants expressed their opinion that learning on smartphones and the Facebook platform somehow had intruded upon their social space. When messages and notifications of Facebook postings and personal text messages were sent to individual's smartphones, they felt that it gave them an obligation to respond. Some participants from both iterations also felt irritated with the continuous ringing alert of the messages and notifications and they switched their smartphones off. In investigating how to minimize the social obligation and intrusion effect of smart mobile devices and Facebook when they are used to enhance teaching and learning, this design conjecture was tested in Iteration 2 and proposed to be part of Design Framework 3.

**Conjecture 24: Teachers' familiarity with possible smart mobile applications, Web 2.0 tools and software used will help the planning and teaching of lessons.**

This conjecture was first tested in the first Iteration. In order to plan the lesson for the iteration that integrated the use of smart mobile devices and Web 2.0 tools, I made an effort to familiarize myself with both technologies by being an active user and by observing how other learners enhanced their learning by using them. With my understanding of the affordances of smart mobile device and Web 2.0 tools and my pedagogical knowledge in teaching, I created the activities in both iterations to test the pedagogical affordances of smartphones and Facebook. The findings from this study suggest the importance of teacher initiatives in exploring new technologies to be integrated into teaching. Teachers should also have appropriate pedagogical knowledge. This study indicates that successful teaching that utilizes any technology requires the continuous tailoring of materials and methods of delivery to suit the individual needs of learners (Goyal et. al., 2012). Tanaka (2012) and Brown et. al. (2012) added that, irrespective of how well designed an approach that utilizes any new technology is, the need for skilled and engaging teachers remains. As this conjecture was proven in Iteration 1, it was not tested in Iteration 2.

**Conjecture 25: Sufficient training in the use of technologies that students will be expected to use should be given to ensure a smooth learning experience.**

This conjecture derived from Iteration 2 because the participants did not know how to use certain software that helped them to do the tasks given. In Iteration 1, most participants were advanced in terms of using a variety of software to prepare for their presentations in comparison to some learners in Iteration 2. The teacher took for

granted that participants in Iteration 2 were as advanced as the participants in Iteration 1, so no training in using the technologies investigated was given. To some extent, age seems to appear as a factor why the participants had less problems to utilize various computing technologies because from my observation, the participants in Iteration 1 are all active users of web 2.0 tools and smartphones.

**Conjecture 26: Learning tasks that allow flexibility in using smart mobile devices, other technologies and different means of communication will prompt learners to work collaboratively in various ways.**

This conjecture was tested in Iteration 1 due to the nature of the learning activities in the iteration. The main outcome of the learning tasks given in the iteration was collaborative work produced by the participants. In investigating the affordances of smart mobile devices and Facebook to enhance the participants' learning, the learning tasks were set to allow flexibility in using the technologies investigated and also other means of communication and technologies that learners felt useful. In addition to their online communication via Whatsapp text messages, iMessage and Facebook Messenger, learners in Iteration 1 still found the importance of face-to-face discussions in doing the tasks and they made the effort of meeting with their group members even though most of them were busy with their own commitments. All group members in Iteration 1, except for AZL's group, conducted a face-to-face meeting to clarify decisions made. In terms of the technology to search and share information, although they found their smartphones and tablets useful for them to search and share information while they were on the go, they still felt that it was important for them to do the task given in specific study locations where they were not on the move. At those locations, they preferred to use their laptops and desktop computers over other mobile devices to do the tasks given.

While participants' use of various devices depended on the task requirement and the situations they were in, the highly personalized nature of smartphones was proven to provide an excellent platform for the development of personalized, learner-centric educational experiences marked by flexibility, customization, collaboration, active participation and co-creation (Looi et al., 2009). The findings from this study indicate the relationship of mobile learning with constructivist principles where various learning platforms and scaffolding activities can be constructed, and knowledge can be explored in multiple ways and in multiple contexts that best resonate with the needs of the users (Looi et al., 2009). Collaborative and participatory learning experiences that increase learner engagement and mastery of important concepts can be achieved provided that careful learning using the mobile devices is designed (West, 2012).

**Conjecture 27: Learning tasks that prompt students to use applications from their smart mobile devices and to explore the tools of Web 2.0 will motivate them to learn and participate.**

This conjecture was tested in Iteration 1 in investigating how the use of applications from smartphones and tablets, and also tools of Web 2.0, motivates learners to learn and participate. The teacher did not determine the specific use of tools of the web and applications from smart mobile devices because the learning tasks were set to trigger participants to use tools and applications that they thought suitable. The choice of suitable applications and Web 2.0 tools was left to the participants because, as said by Ciampa (2014), one way to harness student motivation is by allowing and encouraging them to utilize their technical knowledge and experiences and allow them to engage in self-directed learning activities. As expected, for the majority of the participants, the idea of letting them explore various applications and

Web 2.0 tools in the tasks given motivated them to participate in this iteration. They used various tools of Web 2.0 and also explored the use of various applications from their smartphones and tablets to capture and edit videos and photos.

This conjecture was not tested in Iteration 2 because the nature of the learning activities did not require the participants to explore the tools and applications. If relevant to the needs of the activities in the next iteration, this conjecture can be adapted for the next design framework in order to motivate learners to participate.

### 7.4 Presentation of Design Framework 3

Based on the findings gathered from the Exploratory Study, Iteration 1 and Iteration 2, the design framework that informed this study was refined into a more comprehensive and detailed one to address the weaknesses observed to produce Design Framework 3. The conjectures were categorized as presented in Table 16, in which they help to answer the research questions of this study.

**Table 16: Design Framework 3**

Design Framework 3
<p><u>Affordances of smartphones and Web 2.0 tools.</u></p> <ol style="list-style-type: none"> <li>1. Learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their own individual devices.</li> <li>2. Learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook.</li> <li>3. Learning tasks that prompt students to use applications from their smart mobile devices and to explore the tools of Web 2.0 will motivate them to learn and participate.</li> </ol> <p><u>Factors that influence the pedagogical affordances of the combination of smartphones and Facebook to enhance the learning of English for ESL learners.</u></p> <ol style="list-style-type: none"> <li>1. Iterations that are conducted with learners and teachers who use suitable smart mobile devices and are located in an environment that has good access to the Internet can minimize the problems of accessibility to the web.</li> <li>2. Minimum face-to-face meeting with group mates will encourage students to use smart mobile</li> </ol>

devices and Web 2.0 tools to contact each other and to share information.

3. Learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook.

#### Collaborative learning via smartphones and Web 2.0 tools.

1. Learners' online collaboration should begin from collaborative learning activities in the classroom, but specific learning tasks that require online collaboration using the technologies are important for monitoring purposes.

2. Learning tasks that require participants to be reflective about their work will encourage dialogic and collaborative learning among students.

3. Learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their own individual devices.

#### The way learning via smart mobile devices and Web 2.0 tools motivate and engage learners.

1. Learning content that is directly connected to learners' needs and academic courses will motivate them to find reasons for learning.

2. Iterations that take into account the timetable of students will motivate students to learn and participate more.

3. Individual and group assessments are important to ensure that students take the learning during iteration seriously, but the evaluation technique should be innovative in indicating their effort and whether they are making progress towards learning objectives.

4. Learning tasks that prompt students to use applications on their smart mobile devices and to explore the tools of Web 2.0 will motivate them to learn and participate.

#### How different means of communication and technologies help to create continuity of learning.

1. Students' use of smart mobile devices, other technologies, and different means of communication depends on the needs of the learning task, urgency of their needs and the practicality of the situations.

2. Learning tasks that allow flexibility in using smart mobile devices, other technologies, and different means of communication will prompt learners to work collaboratively in various ways.

#### Guidance for teachers when adopting the technologies to encourage collaborative learning among students.

1. A longer iteration held with group of students from similar courses/ backgrounds is important to assess the effectiveness of an iteration.

2. Face-to-face teaching should be conducted and the teaching input should be significant before learners' learning is enhanced in learning tasks that require the use of smart mobile devices and Web 2.0.

3. Teachers should act as a facilitator to facilitate learning, share experience, and manage interactions without dominating the learning discussion.

4. There should be a balance between teachers' instructional guidance and learners' personal freedom to learn constructively.

5. The establishment of ground rules will minimize social obligation and intrusion effects.

6. Agreement between teachers and students over whether to use Facebook and other means of communication is important in order to overcome the social obligation issue.

7. Teachers' postings and messages on Facebook Group Walls and Whatsapp Groups will facilitate students' understanding and encourage students' communication.
8. Teachers should facilitate students' understanding and encourage students' involvement in tasks that require the active involvement of students in online discussion.
9. A Whatsapp Group used as a medium of discussion will ensure important messages are received instantly.
10. Texts sent via Whatsapp should not be so long that they require more than few times of scrolling down if they need to be read instantly.
11. Issues that are not suitable for discussion on social platforms should be discussed individually on Whatsapp texts or Facebook Messenger.
12. Teachers' familiarity with possible smart mobile applications, Web 2.0 tools and software used will help the planning and teaching of lessons.
13. Sufficient training in the use of technologies that students will be expected to use should be given to ensure a smooth learning experience.

The conjectures in Design Framework 3 are in line with the direction of the conceptual framework mapped at the beginning of this study. Table 17 illustrates all the design conjectures of DF3 and the factors considered when designing mobile learning derived from the literature.

**Table 17: Design Framework 3 and the conceptual framework of this study**

<b>M-learning design using smartphones and Facebook</b>	<b>Design Framework 3</b>
<b>Social constructivist theory</b>	<ol style="list-style-type: none"> <li>1. Learners' online collaboration should begin from collaborative learning activities in the classroom, but specific learning tasks that require online collaboration using the technologies are important for monitoring purposes.</li> <li>2. Learning tasks that require participants to reflect on their work will encourage dialogic and collaborative learning among students.</li> <li>3. Learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their own individual devices.</li> <li>4. Learning tasks that allow flexibility in using smart mobile devices, other technologies, and different means of communication will prompt learners to work collaboratively in various ways.</li> <li>5. There should be a balance between teachers' instructional guidance and learners' personal freedom to learn constructively.</li> </ol>

<b>Theory of mobile learning</b>	<ol style="list-style-type: none"> <li>1. Learning tasks that require students to frequently communicate and instantly find and share information while they are on the go will prompt them to use their smart mobile devices and Facebook.</li> <li>2. Minimum face-to-face meeting with group mates will encourage students to use smart mobile devices and Web 2.0 tools to contact each other and to share information.</li> <li>3. Students' use of smart mobile devices, other technologies, and different means of communication depends on the needs of the learning task, urgency of their needs and the practicality of the situations.</li> <li>4. Establishment of ground rules will minimize social obligation and intrusion effects.</li> </ol>
<b>Specification of learning activities</b>	<ol style="list-style-type: none"> <li>1. Learning tasks that prompt students to use applications from their smart mobile devices and to explore the tools of Web 2.0 will motivate them to learn and participate.</li> </ol>
<b>Aims of lesson</b>	<ol style="list-style-type: none"> <li>1. Learning content that is directly connected to learners' needs will motivate them to find reason for learning.</li> <li>2. Individual and group assessments are important to ensure that students take the learning during iteration seriously, but the evaluation technique should be innovative in indicating their effort and whether they are making progress towards learning objectives.</li> <li>3. Iterations that take into account the timetable of students will motivate students to learn and participate more.</li> <li>4. A longer iteration held with group of students from similar courses/ backgrounds is important to assess the effectiveness of an iteration.</li> </ol>
<b>Physical setting</b>	<ol style="list-style-type: none"> <li>1. Iterations that are conducted with learners and teachers who use suitable smart mobile devices and are located in an environment that has good access to the Internet can minimize the problems of accessibility to the web.</li> </ol>
<b>Roles of teachers</b>	<ol style="list-style-type: none"> <li>1. Face-to-face teaching should be conducted and the teaching input should be significant before learners' learning is enhanced in learning tasks that require the use of smart mobile devices and Web 2.0.</li> <li>2. Teachers should act as a facilitator to facilitate learning, share experience, and manage interactions without dominating the learning discussion.</li> <li>3. There should be a balance between teachers' instructional guidance and learners' personal freedom to learn constructively.</li> <li>4. The establishment of ground rules will minimize social obligation and intrusion effects.</li> <li>5. Agreement between teachers and students over whether to use Facebook and other means of communication is important in order to overcome the social obligation issue.</li> <li>6. Teachers' postings and messages on Facebook Group Walls and Whatsapp Groups will facilitate students' understanding and encourage students' communication.</li> <li>7. Teachers should facilitate students' understanding and encourage students' involvement in tasks that require the active involvement of students in online discussion.</li> <li>8. A Whatsapp Group used as a medium of discussion will ensure important messages are</li> </ol>

	<p>received instantly.</p> <p>9. Texts sent via Whatsapp should not be so long that they require more than few times of scrolling down if they need to be read instantly.</p> <p>10. Issues that are not suitable for discussion on social platforms should be discussed individually on Whatsapp texts or Facebook Messenger.</p> <p>11. Texts sent via Whatsapp should not be so long that they require more than few times of scrolling down if they need to be read instantly.</p> <p>12. Teachers' familiarity with possible smart mobile applications, Web 2.0 tools and software used will help the planning and teaching of lessons.</p> <p>13. Sufficient training in the use of technologies that students will be expected to use should be given to ensure a smooth learning experience.</p>
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## 7.5 Returning to the Research Questions

*1. What are the pedagogical affordances of integrating the tools of Facebook and smartphones for the teaching and learning of English for ESL students?*

Some properties of handheld devices (Klopfer et al., 2002) such as portability, social interactivity, connectivity and individuality, that produce unique educational affordances were tested in Iteration 1 to explore their pedagogical affordances in combination with Facebook. Utilizing the properties investigated, findings from both Iterations 1 and 2 indicated that the combination of smartphones and Facebook offered the pedagogical affordances of scaffolding learners' needs, asynchronous communication, synchronous communication, collaboration and support, data and resource capturing, rich data sharing and teacher feedback. The affordances found were relevant to the nature of the learning activities given in both iterations.

### *i. Scaffolding learners' needs*

With the portability and individuality aspects of smartphones, participants' smartphones provided scaffolding for their needs because the activity in Iteration 1 required them to contribute their knowledge and ideas. As most of them were not

familiar with the areas of professional communication skills for the context needed in the tasks given, smartphones facilitated participants' self-initiation in searching for and sharing information whenever and wherever they needed it, even while they were on the go. They used their smartphones and some used tablets to search for the meanings of words and videos that could help them to understand the contexts better. With the affordance of smartphone that allows information to be in students' hands instantly, they contributed ideas to their group mates rather than becoming passive learners. This finding is supported by Laurillard (2007 p.157), who claims that "the intrinsic nature of mobile technologies is to offer digitally-facilitated site-specific learning, which is motivating because of the degree of ownership and control".

However, for Fewkes & McCabe (2012) and Gray et al. (2010), the idea that technologies like Facebook can transform students from passive and disengaged to active and participatory learners was not well evidenced in their studies because of the very limited number of the participants. In this study, I did not find a great amount of evidence that proved this significant change in students' active involvement because each iteration was limited to just three weeks, and this study did not intend to compare the students' involvement throughout the iterations. Particularly importantly for pragmatic researchers who consider the consequences of the action rather than the antecedent phenomena, future research which is conducted over a longer period than this study should consider the effects of the pedagogical affordances of smart mobile devices and Facebook on students' performance in learning.

## *ii. Synchronous communication*

The portability and individuality of smartphones and tablets enhanced students' learning when students could share information and instantly respond to the postings made by their group members through web hosts and portable and wireless delivery mechanisms. This synchronous communication was found in Iteration 1, as there were instances where students planned to meet virtually on Facebook Messenger, Whatsapp and iMessage to discuss their work. Using these tools, the participants felt that the synchronous communication gave immediate answers to questions posed, involved more group support and clarification, and demonstrated more student control because the communications were initiated by them.

In Iteration 2, the synchronous communication was part of the weekly activity using Facebook Messenger. Participants and teacher had discussion during 'real time' on issues related to academic writing at a specific time and day and they found that the activity enhanced interaction and collaboration. With the limitation of conducting this study over no longer than three weeks (for each iteration) and as I could not meet the respondents frequently due to their own study commitments, I felt that the use of synchronous online communication in Iteration 2 was useful, especially for courses scheduled for short durations. As indicated by Johnson et al. (2000), many researchers viewed online discussion as a major advancement in teaching and learning because it facilitated the exchange of information and provided opportunities for all learners. However, participants communicating online may not participate extensively if they are not used to having online discussion and especially if their participation does not reward them with marks or credits. I found this problem in Iteration 2, as I observed that the students were waiting for me to initiate and lead all the discussion in the first week. They admitted that they were not sure of how to

discuss their problems on an online platform so they just waited for me to start it. Therefore, to ensure that they contributed to the discussion in the following week, I prepared materials to share with them and asked specific questions for them to respond to. Instead of leaving the students to think of topics to be discussed, I used the platform to give additional input related to their tasks for the week, as well as commenting on their work generally. As a result, all participants in Iteration 2 reported that the synchronous discussion activity helped them to understand the academic writing course content better.

### *iii. Asynchronous communication*

The tasks in Iteration 1 required students to search for and share information and discuss with group mates. Most participants admitted that they needed to meet face-to-face and use computers to do the assignments given. However, because they were always on the go and had many personal educational commitments, finding convenient times to meet was difficult. They needed a device that connected every group member and a platform that they could use to meet virtually, share information and discuss their group work at any time and in any place they were available. Using the technology of Facebook and smartphones, they communicated asynchronously and the discussion provided flexible learning because participants had ample time to research and compose their messages and responses to the postings on their Facebook Group Walls and through personal Whatsapp text messages. The efforts by Sharples et al. (2007) to postulate a theory of mobile learning placed mobility as the object of analysis and acknowledged that knowledge and skills were transferred across different contexts. I saw the application of the theory in my participants: although they were always on the move, they still managed to communicate with their friends. With the affordances of smartphones, they updated their group mates

on progress, and asked for help from each other. As it was asynchronous communication, each posting and message did not require a prompt reply.

Another positive outcome from the asynchronous communication affordance found in Iteration 1 was that it encouraged participants who were conscious of their language proficiency to practice using the language. As the communication did not demand prompt replies, they had more time to read messages, reflect on them and compose thoughtful responses. However, there were also negative instances of having lurkers or peripheral participants (Taylor, 2002), i.e. participants who participated occasionally but mostly on “read-only-mode”, as admitted by the participants during the interview in Iteration 1.

#### *iv. Collaboration and support*

When the students were away from the classroom, smartphones and tablets helped to continue the learning momentum that they gained from their classroom. Besides using texting applications such as Whatsapp and iMessage in their smartphones, they collaborated and supported each other using Facebook Groups to discuss and share information regarding the tasks before and after they had face-to-face meetings. All groups in Iteration 1 took their own initiative to create a Facebook Group and they accessed them using their smartphones and tablets. With the teacher actively monitoring their progress, most participants in this iteration felt that it had a positive impact on their performance because they had the impression that the teacher cared about them, so they wanted to prove to the teacher that they could do the task well.

For Iteration 2, the collaboration and support affordance was not tested with the use of Facebook Groups and text messaging. Using Facebook Messenger as a medium

of communication for weekly classroom discussion enhanced students' learning because it encouraged students to communicate using the English language, and to learn from each other. The participants supported each other during their group chatting via Facebook Messenger when they shared their problems and suggested solutions with the teacher. As Facebook is a social network platform, communication via this channel was not seen as formal learning, so the participants were not conscious of their informal writing style, but focused more on sharing problems that they had in writing and discussing solutions together. Gray et al. (2010) also observed the same finding in their case study groups; their groups deployed Facebook tools with varying success to exchange learning resources, information and advice and to maintain a sense of being in a learning community through announcements, conversations and records of shared activity.

In Iteration 1, the participants arranged face-to-face meetings with each other by using Facebook Groups. The social networking site supplied an interpersonal and social communication network among participants because this platform united the groups as everybody owned an account on the social networking site. This finding was also supported in research by Fewkes & McCabe (2012) and Gray et al. (2010), who found that Facebook can be used as an educational tool because it made it easy for students to quickly and easily communicate with classmates individually, initiate study groups quickly and informally, and to conduct discussion forums and group collaboration easily.

*v. Data and resource capturing*

Another positive pedagogical affordance of smartphones and Facebook found in this study was the combination of captured data and resources which were useful for

students' learning. Rather than using computers in fixed places and specific devices like cameras and video recorders to take photos and videos, participants in Iteration 1 were excited because they could use their smartphones to search for information and take photos and videos that were relevant to their tasks. They found that the learning activities were interesting and worthwhile because they were allowed to explore and use various applications of their smartphones and tablets and also Facebook tools to help them do the tasks. As they were familiar with the technologies of their own devices, learners had control in using the devices to access the web and to utilize relevant applications to do the tasks given. As admitted by Cochrane (2010), the tools of Web 2.0 support student media-rich content creation and sharing via free, easily personalisable interfaces. In Iteration 1, the tasks given prompted participants to use videos and images so all groups utilized the camera and photo editing applications on their smartphones before they were uploaded to the Web using Youtube and shared using Facebook.

*vi. Rich data sharing*

Participants in Iteration 1 shared resources for their group work on their Facebook Group Walls. The data included videos and pictures relevant for their presentations. They liked the idea of sharing information on their Facebook Group because the platform acted as a storage location for all materials and discussions that they had for their group work. For Iteration 2, none of the participants except one used the platform of the Facebook Group to share information. This was because the task given did not require them to do so.

### *vii. Teacher feedback*

Participants in Iteration 1 acknowledged the usefulness of the feedback given by the teachers via Facebook postings on the progress of their group work. Besides giving feedback, the teacher also used the platform to ask about their progress. These initiatives motivated the participants to continue working. In Iteration 2, the teacher gave individual feedback about the students' writing via emails. Feedback for the whole group was discussed via Facebook Messenger. All participants accepted the comments by the teacher on the public platform because the comments were not meant for specific individuals but for the whole group.

### *viii. Negative affordances: Social intrusion*

Besides the positive affordances, negative affordances of the combination of technologies were also revealed in this study. Although the majority of participants did not mind responding to the Facebook notifications and messages, some experienced the notifications and messages related to education retrieved through their smartphones as an intrusion into their social space. Baran (2010) and Madge, Meek, Wellens and Hooley (2009) have warned about the invasion of smartphones and Facebook into the social-networking space that students clearly feel is theirs, even when used for their educational benefit. As found in the present study, some participants in both iterations felt that messages and postings sent to Facebook and texting applications retrieved by their smartphones gave some sense of urgency for them to check and respond. They also could not tolerate the ringing alert of the messages and Facebook notifications that appeared on their smartphones, especially when they were taking a break from their studies. Some reported that they changed their phone settings so that they did not receive any notification about their

work on their phone and some even switched their mobile devices off. This small number of participants who experienced this intrusion explained that they felt that way because the iterations were conducted while they were very busy with their own study commitments. For the rest of the participants, they did not see that the use of smartphones and Facebook intruded into their social space because they saw that the use of those technologies for education had been part of their lives as students.

In Iteration 2, the issue of social obligation and intrusion was further investigated with the introduction of ground rules to limit participants' use of both technologies for the iteration. Selwyn (2009); Greenhow, Robelia, & Hughes (2009); and Mazman (2011) concluded that students generally accept Facebook as a social technology rather than a formal teaching tool. However, this study revealed that participants did not feel that the use of smartphones intruded upon their social life because the technology helped in their learning. In addition, Facebook was shown to be an important tool that can enhance students' learning if careful preparation of learning activities that utilize the technology is undertaken, and initiatives to avoid the social intrusion issue are adopted. In addition, the learning content should also have significance for the students. While the studies by Selwyn (2009), Robelia et al. (2009) and Mazman (2011) generally surveyed students' acceptance of Facebook to be used for learning, the present study was unique because the use of Facebook and mobile devices in the iterations was for specific learning activities. So, based on the needs of the specific learning activities given, the respondents of this study were able to explain the affordances of the specific tools used and whether they could enhance their learning or not. Generally, participants from both iterations felt that they utilized their smart mobile devices and Facebook appropriately according to the needs of the tasks given, and if there was any constraint that limited their use of

those technologies, it was just due to the timing of the iterations when they had other study commitments.

In Iteration 2, there was an issue that should be considered if teachers expect students to publish their work on the public platform of Facebook. Especially if the focus of the lesson is on improving writing skills, teachers should discuss with students whether they agree or not to post their writing on the Walls of Facebook Group pages. Although none of the activities in either iteration required participants to post their individual writing work on Facebook Groups to be commented on by the others, participants in Iteration 2 suggested that this action could cause discomfort among students if they were asked to do so. Especially if students were conscious of their writing mistakes, this kind of activity could demotivate students from participating.

*1a. What factors influence the pedagogical affordances of the combination of smartphones and Facebook in enhancing the learning of English for ESL learners?*

In terms of technical requirements, findings from both iterations suggest that the pedagogical affordances of smart mobile devices and tools of Facebook work best if both teachers and learners have appropriate choice of mobile devices that can be connected to the web at any time and in any place. Iterations should also be held in environments that have good network infrastructure to minimize the problems of accessibility to the web. Smart mobile devices used by participants and researchers should have a mobile broadband data coverage and be able to access the Wi-fi Internet service from premises which are Hotspots. This was the reason why most participants in Iteration 1 used their smart mobile devices while they were on the university premises, as the Wi-fi service on campus is free of charge for all university

students. Smartphones were their personal item so they could use them at any time and in any place they were available to search for and share information with their group mates. When their smartphones had Internet connection, most used the Whatsapp application to text each other about their work instantly because they seldom met face-to-face.

Another factor that influenced the pedagogical affordances of the combination of smartphones and Facebook relates to the similar Operating Systems (OS) used by both participants and researchers. Certain applications from the Apple mobile operating system may not be developed in other operating systems such as Android or Mobile Windows. In Iteration 1, the participants who used smartphones with similar Operating Systems utilized specific applications intended for them. For example, users of iPhone texted each other using the iMessage application because it was a free service for all Apple users. To communicate with other friends who used smartphones from other Operating Systems, all participants used Whatsapp and also Facebook Messenger. Although Whatsapp had started to charge its users, the participants did not feel that it was a burden for them to pay because the amount was small for them as compared to what they gained from it.

The findings of this study also suggest that another technical aspect required for smart mobile devices to work best is a high capacity memory on the device. With high capacity memory, participants could download a number of useful applications to their phone such as the mobile applications of Facebook and Whatsapp, and various applications of camera and media. All these applications were found useful in Iteration 1 because the participants were expected to produce a presentation that utilized various media. In contrast, Iteration 2, which concentrated on the social

obligation issue of smart mobile devices and Facebook, the mobile Facebook and Whatsapp application were only used to convey information to the participants.

Another important technical aspect found in this study relates to the appropriate choice of mobile devices. This was pertinent for the participants to do activities related to the task conveniently, although they were used mostly for quick information checking and sharing. Nevertheless, the advanced level of smart mobile devices did not determine whether all the tasks given could be done successfully; this still depended on the requirements of the tasks. The findings of this study suggest the importance of teachers making sure that they know the technical requirements of any mobile devices to be utilized in any learning activities designed. For example, all participants in Iteration 1 used advanced smartphones and tablets and they were found useful to do the activities given. However, for Iteration 2, advanced mobile phones and tablets were not really necessary because all the participants chose to participate in the online conversation using their laptop and university desktop computer. When tasks for both iterations were designed, I particularly focused on how the objectives of the tasks could be achieved by using smart mobile devices and Facebook.

Besides making appropriate choices about smart mobile devices that can connect to the Internet with ease, it was proven in both iterations that the factors which allowed affordances of the smart mobile devices and Facebook to work best were appropriate teaching and learning activities that utilized the technologies. Winters (2006) said that mobile learning was for students who appreciated learning on the move but, as can be seen in this study, successful learning via mobile devices still depended on the participants' situations and the conditions which they felt were suitable for learning to take place. If the learning activities required students to be

constantly on the move where they had to search for and share information and keep in touch with their friends, using smartphones or tablets was the most suitable choice because they were lighter as compared to laptops. But none of the activities in either iteration specifically required them to be on the go to do information searching and sharing because the design of the learning activities considered other factors such as the appropriateness and relevance of the learning content to the participants. For Iteration 1, the participants needed to use their smartphones and Facebook to contact each other and to share information. As they were usually on the go and they were busy with their own study commitments, their smartphones and Facebook worked well in these circumstances. The theory of mobile learning proposed by Sharples et al. (2005), according to which a considerable amount of learning happens outside classrooms, was supported in this iteration as most participants downloaded specific applications to their smartphones and tablets to retrieve current news and to watch videos to give them ideas for their presentation whenever they were free. However, in circumstances where they were in fixed settings, such as in their study rooms, laptops were found more useful than mobile devices. Searching for and sharing information, discussions on Facebook and preparation of slides were done using laptops but, for personal communication via texting, all still used their smartphones.

Participants in this study had the choice to be connected to the Internet using smart mobile devices, desktop computers, or laptops, and their decisions depended on the needs of their tasks. For example, in Iteration 2, although all participants' smart mobile devices had the 3G and the 4G service, the nature of the task in Task 2 (discussion via Facebook Messenger) prompted them to use laptops and desktop computers because they felt that those devices had the most stable Internet

connection for them to be online for the 30 minute discussion without interruption. Although the learning was done informally through the chatting platform of Facebook Messenger, as the teacher, I sensed that the participants were serious in their effort to ensure they did not miss the discussion activity conducted every week. They were aware that there were risks of losing the Internet connection when chatting using smartphones, besides the limitations of limited screen size, limited battery capacity and the possibility of losing the connection if they received phone calls while the online discussion took place. Although they could use their tablets, which were bigger in terms of the screen, the participants still chose to use desktop computers and laptops with reliable Internet connection from the university and some from their homes.

In comparison, the participants in Iteration 1, although they could use any appropriate technologies to do the tasks, were not asked to use the Internet or any device at specific times. Participants from Iteration 1 were more active in posting and commenting on their work progress on their Facebook Groups as compared to participants from Iteration 2 because their tasks required them to do so. However, although they found that their conversations in online discussions were important to direct the group members on what they were supposed to do, most of them still made the effort to meet their group members face-to-face to discuss the tasks to clarify decisions. As the tasks required them to work collaboratively, they felt that it was important for them to see the facial expressions of their friends while making decisions and they could make instant changes to their plan if they did not agree on something. During the face-to-face meetings, the students also worked on their presentations together. For example, for Damia Sizzling, besides discussing the flow of their presentation, they took a video of themselves using their smartphone, edited

and uploaded it on Youtube and shared it with their Facebook group using computers so that other group members could see the progress made by their group.

For Iteration 2, all participants used Facebook Messenger to conduct group discussions with the teacher because it was required for the task; however, in order to participate in the discussion, none of them accessed the Facebook Messenger application from their smartphones and tablets but all chose to use laptops and desktop computers because the discussion was a planned activity. They chose to use these devices over mobile devices because they believed that the Internet connectivity via laptop and desktop computer was more stable as compared to smartphones and tablets.

The journey of investigating factors that influence the pedagogical affordances of smart mobile devices and Facebook through two iterations confirmed the pedagogical roles of teachers in deciding the circumstances in which the technologies can be used to enhance learning. It was shown in both iterations that students' use of smart mobile devices, other technologies, and different means of communication depends on the needs of the learning task, the urgency of their needs and the practicality of the situations. With the rapid development of new technology, and the changing landscape of the online world, the findings of this study confirm that there is no way that technology itself can teach and transform pedagogy. Researchers can investigate the pedagogical affordances of new technologies but, in order to determine under what circumstances the affordances of the pedagogy work best, the answer still relies on how the technologies are utilized by teachers. Vrasidas and Zembylas (2004) stressed this notion and suggested that, rather than waiting for pedagogy to be transformed by technology, it is the way we

approach or employ it that makes the difference. If new technology is mediated by ways consistent with meaningful learning and interaction, using the Web might contribute to students' learning and also to the professional development of educators.

*1b. To what extent can learning through smartphones and Facebook engage and motivate learners, and how?*

The most notable feature of the data collected was participants' admission that they were excited about actively participating in both iterations because the smart mobile technologies investigated were very close to them, besides the great ease of accessibility to Facebook website via their smartphones. As postulated by Schroeder and Greenbowe (2009), the main reason why students are more reachable via this social networking could be that they are already accessing Facebook for personal use so including educational purposes was not an issue for them. With the integration of the Facebook mobile application into participants' smartphones, learners could easily check any posts and read messages.

In this study, the teamwork and opportunities to work with other students via smartphones and Facebook were also found to be the reason why the participants were engaged in their learning. Using Facebook Groups, they were motivated to share thoughts and ideas and become active participants in a digital society and develop the skills of cooperation and collaboration. As with any learning experience, providing a scaffolded experience can help develop the individual and motivate them to participate in learning. The participants also felt that that they were given the freedom to explore the use of various applications on their smart mobile devices, which had previously been used in their social space. The experience was very

engaging because they could be creative in using any relevant application, and information on the web, to prepare for their presentation. While preparing for their presentations, the teacher's initiatives of asking about their progress via postings on Facebook Group Walls also motivated the participants to work on their presentations quickly. The motivating and engaging feature of social media found in this study is supported by the work of Fewkes and McCabe (2012): the scholars confirmed that, going forward, education institutions who choose to embrace the gaining popularity of social media must implement programs that give students more freedom and trust to utilize the technologies for learning in a less controlled environment. Equally important, teachers should feel comfortable enough to adapt the use of the technologies in their teaching. In this study, as the teacher, I was comfortable with embracing the technologies in my teaching activities in both iterations and I was always ready to learn new applications of the technologies from my participants.

Overall, there was a great level of student participation in all the activities designed in both iterations and this indicated high levels of engagement. This study indicated that learning through Facebook and smart mobile devices can engage and motivate learners if the learning content prepared by the teacher is directly connected to learners' needs and academic courses. In Iteration 1, the participants were interested in the learning because they could apply the professional communication skills taught when they started working. The participants in Iteration 2 were motivated because they were in the middle of their research writing process and needed to learn more about academic writing. Through the online discussion in Facebook Messenger, the technology was used to share thoughts on and problems with academic writing. Commenting on their level of engagement and motivation to learn English using the technologies, participants from both iterations strongly

believed that the use of the combination of technologies would motivate them more if participation in this study was part of their study course where they were awarded credits for their participation.

In the context of this study, participants from both iterations felt that the combination of the online space using Facebook Groups, Facebook Messenger, personal Whatsapp text and Whatsapp Groups engaged and motivated them in their learning because the technologies helped to extend the learning experience outside the classroom by opening more dialogues that fostered language practice and collaborative learning. In Iteration 1, due to the nature of the task, they mostly communicated face-to-face and texted each other personally via Facebook Messenger, Whatsapp and iMessage. Due to the limited opportunity of meeting face-to-face, they were motivated to use the Facebook Group to learn collaboratively by posting questions to their group mates on their Facebook Group Walls. The use of social software and smart mobile devices also engaged the participants in this study because, as all group members could see the postings, each of them helped each other by giving comments and suggestions for improvement. When participants had face-to-face discussions, they also used their Facebook Group platform to post about the meetings held and the decisions made, so that all group members were updated with any changes.

Another aspect of why the use of smartphones and Facebook tools in this study engaged and motivated the learners relates to the forms of assessments given to students when doing the tasks. There was no formal assessment prepared for the participants to determine their performance after participating in this research because this study was not part of their formal study course. Nevertheless, although not carried out formally, the assessments created some tension: the participants

wanted to perform well. As found in the study by Baran (2010), students would not send any work to teachers if they knew that their effort would not be assessed. This study indicated that the participants would have been more engaged in both iterations if they had been given real assessments that awarded credits to the course they were taking. Individual and group assessment techniques should also be innovative in indicating participants' effort and whether they are making progress as far as the learning objectives are concerned. Madge et al. (2009) suggested that it was important to be aware of the tensions that may arise between the formal and the informal uses of social networking tools in education. Mandating their use with the use of grades will not necessarily encourage students to embrace these tools in formal education. Baran (2010) observed that the number of students' messages, extent of their reading each other's messages, and the frequency of their examining links in depth, etc. were directly related to the students' intrinsic motivations, so students need to be so motivated that they voluntarily involve themselves in the educational applications of these services.

Another aspect in both iterations that motivated and engaged learners was the use of collaborative learning activities. Especially in iteration 1, the collaborative activities required participants to communicate with each other and be creative in using the media applications in their smartphones. This research adds additional support to the findings by Baran (2010), who confirmed the importance of collaborative activities in motivating students to learn. Participants from both iterations in this study also felt that the collaborative tasks given were unique because of the use of Facebook tools and smartphones. Shield and Kukulska-Hulme (2006) also advocated that, with the use of mobile technology, learners were reported to have more motivation and higher levels of engagement with the subject that they learnt,

besides having higher levels of interaction and collaboration. The participants in this study felt that Facebook and smartphones were generally meant for entertainment but, when participating, they discovered that learning via both platforms can also be exciting and rewarding. This explains why most participants from both iterations took the initiative of devoting significant time to doing the tasks assigned. Backer (2010 p.35) also found that the students participating in his study spent more time than they did in their ordinary assignments on tasks that required them to use Facebook because they found the task was unique, so they “wanted to show extra effort for a unique task. The use of the technology pushed them further to look into components of [the] report more thoroughly”.

In investigating the extent to which learning through smartphones and Facebook tools engage and motivate learners, this study was limited because each iteration was held over just three weeks. A longer iteration held with groups of students from similar courses/backgrounds is also important to assess the effectiveness of the iteration, an aspect that is lacking in both of the iterations in this study. Besides the positive affordances of smartphones and Web 2.0 (as elaborated above), this study has also revealed some limitations of the combination of technologies in motivating and engaging learners. Baran (2010) concluded that students still viewed Facebook as their social space even though it was being used for education. They tend to be more interested in the social purpose of the website rather than the teaching dimensions. The writer suggested that, because of the informal basis of Facebook, the students may not necessarily perceive this as a formally planned element of the teaching and learning. Considering the findings of the studies that cast doubt over whether Facebook can enhance the teaching and learning experience, this study suggests that teachers should carefully plan the teaching and learning activities and

not rely too heavily on the use of the technologies. Teachers should also ensure that participants do not feel burdened when participating in a study, but should allow students to use other technologies of Web 2.0 to enhance their learning.

*1c. To what extent can learning through smartphones and Facebook tools support collaborative learning, and how?*

Cooperative learning via the social interaction in this study resulted in supportiveness among participants and an increase in helping behaviours. For example, the online discussions, especially in Iteration 2 via Facebook Messenger, were found to overcome participants' shyness and led to improved participation because they felt that they could communicate openly about their problems in writing with peers that might have the same problems as them. To explain this finding, Vygotsky's (1978) theory of Zone of Proximal Development (ZPD) was referred to. According to Vygotsky's social constructivist theory, learning is a socio-culturally mediated and collaborative process, that occurs through interactions and sharing with others, including teachers, parents and other learners (Vygotsky, 1978). The theory accentuates the supportive guidance from others, as they enable the novice learner to achieve successively more complex skills and understanding, and ultimately independent competence. In this study, the guidance from others was gained from the virtual community of the Facebook Group that every participant was a member of.

Cerdà and Plannas (2011) supported the fact that Facebook fosters a virtual community culture and social learning that motivates students, allows significant content to be presented by means of genuine materials and supports synchronous and asynchronous communication. While it supports innovative learning approaches,

the software is a suitable platform for promoting informal learning, and it allows individuals to move towards the lifelong-learning ideal of user-managed open learning and collaborative learning. However, Cerdà & Plannas (2011) warned that Facebook was not the best option for implementing collaborative projects, especially if there were high demands in terms of time control, information organisation and task-management flexibility. To a certain extent, the findings by Cerdà and Plannas (2011) were corroborated in this study because when it was suggested that the participants in Iteration 1 could use a Facebook Group as a platform to unite them, it was expected that the website would be fully utilized to record every detail of their plan and of the progression of their work. There was a high demand for time control in this iteration because the participants were only given two weeks to prepare for their presentation. However, as there was flexibility in terms of how they managed their tasks and organized the information for their presentation, most participants were more motivated to use other means of communication to discuss with their group mates. They still produced a quality collaborative presentation at the end of this iteration, but the details of their collaborative work were not evidenced in the threads of their Facebook Group discussions. When it came to decision-making, most of the groups in Iteration 1 took the initiative to meet each other face-to-face because it was quicker and more effective for them to work as a group rather than relying on on-line communication.

The collaborative learning using Facebook and smart mobile devices in Iteration 1 had some limitations in terms of time control because, as a response from the participants, it could have been done more quickly if each student had a clear individual role before they collaborated with others. Baran (2010) suggested that, if messages, links and resources are essential to the learning outcomes, the

instructional design and online discussion strategies must be planned and managed to encourage and support student–student, student–content and student–teacher interaction. To ensure that information posted on the Facebook Group was organized and there was task-management flexibility, participants from Iteration 1 suggested that the teacher should assign specific roles to each student rather than leaving them to decide how everybody should contribute to their presentation. With the individual work that they had to do, the students felt that they could reflect on their learning before they could work with others. This suggestion was made because, in some groups, there was an imbalance of responsibilities held by each member. Reflecting on this issue, this finding from Iteration 1 indicated a high level of dependency among the participants on teachers, even though they were free to manage their own group responsibilities. The issue was addressed in Iteration 2 as specific learning tasks were given to specific learners.

In Iteration 2, specific learning activities were given to specific learners and they were done in stages before learners were expected to learn collaboratively from each other. With all participants having a common goal to improve their academic writing skills, the social networking platform of Facebook proved to be effective in allowing participants to reflect on their learning and the efforts that they had made for their groups. Their feedback through the online discussion via Facebook Messenger supported the theory of social constructivism which posits the interdependence of social and individual process in the co-construction of knowledge (Palincsar, 1998). A web-mediated learning environment needs socio-constructivist/collaborative approaches that highlight learners' active roles and open new horizons/ spaces for dialogue (Wegerif, 2009). Via the lenses of social constructivism, learning is perceived as a process that is socially constructed within a context. In Iteration 2, the

collaborative learning began from their individual writing, then getting their pairs to check and comment on their work before it was sent to the teacher to grade. Finally, students had collaborative learning through weekly group discussions on their writing. The online discussion opened and extended dialogue among learners because they had equal opportunities to participate in a democratic but relaxed environment.

Through the collaborative activities designed, the participants in Iteration 2 achieved the aim of improving their academic writing skills, and it could be seen that they applied their understanding of the lesson taught when they gave feedback to their friends' writings. For Iteration 1, participants' collaborative efforts were evidenced in their group presentations. Nevertheless, the collaborative learning demonstrated by learners in both iterations was limited because both were conducted over not more than a month. Especially for iteration 2, learning academic writing was a long process that was impossible to be taught in just a day of workshop time. The findings of this study also aligned with those of Tiryakioglu & Enzurum (2011). The intra-class dialogue was effectively realized and maintained on the Facebook environment because communication between students was not limited to course hours. Students who communicate over longer periods of time will better know each other and they will also conduct better teamwork. Gray et al., (2010) also supported this view and claimed that both technological affordances and group dynamics were important factors contributing to groups' mixed successes. Individual students' differing expectations about the balance between socializing and academic activity in a Facebook study group, and group mechanisms to maintain this balance, must be raised, negotiated and resolved for a group to function successfully.

*2. How do different means of communications and technologies help to create continuity of learning?*

Different means of communication and technologies were found to create continuity of learning in both iterations of this study, but their use depended on the needs of the learning task, the urgency of their needs and the practicality of the situations. Learning tasks set by teachers therefore should allow flexibility in using smart mobile devices, other technologies, and different means of communication, and they should prompt learners to work collaboratively in various ways.

In Iteration 1, communication via Facebook and smartphones and also via face-to-face meetings complemented each other. Due to the nature of the group work task given, most of the groups took the initiative to meet face-to-face to clarify the roles that each member should take before they started to present their parts. Their first face-to-face meeting about the assignment was held at the end of the workshop after they received the group tasks. They clarified their plans and divided roles to be taken by each member before everybody went to do what they had agreed to do. During the iteration, most also conducted another meeting. A group that I observed conducted the meeting to discuss again the roles of each member and to prepare the presentation slides together. They did the work together during the face-to-face meeting because they felt that the work could be done faster and they could make decisions quicker. Another group that I observed just reminded each member of their responsibilities, but they did not discuss how their roles could complement each other. As a result, during the presentation day, it was obvious that there was less coordination between the group members. There was a group who did not conduct a final meeting before they did their presentation like the others, but managed to present their work and show collaborative efforts from all group members. Findings

from this iteration confirmed that the initial face-to-face meeting and another meeting before all groups presented their work were the only critical periods where the students needed to meet because they needed to clarify their roles and decisions. However, depending on the attitudes of the participants and their awareness of the importance of the decisions to be made collaboratively, participants may not really need to meet face-to-face frequently during the iteration because they could make use of virtual meetings using messaging applications (Whatsapp, iMessage and Facebook Messenger).

In terms of getting clarification from every member when making decisions, this study found that to a certain extent, and depending on the importance of the decision made, participants did not have any problem when relying on communication via smart mobile devices and Facebook technologies. Decisions in Iteration 1 were seen to be more important because they involved different roles taken by different participants, so there was significant number of participants who conducted face-to-face meetings to discuss the tasks. In Iteration 2, only one pair conducted a face-to-face meeting while others just relied on communication via the Whatsapp Group and Facebook Group. Whether holding face-to-face or virtual discussion, this study revealed that any means of communication would be useful and effective if participants understood what was to be discussed and how to manage their discussions so that they could reach consensus from all their group members.

There was a continuity of learning when participants in this study were observed to use different means of communication and technologies to do the tasks assigned. For example in Iteration 1, to prepare the presentation slides, besides using Power Point, the participants also used other means such as Prezi and PowerPoint online so that they could work synchronously with their group mates. While working on their

slides online, they contacted each other by using Whatsapp text messages and phone calls to comment on and edit the slides together. Other than that, various applications in smartphones such as the camera applications were also used to do the tasks. In Iteration 2, participants felt the continuity of learning from the workshop when they were asked to do the writing task and communicate about it every week using Facebook Messenger. In both iterations, the participants used both smartphones and laptops to do the tasks. When they were at home, they used their laptops to do information finding and sharing and also for typing. To prepare the presentation slides, they used the PowerPoint software and to do the writing they used Microsoft Word.

The change of devices and means of communication in this iteration was influenced by the demands of the task and, most importantly, by the settings in which the participants were working. In terms of communicating with each other, they had a face-to-face meeting when they felt the need, especially when making clarifications and decisions, which could be made faster by doing face-to-face meetings. Most of the time, all participants communicated with each other using personal texting applications. Therefore, to create continuity of learning, this study found that it was not necessarily the technology, but the teaching that was the main factor in how different means of communication and technologies work together.

### *3. What are the roles of teachers when adapting the technology of smartphones and Facebook in their teaching?*

Vrasidas and Zembylas (2004) granted that “technology itself does not teach or transform pedagogy; rather it is the way we approach or employ it that makes the difference; thus, if mediated by ways consistent with meaningful learning and

interactions, using the Web might contribute to learning and professional development”. Wegerif (2007) also suggested that the Web should be viewed from the perspective of affordances rather than from a technical perspective. The findings of this study were able to demonstrate the relevance of ideas from these scholars; it suggested the importance of teachers integrating technology and learning in a manner whereby pedagogy and learning theories were the driving forces, rather than focusing only on the affordances of the technology.

Derived from Design Framework 1 and Design Framework 2, Design Framework 3 continues to suggest that face-to-face teaching should be conducted before learners’ learning is enhanced in learning tasks that require the use of smart mobile devices and Web 2.0. In both iterations in this study, all participants emphasized the need for face-to-face teaching by the teacher because they could understand the lesson better. They believed that learning with a teacher who was physically present in front of them was more effective as they felt that their relationship with the teacher was closer; thus, they did not feel any barrier to learning when they were required to interact with the teacher online. The meeting with the teacher and other participants during the workshop had also left the feeling that they wanted to continue the learning momentum from the class using mobile technologies and Facebook.

Kukulka-Hulme and Shield (2008) suggested that educators should understand how mobile technologies can be effectively used to support various kinds of learning and develop effective methods and materials for mobile assisted language learning (MALL). For the context of this study, as suggested in Design Framework 3, teachers’ familiarity with possible smart mobile applications and Web 2.0 tools helped the planning and teaching of the lessons in both iterations. While I was planning to do my PhD research, I saw that many of my students had been using

them as part of their learning. As a teacher who never had the experience of using tablets and smartphones, I took the challenge of exploring applications in tablets and smartphones and Facebook facilities that could be used for teaching and learning. Since this research began, I also kept up-to-date with different ways of adapting the technologies for teaching used by my English language teacher friends who were teaching in higher education institutions in Malaysia. Besides the teachers, I also had frequent discussions with students studying in higher education institutions in the UK on their attitudes towards the use of technologies for learning. My initiatives were found to be helpful in understanding my participants' various uses of technologies for the tasks assigned to them in this study. For example, before this study began, I had not heard of Prezi, a cloud-based presentation software that was used by one of my group of respondents in Iteration 1. Since I was aware that students love to explore the use of various technologies that can help their learning, I admitted that, in terms of technological knowledge, they were much more advanced than I was. I also did not expect that I would be using Facebook Messenger as the platform for discussion in Iteration 2, but this arose from my reflections on the findings from Iteration 1 and the respondents' suggestions. With more students acclimatizing to a combined virtual and physical life, this study suggests that educators need to find ways to incorporate these new technologies into pedagogies. Instructions need to be kept pertinent and applicable to the world that our students are used to and which they will inhabit after graduation. Simply adopting a technology and not truly understanding its potential will not suffice.

While students may be advanced in terms of how to utilize mobile technologies for learning, Design Framework 3 suggested that teachers should provide sufficient training to use any technologies that were expected to be used by students in

iterations to ensure a smooth learning experience. Teachers should anticipate the problems faced by the participants if the learning activity required them to use other technologies besides their mobile devices. For example, in Iteration 2, I took for granted that all the participants knew how to operate the settings of Facebook Messenger to chat on a bigger screen. I only realized during the interviews that some of them had problems in following the online discussion because it was too fast: they did not enlarge the chat box of their Facebook Messenger. Other than the technical aspects of using smart mobile devices and Facebook tools, teachers should also attempt to foresee the problems faced by the participants if the learning activity requires them to use other software. In Iteration 2, when suggesting that the students use the Track Change tool of Microsoft Word, I assumed that all of them knew how to use it, but actually only a few of them did. If I had spent some time teaching the participants about the expected applications and software used in the iteration, I believe the learning experience of the participants would have been better. Cheung and Vogel (2010), who believe that communication between teachers and students can be enhanced with the use of Facebook, also suggested that teachers need to be aware of the uses of technological tools and carry out careful pedagogical planning of lessons that integrate the use of any software.

As this study explored the use of mobile learning and Facebook to encourage collaborative learning, it is suggested in Design Framework 3 that teachers should facilitate students' understanding and encourage their involvement. For tasks that required students to have active discussions on Facebook Group, as in Iteration 1, teachers should consistently post on the groups' Facebook Walls to ask students about progress, besides sharing relevant learning input. The postings will facilitate students' understanding, encourage their communication and motivate them to work

on the learning task given. For Iteration 2, students' active postings on the Facebook Group were not necessary, but generally participants from both iterations were satisfied with the role of the teacher because the postings made by the teacher on the Facebook Group and the Whatsapp groups reminded them what they were supposed to do. They did not feel disturbed because the postings were not made every day, and they mostly offered the students help. Most participants felt that the postings pushed them to do the work, and that they needed that motivation to continue working. Therefore, based on the findings from both iterations, Design Framework 3 suggests that teacher's postings asking students about progress and relevant learning input on Facebook Group Walls will facilitate students' understanding, encourage students' communication and will motivate students to work on the learning task given.

To send instant texts that convey short messages to all participants, Design Framework 3 suggested that a Whatsapp Group could be used as a medium of discussion to ensure that important messages are instantly received. However, for the messages to be instantly read, the findings from this study emphasized that they should not be too long (more than 30 words) or require more than a few times of scrolling down. Other than using the Facebook and Whatsapp Group platforms, teachers should also provide room for students to communicate personally regarding the tasks given. Equally importantly, ground rules should be implemented to limit both teacher and students' use of Facebook and smartphones for education so that both parties do not feel burdened to reply to every posting and message.

In investigating the extent to which Facebook and smart mobile devices support collaborative learning, it was found that students used various technologies other than Facebook and smartphones to support their collaborative learning. Particularly

in Iteration 1, students were expected to discuss the tasks on their Facebook groups, but they also used various modes of discussion such as face-to-face interactions and personal text messaging to communicate with each other. While participants' decisions to use various means of communication to do the task were not wrong, to indicate the flow of participants' discussion on online platforms, Design Framework 3 suggested teachers could give learning tasks that utilize specific online platforms so that participants' discussions could be monitored; for example in Iteration 2, participants were required to use Facebook Messenger for the online discussions: the discussions were held in real time, where all participants needed to meet together at the same time on the online platform.

Several precautions need to be taken in the implementation of online discussion joined by the teacher. As found in Iteration 2, there was a tendency for the teacher to dominate the discussion, especially if students were found to be passive and did not lead the discussions. Therefore, Design Framework 3 suggested that teachers should act as facilitator: to facilitate learning, share experience, and manage interactions without dominating the learning discussion. As found by Fewkes and McCabe (2012 p. 30), "when implementing new technologies in classrooms, it is of the utmost importance that teachers create a rich environment focused on promoting knowledge rather than "simply being a source of information". Lee (2010) also highlighted the importance of linguistic feedback from teachers, and peer feedback in students' learning, as those aspects helped in prompting and encouraging further discussion among students when applying the Web 2.0 tool. However, there should be a balance between teacher's instructional guidance and learners' personal freedom to learn constructively; teachers should be aware that they should avoid dominating students' discussions as found in this study.

A valid reason, seen in this study, for why the teacher tended to dominate the online discussion was probably the time allocated for the discussion and the short duration of learning in both iterations. If both iterations had been held over a longer period, the participants would have had more input on the course and more activities could have been conducted. Shortage of time was found to be one of the main limitations of this study, as it did not allow for a long duration of iteration due to the commitments that the participants had. Design Framework 3 suggests that a longer iteration held with groups of students from similar courses/ backgrounds is important to assess the effectiveness of the iteration.

An important issue that arose from Iteration 1 was the social obligation issue of smart mobile devices and Facebook when they were used in learning. The use of the combination of the technology was found to intrude into participants' social space because the technologies were initially meant for entertainment and as a social space for the participants. Fewkes and McCabe (2012) also found that it was a challenge for educators to find the distinction between entertainment and true intellectual engagement. The nature of multimedia can captivate students easily, but this visual engagement does not necessarily represent intellectual engagement (Fewkes & McCabe, 2012). In fact, too much multimedia stimulation can interfere with the deeper cognitive processing that is critical to learning. This negative affordance was addressed in Iteration 2 by establishing ground rules to minimize the social obligation and intrusion effects. To overcome the social obligation issue, teachers and students should also agree whether to use Facebook and other means of communication for learning. The final design framework of this research (Design Framework 3) also emphasizes agreement between teachers and students whether

to use Facebook and other means of communication in order to overcome the social obligation issue.

## **7.6 Emergent issues**

The most significant issue which emerged in this study was the social obligation and social intrusion of smartphones and Facebook into participants' social life when the combination of technologies was used for learning. Not many participants admitted that this was a problematic issue for them because most of them saw that smartphones and Facebook had been part of their lives. From their responses in this study, participants could be roughly grouped into two groups:

a. Students whose learning space was completely integrated. They did not see any distinction between social and educational matters. White & Le Cornu (2011 p.2) classify this group of learners as 'digital natives': "Our students today are all "native speakers" of the digital language computers, video games and the Internet". The majority of participants in this study belong to this group, and they admitted that they could not live without smartphones and Facebook. They were multi-taskers and they did not see that the combination of technologies intruded upon their social space because they knew that they could manage their life in this new age of information technology. While studying, they admitted that they often opened a tab for Facebook on their computer and they usually visited the website, especially when they needed a break from their study. They admitted that Facebook and smartphones could easily distract them from their studies but they knew that they could control themselves. For most undergraduates (learners aged 25 and below) they managed to multi-task for educational and social matters using their smart mobile devices because they had no other important commitments. It was observed that there was a very limited

boundary of time for them to complete any tasks related to their education and they mostly studied at any time and in any place they felt so inclined. In comparison, the postgraduates who were married with children allocated specific time for their study because they also had other important family commitments. However, as their smartphones were always with them, they did not feel bothered if other participants contacted them using smartphones and Facebook. Most importantly, this group of participants did not feel that smartphones and Facebook intruded into their social space, because they did not feel that they had the obligation to respond and reply to every message and posting. They gave their responses to the messages and postings whenever they were free to do so.

b. Students who separated what they did for learning and what they did in a social space. These students could also be classified as 'digital natives' (White & Le Cornu, 2011), but in this study they made it clear that they wanted to see a clear distinction between using smartphones and Facebook for education and for other purposes. They did not want their learning to intrude into their social life and this group could not tolerate studies, entertainment and social life being mixed up. So, as they saw that Facebook was meant for entertainment, they could not tolerate its use for learning. They admitted that if they were asked to use Facebook for learning, they were easily distracted, seeing other people's postings and watching videos on Facebook, so they tended to spend more time on the entertainment side of Facebook rather than using it for education. They suggested other tools of Web 2.0 should be used because they wanted the clear distinction of educational purpose in the tools rather than using Facebook.

Although the issue of social obligation and the intrusion of smartphones and Facebook into one's social life was not faced by the majority of the respondents of

this study, this study raised possible challenges that not only teachers but students must face if the combination of technologies is to be used for teaching and learning. If the technology is chosen to be integrated into teaching and learning, students should have an open mind about using Facebook educationally, where there is an opportunity and some prospect that they can use it to good effect for their studies. The social networking site can only enhance their learning if they can maintain the momentum to contribute, share knowledge, and discuss actively on the platform of a social space so that all learners can learn from each other. Most importantly, both teachers and students should know how to control themselves and not easily divert their attention to the entertainment and social side of Facebook when using the website for education.

Another interesting issue uncovered in this study was the importance of assessment in testing the efficacy of tasks used in an iteration. The design of the activities in both iterations of this study was based purely on the teacher's pedagogical knowledge, content knowledge and some technological pedagogical content knowledge of smart mobile devices and Web 2.0 tools. In this journey of exploring the pedagogical affordances of smartphones and Facebook, when it was initially designed, this study did not intend to assess the efficacy of the tasks which used technology. However, towards the end of this research journey, I read a blog posting by Ruben R. Puentedura that recorded his ongoing thoughts on education and technology (Puentedura, 2014). The postings by Puentedura (2014) contributed to additional findings of this study because he suggested a mechanism that informs the level of technology integration in any teaching that integrates the use of technology.

Puentedura (2014) suggests a framework for assessing the efficacy of technology tasks, namely Substitution, Augmentation, Modification and Redefinition. The tasks

under Substitution and Augmentation are classed as Enhancement. Technologies that are used to do tasks under this class enhance the tasks design. For example, the word processing in Microsoft Word has a functionality that is more efficient than handwriting. Technological tasks under categories of Redefinition and Modification are grouped as Transformation, as they cannot be done without the use of technology. Referring to the model, the tasks for both iterations of this study could be considered under Enhancement but also reach the level of Transformation. They were designed to use mobile and Web 2.0 technologies effectively as well as redesigning traditional ways of learning and providing learning opportunities that do not exist without technology. For example, in Iteration 1, the task required participants to share documents and be available most of time online to be able to discuss it, and to offer help to each other, at any time and in any place. In Iteration 2, chatting via Facebook Messenger required them to meet at a specific time and date to discuss some issues from any location they were in. They were designed by considering the mobility of participants and the affordances of the mobile technologies that connected each learner. It was interesting to note that there was no reference to any model that assessed the efficacy of the technological tasks when the iterations of this study were planned. However, with the motivation to explore the pedagogical affordances of smartphones and Facebook and the meticulous stages of DBR, this research journey provoked some deeper thinking about how to leverage technology in appropriate learning contexts for Malaysian ESL learners. With pedagogical knowledge, content knowledge and technology knowledge, smartphones and Facebook technology can be integrated within the complexities of learning contexts.

Another interesting issue which emerged from this study was the degree of students' reliance on the teacher's assistance, although their learning was enhanced using various technologies. In some instances from both iterations it was observed that, while the students still wished to independently construct their knowledge, they still needed to experience the authority of the teacher, whether face-to-face or online, to instruct them on what they were supposed to do. For example, in Iteration 1, although all the students were aware of their responsibilities in doing the tasks assigned, they still needed the teacher to send postings to their Facebook Groups, asking about their progress. All of them admitted that the announcement posted by the teacher had an impact, compelling them to start taking their work seriously. In Iteration 2, none of the participants were active in initiating topics to be discussed, and they expected the teacher to initiate them, although they were aware that the discussion held on Facebook Messenger was to address any problems that they had in academic writing.

## **7.7 Conclusion**

In order to develop innovative educational activities using smartphones and Facebook, this study suggests the importance of integrating technology and learning in a manner whereby pedagogy and learning theories are the driving forces, rather than the technology. By using mobile learning experiences that exploited the media-rich and image-capture capabilities of smartphones and Facebook, learners' learning was enhanced as they saw that the learning was fun and worthwhile. Along with the positive affordances of the technologies, the combination also posed the danger of social obligation and social intrusion into learners' personal space.

This chapter outlined the development of the iterations, and revisited the research questions, to discuss the overall findings of this research process before it presented the final design framework of this research (Design Framework 3). Presenting the main contribution of this study, it is hoped that Design Framework 3 can be used as a guideline for future researchers, giving them the opportunity to test it through further research. This chapter ended by discussing issues that emerged through this research. The next chapter will conclude the whole research journey.

## **Chapter 8: Conclusion**

This chapter firstly summarizes the links between the conjectures and the research questions of this study. Then, it explains the research contributions of this study to methodology, knowledge and practice, and acknowledges the limitations of this DBR study. Finally this chapter makes recommendations for further developing the derived Design Framework 3 from this study.

### **8.1 Link between conjectures and research questions**

The conjectures in this research were mapped to find the answers to the research questions of this study. This was derived from the ideas of Sandoval (2014 p.20), who proposed conjecture mapping as a method “for articulating the joint design and theoretical ideas embodied in a learning environment in a way that supports choices about the means for testing them”.

To answer research question 1 (What are the pedagogical affordances of integrating the tools of Facebook and smartphones for the teaching and learning of English for ESL students?) and research question 1a (What factors influence the pedagogical affordances of the combination of smartphones and Facebook to enhance the learning of English for ESL learners?) the conjectures of this study were mapped in such a way that they considered the affordances of smartphones and Facebook and how these were expected to function to promote learning. The conjectures predicted the importance of the appropriate choice of mobile devices and suitable locations that have good access to the Internet, minimizing problems of accessibility to the web. The importance of designing tasks that require frequent communication and information to test the pedagogical affordances of smartphones and Facebook was also predicted.

To find the answer for research question 1b (To what extent can learning through smartphones and Facebook tools support collaborative learning, and if so, how?) the conjectures predicted that learners' online collaboration should begin from collaborative learning activities in the classroom, but specific learning tasks that require online collaboration using the technologies were important for monitoring purposes. It also predicted that learning tasks that required participants to be reflective about their work would encourage dialogic and collaborative learning among students. Other than that, learning tasks that prompt students to divide individual tasks before collaborating with others will prompt them to use their own individual devices.

For research question 1c (To what extent can learning through smartphones engage and motivate learners, and if so, how?) the conjectures mapped suggested that learning content that was directly connected to learners' needs and academic courses will motivate them to find reasons for learning. An iteration that takes into account the timetable of students was also predicted to motivate students to learn and participate more. Other conjectures predicted the importance of suitable assessment techniques to prompt students to use applications from their smart mobile devices and to explore the tools of Web 2.0 to motivate them to learn and participate.

For the second research question of this study (How do different means of communications and technologies help to create continuity of learning?) the conjectures predicted that students' use of smart mobile devices, other technologies and different means of communication, depended on the needs of the learning task, the urgency of their needs and the practicality of the situations. The conjecture also

predicted the importance of flexibility when using different technologies and means of communication in the learning tasks designed.

For the final research question of this study (What are the roles of teachers when adapting the technology of smartphones and Facebook in their teaching?), the conjectures predicted various roles for teachers when adapting mobile technologies and social networking software in teaching, and several precautions that should be taken when using new technologies in teaching. The conjectures also proposed different ways of teaching that should be adapted to encourage collaborative learning among students.

## **8.2 Research contribution**

The affordances of mobile learning and Facebook to enhance teaching and learning as discussed in the literature (Chapter 3) suggest that the adoption of this combination of technology by educators is overdue. However, not all teaching can, nor should, successfully integrate mobile computing applications and Facebook. Different structures of class, learning content, pedagogical model and curricular philosophies should influence the way in which wireless technology is used effectively. The use of smart mobile devices is a changing trend and does not require changes in teachers' pedagogical beliefs simply because it is a new technology. It should also not be perceived as a magical object that could solve all teaching and learning predicaments. Nevertheless, in the ecology of methods for teaching and learning, this study indicated that smartphones and Facebook play some roles in bridging the gap between classroom and out-of-classroom learning. This is especially the case because they are portable and ubiquitous so that information obtained from the web can be retrieved and shared instantly while

learners are on the go. The affordances of mobile technologies and Facebook, together with appropriate theoretical frameworks, have the potential to enable teachers to adopt mobile learning in sound and significant ways, and to ensure that it survives beyond novelty and convenience value. Roschelle (2003) emphasizes that mobile learning research is needed to establish these affordances in the context of appropriate theoretical underpinnings and pedagogical applications. This study contributes to the literature as it suggests a revised design framework for the pedagogical use of Facebook and smartphones. Although Facebook was initially developed as a students' social networking space, the site has the potential to be used as a platform for educational purposes with careful pedagogical planning by teachers who are aware of the uses of technological tools. This study exploits the unique pedagogical capabilities and characteristics of Web 2.0 tools, particularly Facebook, in combination with smart mobile technologies to enable new and engaging forms of teaching and learning.

Based on the significance of this study as discussed in this chapter, this study has many contributions to aspects as discussed below:

### **8.2.1 Contributions to Methodology**

As reviewed by Viberg, Olga and Grönlund (2012), the most common paradigm that informs most research on mobile learning areas is positivism, with experimental methods commonly applied. There is a need for more solid empirical evidence from interpretive studies to underpin theoretical conclusions about how mobile devices can enhance students' learning. This study contributes to the methodologies used in mobile learning studies as it adopted educational DBR but conducted through the lens of interpretivism. Used as an alternative to the experimental design, the DBR

methodology adopted in this study has produced outcomes that link theories of mobile learning and language learning to practice, as well as presenting principles, or guidelines, for teachers to consult when faced with practical problems.

Herrington et al. (2007) argued that the DBR methodology can be feasible in PhD projects if the projects are adjusted to suit the context and conditions of the study. This study was unique as it was conducted differently from the traditional model of DBR. My adapted DBR version was determined by the research objectives of this study; the approach was cyclical like the traditional DBR but was unique. Iteration 1 tested all the design conjectures of Design Framework 1. In Iteration 2, rather than repeating the testing of the full set of conjectures, salient conjectures from Iteration 1 were chosen to be explored besides particularly focused on emerging issues from Iteration 1. To produce the final design framework from this study, each iteration was conducted with different participants and in different learning contexts, and I was engaged in testing, developing, and exploring a range of design conjectures in iterative cycles. In Iteration 2, some of the design conjectures were adjusted in exploring ways in which pedagogical designs for mobile learning with social networking were tested, taking the social obligation effect into account in order to avoid its negative consequences and make best use of its positive consequences.

### **8.2.2 Contribution to Theory**

Although a vast number of studies have been conducted on using smart mobile devices and Facebook for learning, none of the previous studies researched the pedagogical affordances of the combination of both technologies to enhance the learning of English in the context of ESL learners. Early studies on Facebook reported that students generally accepted Facebook as a social technology rather

than a formal teaching tool (Robelia et al., 2009; Selwyn, 2009; and Usluel & Mazman, 2009) but none of these studies integrated the social networking site for specific learning activities as conducted in this research. Judging from the fact that Facebook was initially created as a social space, the findings from the scholars were relevant, but this study indicated that the social networking site enhanced students' learning where respondents' uses of the technologies were shaped by the learning activities that they were engaged in.

The most important finding of this study was the importance of the social obligation effect for the design of mobile learning with social-networking. It was first reported in the finding of Iteration 1, where the participants felt that their social life was intruded upon when their personal social account of Facebook was used for education (as first highlighted by FD and DE in Chapter 5). Some participants felt some level of social obligation to respond to the postings and messages sent. In Iteration 2, although the issue was addressed with the introduction of ground rules, some participants raised the issue that they needed a separate platform that distinguished between learning and entertainment. This study suggested that it was not just mobile learning, but it was the integration of mobile learning and Web 2.0 tools (Facebook) that lead to the social obligation effect because it involved social networks and learning. With the social intrusion effect of learning via mobile devices and Facebook, this study also contributes to the theory of mobile learning put forward by Sharples et al., (2005). Sharples et al., (2007), who proposed the importance of understanding the way people learn through mobile, pervasive and life-long interaction with technology, and suggested the need to understand the implications of learning with mobile technology and building an appropriate theory of education for the mobile age. In order to overcome the social intrusion issue, this study

proposed the introduction of ground rules, meaningful learning content to be taught to learners and suitable forms of assessment for any learning that integrates the use of smartphones and Facebook.

This study also contributes to the generation of a design framework that involves a domain-specific instructional theory (Cobb, Confrey, DiSessa, Lehrer, & Schauble, 2003). This theory relates to language learning based on the iterations conducted within the context of motivated Malaysian ESL learners studying in the UK. It is not an ambitious theory that can be applied in many contexts, but it was generated based on the theory of language learning for second language acquisition and specific contextual issues as indicated by the results obtained from both iterations conducted in this study.

### **8.2.3 Contribution to Practice**

This study contributes to practice by suggesting Design Framework 3, which consists of guidelines for teachers to adopt the use of smartphones and Facebook as part of their teaching. Although the guidelines were suitable for the learning content from both iterations, they initially emerged from the authentic practices of teachers teaching ESL learners, feedback for ESL learners during the exploratory phase, and also from my personal teaching experience as a teacher. Based on these real learning contexts, the problem was identified in which some design conjectures were formed and revised through circles of iterations. To address specific learning problems or situations, input from theory was employed.

This study also contributes in many ways to the language learning practice of ESL learners and also to teachers. It suggests new opportunities for language learning and teaching by utilizing students' and teachers' personal devices and social

network software, two technologies that are very close to most learners today. The technologies of smartphones and Facebook investigated in this study may not stay forever; technologies evolve most of the time but by keeping up with them and embracing the power of technologies that are already in the pockets of students, this practice could encourage learners to engage in independent learning and with the subject material. By using technologies that are familiar to students, this study suggests that students are more motivated to participate and learn collaboratively with each other. Therefore, this study encourages teachers to do something new and explore the opportunities to use new technologies as a tool that can open up new affordances that can engage students' learning.

Participants in this study were exposed to common technologies that they have been using previously as a social space. Some of them were more advanced than the others, so on the online learning platform provided, the participants learnt from each other; this study encouraged learners to be creative in utilizing other relevant technologies to do the tasks assigned. Most importantly, they could practice using the English language and express themselves freely in a less stressful and formal environment, and the teacher could monitor their conversation.

### **8.3 Limitations of this study**

The limitations of this study deserve examination because they affect the reliability of the results. The limitations revolved around issues of my position as a PhD student and the selection of participants, the design of the learning course, the limited affordances tested, and time constraints.

Although my profession is teaching, this study used respondents who were not my real students because I was on my PhD study leave while this study was conducted.

The limitation in terms of my condition as a student leads to the constraints of designing appropriate learning courses for the participants in this study. These students were from different courses and volunteered to be part of the study because they wanted to gain some benefits from the iterations. So the learning content in both iterations was designed to suit the needs of the participants. For Iteration 1, I designed a Professional Communications Skills workshop for the participants, with the idea that the learning input would be useful for them when they started working. For Iteration 2, I designed an Academic Writing course for the participants because they were in the midst of their writing and needed these skills most. Although the participants claimed that the iterations helped to improve their English language skills in the areas taught and they were encouraged to participate actively due to the forms of assessments carried out, they admitted that their attitudes would be different if the study was really a part of their learning courses where participation was mandatory and awarded credits. Therefore, the findings of this study were limited in that similar outcomes might not be achieved if the iterations of this study were tested in other contexts, especially if the participants did not gain any benefit by taking part in the research.

Next, although the activities designed in the iterations aimed to test the affordances of smartphones and Facebook and to allow more affordances to emerge, this study was limited as it was not able to test all the advantages of the technologies. Only some of the affordances of the technologies could be tested to suit the lessons conducted in the iterations. For example, the affordance of smartphones related to the ability to navigate different geographical locations could not be tested because it was not suitable for the content of the lesson in either iteration. For Iteration 2, although smartphones and Facebook allowed participants to communicate and learn

from each other, the participants while doing their assignments did not utilize this affordance. Due to the nature of the assignment itself, which was writing, they did not feel the need to contact each other because writing is mostly individual work.

Another limitation of this study is related to the time when this study was conducted. It was conducted with participants from various courses during an academic year of university; I had no choice but to conduct the iterations while they were busy with their studies, deadlines, exams and with assignments to submit. So, this study was limited because it did not allow for an exhaustive, long-term prototyping process as is the case in many design based research studies. I understood that the participants' performance in the study was unpredictable because, in reality, they had to prioritize their studies rather than this research, so the prototyping phases were short, lasting as a whole for no more than three months, and involving only two iterations. Therefore, the final design framework (DF3) is final for this study, but is still open to modification and refinement for future studies. This limitation might limit the generalizability of the findings; future studies should involve larger number of participants who are real students of the researcher to increase authenticity and to be able to generalize the results.

#### **8.4 Suggestions for future research**

This research has established the critical consideration of the negative affordance of smartphones and Facebook to be used in learning: that the combination has the potential to intrude upon students' social space. Without considerable actions taken by educators to limit the use of the technologies, users of the technologies may feel that they have the obligation to respond to all notifications that appear on their

personal devices. Future research is required to establish the validity of this design framework.

Future research should investigate how the technologies of smartphone and Facebook could be used to facilitate student-generated content for learning. The research context should be broadened beyond a single institution because, as Facebook and smartphones are technologies that are in the pockets of most university students nowadays, they can be the platform for national and international collaborative learning projects. Other than that, there is also a value for future mobile learning projects to research new mobile technologies and new social networking sites, based upon sound design framework and implementation strategies as established in this research. Along with the use of new technologies, innovative evaluation techniques should be used to assess students learning that are enhanced using the technologies.

To evaluate participants' perceptions of the impact of each intervention, semi-structured qualitative interviews (Bryman, 2012) were used in this study. This study is limited because it could have also used students' reflections on their learning when they utilize smartphones and Facebook. Using smartphones, a device that is always the closest to students, future studies should investigate how learning using mobile devices and Facebook facilitates students to be reflective in their learning. Moreover, smart mobile devices and Web 2.0 tools are evolving technologies so the affordances tested were relevant during the time this study was conducted, but are open to development over time.

In terms of the use of DBR as the methodology for mobile learning research, it is suggested that future research employs a variety of quantitative and qualitative

methods. The use of triangulation of data is to resolve the validity and reliability issues within DBR. Objective methods such as external observation and statistical analysis help to overcome the weaknesses of subjectivity.

Both iterations conducted in this study were conducted in an environment that has good network infrastructure, thus the participants did not raise any issue regarding problems of Internet connectivity while doing the assignments that required them to use smartphones and Facebook tools. For future research that requires participants and teachers to meet virtually on smartphones, Facebook and any other types of technologies and Web 2.0 tools, this research recommends that the studies be conducted in environments that have good network infrastructure. To encourage more practices of learning at any time and in any place, universities especially should have more hotspots, with students and teachers using appropriate smartphones.

This study responds to the popularity of the social networking site Facebook, and the ubiquitous use of smartphones among students nowadays. As time changes in the future, mobile phone technologies will offer more learning possibilities and there might be other social networking sites that may replace the popularity of Facebook. Teachers should not panic with the advancement of technology, but be proactive by continuing to take the initiative in exploring the technologies for teaching. For teachers who are not confident in adapting new technologies in their teaching, this study suggests that they should be willing to learn from their own students. There are benefits for teachers and students acting side by side; until teachers become more comfortable with technology, teachers should focus on pedagogy and students can help out with technology.

This study recommends that the use of mobile technologies and Web 2.0 can motivate learners to participate and learn. As the teacher for both iterations, I, too, felt excited about teaching the students using the technologies because I had never used them before. Although this study focused on Facebook, I let them explore other technologies of Web 2.0 in my learning activities. In this way, I learned from the students about the new emerging technologies. So, future studies should explore other emerging tools of Web 2.0, which are likely to be those technologies that can satisfy many types of learning preferences, as embodied by one person or by a whole class.

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## **Appendix A**

**Certificate of ethical research approval from Graduate School of Education,  
University of Exeter University**

**STUDENT HIGHER-LEVEL RESEARCH  
DISSERTATION/THESIS**



**Graduate School of Education  
Certificate of ethical research approval  
DISSERTATION/THESIS**

To activate this certificate you need to first sign it yourself, and then have it signed by your supervisor and finally by the Chair of the School's Ethics Committee.

For further information on ethical educational research access the guidelines on the BERA web site: <http://www.bera.ac.uk/publications> and view the School's Policy online.

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**READ THIS FORM CAREFULLY AND THEN COMPLETE IT ON YOUR COMPUTER** (the form will expand to contain the text you enter).  
**DO NOT COMPLETE BY HAND**

---

**Your name:** Nurhasmiza Sazalli

**Your student no:** 600044021 PF

**Return address for this certificate:** 29, Clifton St. Exeter EX12EN

**Degree/Programme of Study:** PhD in Education

**Project Supervisor(s):** Prof. Rupert Wegerif, Dr. Judith Kleine-Staarman

**Your email address:** nbas201@exeter.ac.uk

**Tel:** 07402833523

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**I hereby certify that I will abide by the details given overleaf and that I undertake in my thesis ( to respect the dignity and privacy of those participating in this research.**

**I confirm that if my research should change radically, I will complete a further form.**

**Signed:.....date: March 28, 2013...**

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***NB For Masters dissertations, which are marked blind, this first page must not be included in your work. It can be kept for your records.***

# Certificate of ethical research approval

## DISSERTATION/THESIS

Your student no: 600044021 PF

---

### **Title of your project:**

The affordances of smartphones and Facebook tools to enhance the teaching and learning of English for English as a Second Language learners.

### **Brief description of your research project:**

The research focuses on the affordances of mobile devices particularly Smartphones and the technology of Web 2.0 to help English as a Second Language (ESL) speakers to learn communication skills in English at workplace.

The research questions of the study are:

1. What are the pedagogical affordances of integrating the tools of Facebook and smartphones into the teaching and learning of English for ESL students?
  - a. What factors influence the pedagogical affordances of the combination of smartphones and Facebook to enhance the learning of English for ESL learners?
  - b. To what extent can learning through smartphones and Facebook tools support collaborative learning, and how?
  - c. To what extent can learning through smartphones engage and motivate learners, and how?
2. How do different means of communication and different technologies help to create continuity of learning?
3. What are the roles of teachers when adapting the technology of smartphones and Facebook for their teaching?

Activities planned for this study will involve students' use of Smart mobile devices particularly Smartphones and tablets. The activities are designed to test the affordances of these mobile devices in combination with Web 2.0 tools in enhancing students' learning.

### **Give details of the participants in this research (giving ages of any children and/or young people involved):**

The participants of this study will be 18 Malaysian undergraduates, studying in a university in the UK. Before the data collection stage begins, there will be a short course that focusses on developing students' English communication skills at workplace given by the researcher to the students. Participants who are in the final

year of their study and will soon start working are chosen to be in this study so that they could gain beneficial knowledge and experience that can be applied especially at workplaces. As this study focusses on ESL learners, Malaysian undergraduate students are chosen by the researcher to be the participants for the course. They are expected to use their personal Smart mobile devices in order to participate in this study. So only participants who own Smart mobile devices will be selected to be in this study.

Various types of participants:

The participants are 21 and 22 years old and are studying various courses such as Business Economics, Engineering, Physics, Accounting and Finance in a university in the UK. Firstly, they are involved in this research by attending the short course. Then, they will do the group assignment given. While doing the assignment, they are expected to discuss it using their Facebook group pages ([www.facebook.com](http://www.facebook.com)) and will use their Smart mobile devices to share information. This research will take place in the UK as that is where all the participants will be at the time of the research.

**Give details (with special reference to any children or those with special needs) regarding the ethical issues of:**

- a) **informed consent**: Where children in schools are involved this includes both headteachers and parents). Copy(ies) of your consent form(s) you will be using must accompany this document. Blank consent forms for participants and for parents of participants who are children or young people can be downloaded from the GSE ELE pages.

There are no participants who require special needs involved in this study. They will sign the Consent Form to show that they agree to participate in the research and are free to opt out from the research anytime they wish. Each consent form will state the title of the project, researcher's name and professional contact information which are email address and mobile phone number.

The data gathered in this research will include participants' online discussion via Facebook Groups, students' diary, and voice clips and video clips (recorded during the interviews). Participants will be informed about all types of data that will be gathered and it will be made clear in the consent forms that 'data' includes images, and audio and video clips and they are to be published, broadcast or shared with people outside the research team in any way (e.g. in publications, conferences / seminars, training materials). Before interviews are conducted, participants will choose the time, date and place that suit them. The voice and video clips taken during the interview will be transcribed and sent to the participants for them to check all the information that they give. They are free to ask the researcher to add more information or to delete certain points of theirs after reading the transcriptions if they feel that they might cause harm to them.

**b) anonymity and confidentiality**

Data will be gathered and analysed specifically for the purposes of this research, including for use in any dissemination, but will not be made available to anyone else other than me (the researcher) and my supervisors. Every reasonable effort will be

made to ensure that no output (e.g. dissertation, article, report, conference or seminar presentation) will provide information which might allow any participant or institution (e.g. school, college, university) to be identified from names, data, contextual information or a combination of these.

Students' names are only revealed via the online group discussions that they have in their respective Facebook Groups. The group is made private where any discussions or postings can only be read by group members and me (the researcher). Before setting up the group, students will be explained that their postings can be read only by their group members so they are given the choice to choose another group or to opt out from the study if they are not happy working in the groups assigned.

**Give details of the methods to be used for data collection and analysis and how you would ensure they do not cause any harm, detriment or unreasonable stress:**

The documents that will be analysed in this study are students' online group discussions via Facebook groups, students' personal diary (they will be writing on their use of mobile devices for education purposes), and semi-structured interview with students.

Based on the input from my observation and informal discussions with students, I expect that students will use Facebook Groups as a platform for discussions and information sharing. So this social networking site will be used to help students to share important links and points, and also discuss and decide their roles for their group presentation. Students are expected to use the site to discuss the assignment given and not to use it for other personal purposes. Their discussions will be monitored by me (the researcher) as I will receive notifications every time any group member post a content to the page. The access to the group is restricted to only the group members and the researcher and restriction is made by choosing the button 'private' when setting up the group. Participants will also be advised not to delete their postings unless it can cause harm to other group members. They do not have the access to delete others' postings.

**Give details of any other ethical issues which may arise from this project (e.g. secure storage of videos/recorded interviews/photos/completed questionnaires or special arrangements made for participants with special needs etc.):**

Students' interview will be recorded, the conversation that they have will be on the social networking site page. The hard copy data (e.g. signed consent forms, any other paper based data) will be stored in a locked filing cabinet. The audio and video data will be downloaded from recording devices at the earliest possible opportunity, and then deleted immediately from those devices. The electronic data will be stored on the university U-drive, protected by my password. Any list containing participants' real names and / or contact details will be stored in a separate location from all other data or on an entirely different hard drive

**Give details of any exceptional factors, which may raise ethical issues (e.g. potential political or ideological conflicts which may pose danger or harm to participants):**

In order to know whether my participants have needs which require an adjustment when engaging with my research methods and processes, I encourage them to give a personal message via Facebook and mobile phone, or contact me through my e-mail to share any problem that they face when participating in this research.

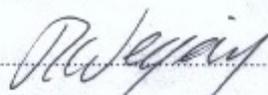
***This form should now be printed out, signed by you on the first page and sent to your supervisor to sign. Your supervisor will forward this document to the School's Research Support Office for the Chair of the School's Ethics Committee to countersign. A unique approval reference will be added and this certificate will be returned to you to be included at the back of your dissertation/thesis.***

***N.B. You should not start the fieldwork part of the project until you have the signature of your supervisor***

**This project has been approved for the period:**

**until:** 1 October 2016

**By** (above mentioned supervisor's signature):



**date:** 5.4.2013

Chair of the School's Ethics Committee  
updated: April 2012

*N.B. To Supervisor: Please ensure that ethical issues are addressed annually in your report and if any changes in the research occur a further form is completed.*

---

GSE unique approval reference:..... D / 12 / 13 / 17 .....

Signed:..... *NR* ..... date: 9/4/13 .....

Chair of the School's Ethics Committee

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## **Appendix B**

### **Consent form**



**GRADUATE SCHOOL OF EDUCATION**

**CONSENT FORM**

**Project title: The affordances of smartphones and Facebook tools to enhance the teaching and learning of English for English as a Second Language learners**

I have been fully informed about the aims and purposes of the project.

I understand that:

there is no compulsion for me to participate in this research project and, if I do choose to participate, I may at any stage withdraw my participation

I have the right to refuse permission for the publication of any information about me

‘Data’ in this study includes images, and audio and video clips and they are to be published, broadcast or shared with people outside the research team in any way (e.g. in publications, conferences / seminars, training materials)

any information which I give will be used solely for the purposes of this research project, which may include publications

If applicable, the information, which I give, may be shared between any of the other researcher(s) participating in this project in an anonymised form

all information I give will be treated as confidential

the researcher(s) will make every effort to preserve my anonymity

.....

.....

(Signature of participant )

(Date)

.....

(Printed name of participant)

One copy of this form will be kept by the participant; a second copy will be kept by the researcher(s)

Contact phone number of researcher(s): 074 02 833 523

If you have any concerns about the project that you would like to discuss, please contact

Nurhasmiza Sazalli at nbas201exeter.ac.uk

## Appendix C

### Iteration 1

#### Professional Communication Skills at Workplace

#### Tentative Programme

Day 1 (9 March 2013)

Venue : Baring Court, St. Luke's Campus, University of Exeter

<b>9:30-9:45</b>	Welcome speech by Nurhasmiza Abu Hasan Sazalli Icebreaking session with participants
<b>9:45-10:00</b>	Introduction to the study
<b>10:00-11:15</b>	Communication basics and barriers
<b>11:15-12:15</b>	How to get to know other people? (NLP and body language)
<b>12:15-12:45</b>	Do you listen enough?
<b>12:45-1:00</b>	Morning Wrap-Up
<b>1:00-2:00</b>	Lunch
<b>2:00-3.00</b>	Presentation skills
<b>3:00-4:00</b>	Maintaining good relationship with people at workplace
<b>4:00-5.00</b>	Discussion on students' assignment

<b>5:00-5:15</b>	Workshop Wrap-Up
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**Day 2 (23 March 2013)**

**Venue: Venue : Baring Court, St. Luke's Campus, University of Exeter**

<b>9.55-10.00</b>	Welcome speech by Nurhasmiza Abu Hasan Sazalli
<b>10.00-10.15</b>	Presentation 1: Damia Sizzling
<b>10:15-10:30</b>	Presentation 2: Bank Case
<b>10.30-10.45</b>	Presentation 3: Group 1
<b>10.45-11.00</b>	Presentation 4: Kak Nomi Research Group
<b>11.00-12.00</b>	Lunch
<b>12.00-12.15</b>	Closing speech by Nurhasmiza Abu Hasan Sazalli Prize giving ceremony

## **Appendix D**

### **Iteration 1**

#### **Professional Communication Skills at Workplace**

##### **Assignment**

**There are two questions in this assignment. Both questions require participants to do a group presentation. Each group gets one question. To prepare for the presentation, participants are given two weeks. The group presentation is held on Day 2 (23 March 2013).**

##### **Questions 1 (For Sizzling Damia and Group 1)**

A marketing team is responsible to promote the products/ service of the company to customers. Conduct a meeting between a marketing team and customers. For example, the marketing team can represent a manufacturer company and the customers are the retailers who are responsible to sell the product to the market. The purpose of the meeting is for the marketing team to introduce their product/service and convince the customers about the product/service. The marketing team should think of creative ways of using the multimedia technology to aid their presentation.

**If your group gets the role of being the marketing team, here is what you should do:**

1. Discuss and decide the product/service that you want to sell. You can decide on the product/ service that you are selling now and announce it to the class. You may change your mind during the two weeks preparation time given to do this assignment, so make sure all your group members are updated with any changes made.

2. Besides the group members, please inform the teacher about the change of product/ service. The teacher will inform the group that will be your customers on the day.
3. Plan your presentation and your strategies to convince your customers using elements of multimedia technology (e.g visuals and audios) to help you explain more about the product.
4. Practice your negotiating skills to convince your customers that the product is created to suit customers' needs (e.g suitability, practicality, price)
5. Be prepared to answer questions from your customers.

**If your group gets the role of being the customers, here is what you should do:**

1. Get to know the product/service that you might be buying.
2. Do your research about the product/ service. Get the reviews on the product from other sources. Share the information to your team.
3. On the day of presentation, ask questions to the marketing team about the product/service before you make your final decision. Plan your questions beforehand and discuss them with your team.

**To both marketing team members and the customers, discuss among your group:**

1. What is the information that you may need to do your presentation?
2. How are you going to delegate the work within your group members?
3. How will the information be shared among group members
4. What are the means that your group should use to have further discussions while preparing for the presentation?

## Question 2 (For Kak Nomi Research Group and Bank Case)

As the manager of your company, you found out that one of your subordinate has been using your company's money for his own purpose (you might choose other crime like bribery etc). So you have assigned the Domestic Enquiry team to investigate this case. After doing the interrogations and collecting all the evidence, the Domestic Enquiry team is now ready to present the case to all the board of directors for them to decide the actions that need to be taken to the subordinate. Conduct a meeting between the Domestic Enquiry team and the board of directors.

If your group gets the role of being the **Domestic Enquiry team**, here is what you should do:

1. Think and decide the case, the evidence that you are going to present to the board of directors and the plot of the story that you find in your investigation. You can decide the case, the evidence and the plot that you are going to present now (e.g the subordinate might not be the guilty one, he might have been framed by others). You may change your idea during the two weeks preparation time given to do this assignment, so make sure that all your group members are updated with any changes made.
2. Besides the group members, please inform the teacher about the change of case that you investigate. The teacher will inform it to the group that will be the board of directors on the day.
3. Plan your presentation and your strategies to convince the directors whether the subordinate is guilty or not using elements of multimedia technology (e.g visuals and audios) to help you explain more about the case.
4. Practice your presentation skills. Remember, the way you present the case will affect the decision made by the board of directors.
5. Be prepared to answer questions from the board of directors.

**If your group gets the role of being the board of directors, here is what you should do:**

1. Get to know the case that you will be judging.
2. Do your research about the kind of punishment/ actions taken by most company for this kind of case. Share the information to other board of directors as you may take similar actions taken by them.
4. Ask as many questions to the Domestic Enquiry team about the case before you make your final decision. Plan your questions beforehand and discuss them with your team.

**To both Domestic Enquiry team and the board of directors, discuss among your group:**

1. What is the information that you may need to do this task?
2. How are you going to delegate the work within your group members?
3. How will the information be shared among group members?
4. What are the means that your group should use to have further discussions while preparing for the presentation?

## Appendix E

### Iteration 1

#### Professional Communication Skills at Workplace

#### Participants' presentation assessment criteria

Group name:

First task : Marketing team (Question 1)

Aspects	Marks
<b>Content (20m)</b> - Maturity of ideas / logic - Relevance - Appropriate level for audience	
<b>Presentation skills (30m)</b> -Oral skills -Confidence -Handling of questions -Time management	
<b>Creativity (10m)</b> - Use of multimedia to aid presentation	
<b>Cooperation (20m)</b>	
<b>TOTAL</b>	

**Second task: Board of Directors (Question 2)**

<b>Aspects</b>	<b>Marks</b>
<b>Being critical (15m)</b> -ask logic and relevant questions to the presenters	
<b>Cooperation (5m)</b> -mutual agreement between all members before making decision	
<b>TOTAL</b>	

**TOTAL MARKS:**

## Appendix F

### Iteration 1

#### Interview schedule with participants

The interview will be done individually. Please write a date and a time you are free to be interviewed. Don't forget to state the venue where you are comfortable for the interview to be conducted. Every interview might take around one hour per person.

DATE: 24 March-14 April 2013

TIME: 9.30am-5.00pm

No.	Name	Date	Time	Venue
1	FD			
2	YT			
3	LE			
4	IL			
5	DM			
6	AZ			
7	BH			
8	EM			

9	SYE			
10	AH			
11	AR			
12	AL			
13	DE			
14	IZ			
15	AZL			
16	LS			
17	AI			

## Appendix G

### Iteration 1

#### **Semi-structured interview questions.**

##### Part A: The use of smart mobile devices, other means of communications and Facebook to enhance students' learning.

1. Can you share some background information about yourself?
2. Do you use any smart mobile device for language learning purposes?
3. What are your favourite applications in your smart mobile devices that are helpful for language learning?
4. For this assignment, what types of mobile devices did you use?
5. Did you use laptops? If you did, when and where did you prefer to use laptops?
6. Did you use Facebook tools to do the assignment?
7. Which Facebook tool did you use and how did it help you to do the assignment?
8. Explain some situations where using smart mobile devices and Facebook tools helped in your learning in this iteration.
9. In what situations did the combination of technologies not help?
10. When did you connect to Facebook from your smart mobile devices, and in which situation did you use laptop to get into the website?
11. Besides Facebook, was there other Web 2.0 tools and software/application that you use to do the assignment?
12. How did they help to do the assignment?

##### Part B: Collaborative learning

1. Did you like learning with each other using smartphones and Facebook in this iteration?
2. Did they engage and motivate you to learn in this iteration? If so, how?
3. How did you find the task that required you to use videos and pictures for the presentation?
4. How did your group collaborate to prepare the videos and the presentation?
5. What means did you use to conduct discussions with your friends?

6. When did you prefer to discuss virtually and in what kinds of situations did you prefer to discuss face-to-face?
7. Did the use of various technologies and means of communications help your learning in this iteration? If they did, how were they useful and if they don't, how were they not useful?
8. How did the use of various technologies and means of communications during the iteration help to create continuity of learning?
9. In this assignment, you were required to do it with your group, discussed how to do it virtually using your smart mobile devices, and searched and share information with the others. Did these requirements burden you?
10. If yes, in what way did the requirements burden you? If no, in what way did the requirements not burden you?
11. What were the problems/ issues that you faced that might have delayed your/ your group progress?
12. What kind of guidance from Kak Normy did you hope to receive as you were expected to work collaboratively, use your smart mobile devices and Web 2.0 tools?
13. How did you feel when Kak Normy posted information on your Facebook Group wall? Did it give any impact to your group's work progress?
14. In your opinion, how can Kak Normy improve the task so that students would use their smartphones/ tablets and tools of Web 2.0 to learn collaboratively with others?
15. Do you have other things to say regarding the use of smartphones and Facebook for learning in this iteration?

*Thank you for your cooperation.*

*Nurhasmiza Sazalli*

## Appendix H

### Iteration 2

#### Academic Writing Workplace

#### Tentative Programme

**Date: 4 April 2014**

**Venue : Baring Court, St. Luke's Campus, University of Exeter**

<b>9:00-9:30</b>	Welcome speech by Nurhasmiza Abu Hasan Sazalli Introduction to the study Icebreaking session with participants
9.30-10.30	Lesson 1: Writing cohesive sentences and paragraphs Writing for Introduction
<b>10:30-11.00</b>	Body: Topic sentences /claims
<b>11:00-12:30</b>	Cohesion between sentences
<b>12:30-1:30</b>	Lunch
<b>1:30-3:30</b>	Vocabulary and grammar
<b>3:30-4:30</b>	Proofreading
<b>4:30-5.00</b>	Workshop wrap up

## Appendix I

### Academic Writing Workshop assignment

**Participants need to do two tasks in a week starting from April 7, to April 27, 2014.**

#### **Task 1: Checking friends' writing (Monday-Thursday).**

1. Choose your current academic writing to be checked by your friend.

Week 1 (April 7-13) : Introduction paragraph (about 300 words)

Week 2 (April 14-20) : Subsequent paragraph (about 300 words)

Week 3 (April 21-27) : Subsequent paragraph (about 300 words)

2. Send your writings to your partner via e-mail.

3. Check your friends' writing based on 'What to peer-check' notes below. Please **do not spend more than one hour** every time you do the checking. If you think your friend's writing is not clear, please highlight it and write your comments.

4. You may use the 'Track Change' feature in Microsoft Word to check the writing.

5. After checking the writing, send it to the teacher at [nbas201@exeter.ac.uk](mailto:nbas201@exeter.ac.uk), and don't forget to send a copy to your friend (the writer).

#### **What to check?**

##### **Week 1: Introduction paragraph**

- ✓ Check the sequence of ideas presented.
- ✓ Check the topic sentence.
- ✓ Check the use of grammar and vocabularies (subject verb agreement, preposition, tenses etc).
- ✓ Give your opinion on the writing. If it is good, why? And if you think that it should be improved, how would you improve it? (If you really do not have any idea on how the writing can be improved, it's ok!)

##### **Week 2: Subsequent paragraph**

- ✓ Check the topic sentence.
- ✓ Check the cohesion between sentences (*e.g this+summary word, summary word etc.*) and between the paragraphs.

- ✓ Check the hedgings (*e.g may best illustrated, are probably due to etc.*).
- ✓ Identify interesting vocabularies/ phrases that you may like to use in your own writing.
- ✓ Check the use of grammar and vocabularies (subject verb agreement, preposition, tenses etc).
- ✓ Give your opinion on the writing. If it is good, why? And if you think that it should be improved, how would you improve it?

### **Week 3: Subsequent paragraphs**

- ✓ Check the cohesion between sentences (*e.g this+summary word, summary word etc.*) and between the paragraphs.
- ✓ Identify any choppy or too long sentences
- ✓ Check the nominalisation, active and passive sentence sentences used
- ✓ Check the use of grammar and vocabularies (subject verb agreement, preposition, tenses etc).
- ✓ Give your opinion on the writing. If it is good, why? And if you think that it should be improved, how would you improve it?

### **Task 2: Online group discussion between teacher and students (Friday)**

**Platform: Facebook Messenger**

**Time: 10.00am on every Friday**

#### **Topics of discussion:**

- a. Good sentence structures, useful vocabularies and also common errors made by students in the writings sent to the teacher.
- b. Students share problems in academic writing, then solutions to the problems are discussed together.
- c. Critical writing skills

## **Appendix J**

### **Iteration 2**

#### **Ground Rules in Iteration 2**

1. For Task 1, the writing to be checked by participants should be around 300 words. Maximum number of words is 350 words. Participants may choose to ignore the writings after it reaches 350 words.
2. Participants need to send their writing to be checked by their partners as early as possible.
3. Participants should not spend more than one hour to check the writings. After the checking is done, send it to the teacher.
4. Participants may send messages to the Whatsapp 'Academic Writing' Group or send postings to Facebook 'Academic Writing' Group if they have any questions regarding Task 1.
5. Nobody should send messages/ postings regarding the tasks in this iteration after 6.00pm. Messages / postings sent after 6pm may be ignored and may be replied on the next day.

## Appendix K

### Iteration 2

#### **Semi-structured interview questions.**

##### Part A: How the experience contributes to dialogic learning.

1. Can you share some background information about yourself?
2. In this iteration, you were asked to correct your friends' work, you received feedback on your work from various friends and the teacher and you also took part in the online conversation that shared ideas on how to improve academic writings. What have you learnt from this experience?
3. How did you feel when your friends and the teacher commented your work and give their opinion?
4. How did you manage the different perspectives?
5. After several people check your writing, do you think that the checking made you more aware? If so, what makes you think so?
6. When you did your writing individually, did you think about the comments given by your friends and teacher?

##### Part B: Collaborative learning using smart mobile devices and Facebook.

1. What do you think about the use of Facebook tools and the Whatsapp Group in this iteration?
2. Could smartphones and Facebook encourage collaborative learning among students? If so, how?
3. How did you feel when messages or announcement were sent to you through the Facebook and the Whatsapp Group used in this iteration? Did they bother you in some way? If so, how?

4. Have you ever felt that your social space was being violated in this iteration? If so, how?
5. How could the use of Facebook tools and Whatsapp be improved?
6. How much notification is just right and how much is too much?
7. What do you think about the Ground Rules that were set in this iteration?
8. Are they important for teaching and learning that utilize smartphones and Facebook? If so, why?
9. Is there a possibility that having the ground rules may prevent some unknown danger? What are the dangers?
10. Instead of setting up rules, do you think students should be given more freedom to utilize their smartphone and Facebook technology anytime and anywhere they want for learning?
11. Imagine that you assign a group of students to work on a project collaboratively. The students are busy with their study and social life but the project gives benefits to them in some way. How would you overcome the tendency of violating the students' social space so that they could still produce the project collaboratively?

Part C: Various means of communications and technologies in continuity in learning.

1. What were the technologies and means of communications that you used in this iteration?
2. Why are they useful in your learning?
3. Do you have other things to say regarding the use of smartphones and Facebook for learning in this iteration?

*Thank you for your cooperation.*

## Appendix L

### Iteration 2

#### Interview schedule with participants

The interview will be done individually. Please write a date and a time you are free to be interviewed. Don't forget to state the **venue** where you are comfortable for the interview to be conducted. Every interview might take around one hour per person.

DATE: 1 June-14 June 2014

TIME: 9.30am-5.00pm

No	Name	Date	Time	Venue
1	JOY			
2	SHA			
3	ZAI			
4	ATI			
5	SAI			
6	SYA			
7	AIR			
8	NAN			

## Appendix M

Major theme	Subtheme	Definition	Except from interview transcript	Sources	References
Scaffolding to learners' needs	Anytime anywhere internet	The ability of accessing the internet anytime by the participants at any location that was convenient to them.	I don't feel burdened to bring it everywhere I go. Most students use it nowadays. You'll feel like you are in a good group because with your tablet, you can do your work anytime you go, you don't waste your time (LE)	17	93
	Multitasking	The ability of doing many tasks at a time.	While cooking, I replied my friends' messages, then I quickly find the info she requested, then I shared it on FB (EM)	14	30
	Multimedia	Images, photos and videos that can be uploaded and downloaded from smartphones.	I like them because they helped me to understand the corruption situation better (AZ)	17	37
Learner generated content	Learner self-initiation and control	Initiatives of participants to use their own smart mobile devices to find more information on the task that will benefit them	I watched Youtube videos and read magazines on Business issue from the apps in my phones to plan for the acting (DM)	12	25
Asynchronous & synchronous communication	Interpersonal and social communication network	The ability of Smartphones and tablets and Facebook to be used as their channel of communication to connect to each other	I was not close to her but I managed to convince her to do her role when we chatted using Facebook message (SYE).	12	32
Data and resource capturing and collaboration	Instant access, quick information finding.	The ability of Smartphones and tablets to connect to the web to retrieve information.	Sometimes while I was talking to my friends and I don't know something. I just Google it up using my phone, then I shared it with them. (YT)	17	121
Rich data sharing	Instant access, quick information sharing	The ability of Smartphones and tablets to share information to others instantly.	Facebook was good because while I was doing some research and I found something, I quickly copied and pasted the link on my Facebook Group (FD).	17	120
Negative affordance	Social obligation	The feeling to have obligation to respond to postings and messages sent by others.	It was a bit disturbing especially when I got messages while I was busy doing my work (AI)	3	7

## Appendix N

Open and axial coding for Research Question 1a: What factors influence the pedagogical affordances of the combination of smartphones and Facebook to enhance learning of English for ESL learners?

Major theme	Subtheme	Definition	Except from interview transcript	Sources	References
Good internet	Wifi at home and university	Good internet access via paid wifi at home and free wifi at university	The speed of the internet at home and in the university made me do this task quickly and I become excited because I got all info without delay (IL).	17	98
Suitable device	Operating System and memory	The Operating System of the smartphones or tablets used are compatible and the memory of the devices are adequate to allow the users to perform tasks related to multimedia.	Most of us used Apple OS so sharing videos was not a problem. Even with the others who used BB and Samsung, they still managed to watch the video that I sent. Phones must have big memory too (BH)	14	50
	Mobile broadband data	Wireless internet access through smartphones or tablets.	In the UK, the data in my phone, in fact in most of my friends' phone too is unlimited (IZ)	12	30
Positive application	Application of smartphones and tablets in daily life	The use of smartphones and tablets for most aspect of life such as for education, family and social life.	It has been part of my life. I cannot live without it (LS)	17	97

## Appendix O

Open and axial coding for Research Question 1b: To what extent can learning through smartphones and Facebook tools support collaborative learning, and how?

Major theme	Subtheme	Definition	Except from interview transcript	Sources	References
From class to online collaboration	Get to know each other	Group activities held in class workshop help students to get to know each other and continue their collaboration on online platforms.	Luckily I worked well with her during the class. After that, we plan our work by just chatting on Facebook (AH)	13	41
	Individual task using smartphone	Individual tasks that require participants to use their personal smartphones.	I used my phone to find the meaning of some words. Then, I had the confidence to discuss about the task with others (SYE)	14	50
	Role of teachers	Teacher's role to encourage collaborative learning among participants.	I am ok that you monitor our group work. We need someone to say, 'Hey, what's going on?'. If not, we would be quite (AR)	16	89

## Appendix P

Open and axial coding for Research question 1c: To what extent can learning through smartphones engage and motivate learners, and how?

Major theme	Subtheme	Definition	Except from interview transcript	Sources	References
Engaging and motivating	Related learning content	The learning content should be related to the participants' needs.	I found the workshop useful for me to improve my communication skills (EM)	12	24
	Time	The iteration should be conducted during suitable time that suits the participants.	The time did not suit most of us. We had assignments and tests so were a bit busy (LE)	16	36
	Creativity	Creativity of using various applications in smartphones and other related technologies.	I like that I can use my photographer skills to do this assignment (DM)	12	27

## Appendix Q

Open and axial coding for Research Question 2: How do different means of communication and different technologies help to create continuity in learning?

Major theme	Subtheme	Definition	Except from interview transcript	Sources	References
Continuous learning	Minimum FTF meeting	Less face-to-face meeting between participants	We were busy so we just talked through Whatsapp (AH)	10	23
	Needs of tasks	The tasks require participants to discuss and make group decisions.	We had to act. So we can't just do the acting without discussing what to do, divide our roles (DM)	14	31
	Urgency of needs and practicality of situations	Decisions to use technologies and means of communication depend on the urgency of needs to and practicality of situations of the participants.	It was better if we meet face-to-face especially when we had to make clarifications on certain decisions (BH)	17	56

## Appendix R

Open and axial coding for Research Question 3: What are the roles of teachers when adapting the technology of Facebook and smartphones in their teaching?

<b>Major theme</b>	<b>Subtheme</b>	<b>Definition</b>	<b>Excerpt from interview transcript</b>	<b>Sources</b>	<b>References</b>
Teachers' role	FTF teaching in classroom	Face-to-face teaching conducted by the teacher in classroom.	First, I need to learn from the teacher face-to-face. Then I can be on my own (AH)	9	20
	Assessment	The competition held as a form of assessment.	When we knew that we would be assessed, we started to work seriously (YT)	10	26
	Teachers' postings	Teachers' postings on Facebook Group walls.	The postings are like your 'eyes', we knew were being monitored (AR)	15	37

## Appendix S

### Important quotations and online entries from participants.

#### 1. Affordances of smart mobile devices and Web 2.0 tools.

Scaffolding to learners' needs.

Participants	Quotations
SYE	After reading the assignment questions, I grabbed my phone to search for some meaning of words and searched for videos of interesting products. Then, I discussed about it with my friends.
IL	I watched BBC News via its mobile application to get ideas for my presentation. Then, I discussed with Yatt about it.
IZ	I watched 'Samarinda' dramas via Youtube on my tablet to get ideas.
LE	I think my iPad helped me a lot in language learning. Before this, I used papers. It was so messy. The papers got lost. With iPad, I am more interested to read them.
AZ	I read lots of information from the magazines application in my tablet. This is my own initiative. They were very helpful for this assignment.
AZ	For example, you may ask us to prepare 5 minutes presentation individually. Students should have different topics that covered different parts for their presentation. Then, we could see a rich, flow and development of discussion because we talk on different topics. As compared to this iteration, we only talked about one topic. So we left it until the last minute.

Asynchronous communication, collaboration and support.

Participants	Quotations
AZL	I was not close to her but I managed to convince her to do her part when we chatted using Facebook message.
LS	Sometimes AZL just want to say something to me, instantly, Facebook is too big, as a platform for only both of us to communicate. We use personal Whatsapp message because it is more personal.
IZZ	When we had a communication network through Facebook, I felt that we were so close, we have had a lot of meetings, and we knew what to do.

AH	If we have to see each other, we have to set our meeting, find a suitable time. And then if someone is not free, we cannot meet, and then we cannot meet at all. So it's better to do it virtually because we can Whatsap and used the Facebook and they will get the message. I used iMessage with AL With the rest, used Facebook.
AZ	When my friends posted something, we discussed about it in groups and we reminded each other, I like it because I felt that this is a strong communication network. We had a feeling that we are on the right track when we use this network because if we don't agree on something, we quickly said it out.
DM	It's easy because I can text them. If I can't contact them through message, I called them, if you I can't call them, I gave a message Facebook, if not, e-mail them. Smartphones and Facebook gave me various ways to keep in touch with my group mates. You can check whether they were on Facebook or not. And also because of online, you know who they are connected to, so you can ask their friends whether they know where they are. It's easy to find everybody.
AZ	Because everybody was busy at that time, my group was a bit slow. But when you started to post something, we did not wait. I started to search for information. DM quickly arranged a meeting with everybody. It's embarrassing if you see us not doing anything because it was already in the second week.

Data and resource capturing and collaboration.

Participants	Quotations
AZL	Facebook was good because while I was doing some research and I found something, I quickly copied and pasted the link on my Facebook Group.
AR	After I did my research, I shared all of them on my Facebook group. Then everybody can read check it out.
LS	Sometimes while I was talking to my friends and I don't know something. I just Google it up using my phone, then I shared it with them.
AL	When my friend shared something, I wanted to see it instantly, so I used my Smartphone. Sometimes, when I had seen them using my phone, I did not see them again using laptop when I am back home. It's better if I did something else.

Engaging and motivating.

Participants	Quotations
AZL	It helps learning become fun.
AI	We took videos from the Internet to introduce our product to make our presentation look grand.
LE	It will be so much interesting. When I can see them, I can understand the situation better. I love reading but I prefer seeing pictures as they help me to understand better. That's why using videos that we share on Facebook engages people.
LS	The technologies motivate me to learn together with my friends because I can easily contact them to discuss about the presentation. Discussions were a bit relaxed but we were very productive. We came out with lotsof ideas.

Continuity in learning.

Participants	Quotations
DM	Smartphone is like a replacement to your laptop. You can use it when you are not with your laptop and you need to do something quick. It just makes things easier.
LS	When AZL sent something to my phone, I checked it there and there. When I was at home with my laptop, I don't check it anymore although the screen was bigger.
SYE	There was a time that I woke up from my sleep. And suddenly I got an idea for my group's presentation. Since my smartphones was just beside me. I recorded the ideas on the phone, and then I quickly posted it to the group. "Everybody, let's do this".
IL	We can't use a memory stick to save my work in tablet but we can synchronize our work to go to iCloud and Google Doc. We can also save them in Dropbox, so storage is actually not an issue, as long as you have a good tablet.
LE	Actually, during the presentation day, there was a time when I was not sure of a term that I was going to use. So, I quickly checked it using my iPad.
SYE	I used my Smartphone to check my Prezi slides. I just want to look at all the slides before I presented.

### Social intrusion and social obligation of using smartphone and Facebook.

Participants	Quotations
DE	I was ok at the beginning but when I kept receiving notifications, I just ignored and I did not bother to read them. Then, I blocked notifications sent to my phone. That means I am not there, no longer can receive notifications.
FD	It suddenly became an obligation to me to check all the notifications. If I check and I did not do anything, the teacher would have known. With the 'seen' feature, you would know who have read and who did not. I don't want everybody to know that I get the notification. So I just switched of my phone.
YT	Yup. Sometimes they disturb me. I felt that I had to reply to all the messages and notifications. They intruded my social space.

### The importance of setting ground rules.

Participants	Quotations
AR	There should be restrictions that are agreed collectively. For example, no discussions regarding the tasks offline, students do the task until certain time every day, teacher should not post anything after some time.
AH	I think the teacher has to set up rules first as in how the Facebook Group would work, so that they don't divert from what they are supposed to do, and don't distract other people
AZ	Make rules not to use smartphones and Facebook for study after 5pm for example. After 5pm, nobody talk about study anymore.

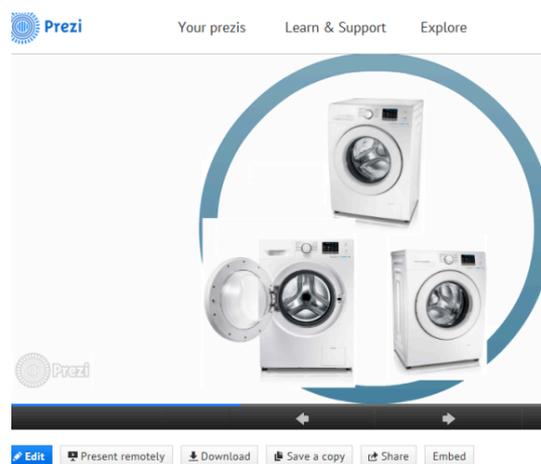
### Roles of teachers.

Participants	Quotations
BH	I like your way of asking our progress. You were not too pushy and you encouraged us to work. When you posted, I felt that I really have to do the work. I think my group and I need this. We need to be reminded most of the time. But we don't mind getting the reminder from you because you were our teacher.
LS	I think the guidance that you gave was enough. From the short course, then you gave the questions, and then you let us discuss in the class, you went from group to group to help us, then you let us do it, have more discussion using Facebook Group, and then you asked

	our progress by posting stuff on our wall.
IZ	Even when you said, how are you all doing to us on Facebook. That was very influential to us. It made us start doing the work or at least, start thinking.
AI	She should ask questions, if not, students won't do it. I think it's the culture from Malaysia, sometimes I feel that my questions are stupid, so I don't want to embarrass myself. I do have that kind of feeling when I want to ask those questions on Facebook because it is public. It's too public I guess. I would rather send a personal e-mail if I have enquiries to my teachers. Unless the questions that I post are only meant for my FB Group members, that one is ok. It could be the culture. The way we are brought up.
DM	Maybe the teacher should post stimulating discussion where everybody can join in, ask questions to the students. This might be too direct, but maybe you could also tag the person, let the person answer (laugh). You know, sometimes when you post, nobody answers. But when you tag the person, he knows that ok, I have to answer.

## 2. Participants use of various sources from Web 2.0 to prepare for their presentations

### 1. The use of Prezi by Damia Sizzling.



### 2. A video link shared by FD

**Firdaus Roslan**  
22 March 2013

this could be our intro vid. jumpe jugak yang lain but there are quite long and boring.

**BlackBerry Z10 Keep Moving Advert**  
Meet the new BlackBerry Z10: The first full touchscreen device for BlackBerry 10 and, according to CEO Thorsten Heins, "the most beautiful BlackBerry we have..."  
YOUTUBE.COM

Like · Comment · Share

Seen by everyone

View 3 more comments

**Aimi Nadhira** I actually dah include in one of my slides. Dah hyperlink kan skali  
22 March 2013 at 19:33 · Like

**Ili Hakima** <http://www.forbes.com/.../presentation-skills-5-lessons.../>  

**Presentation Skills: 5 Lessons From The BlackBerry 10 Keynote - Forbes**  
www.forbes.com  
Five key elements to delivering a memorable presentation.  
22 March 2013 at 23:21 · Like

**Ili Hakima** I think we should learn from this  
22 March 2013 at 23:21 · Like

### 3. Images taken from the Internet by Bank Case group.



## EXPECTED TANGIBLE BENEFITS

Lives in a luxurious apartment located at Damansara which worth more than a million ringgit. Pictures taken using a hidden camera in her handbag when she pretended to be a friend of his son, Abu b. Samuel.



Was seen wearing a Rolex modeled 11823 during a night event on 5<sup>th</sup> feb 2012 which only limited to 50 copies in the world.



#### 4. Facebook postings made by participants to discuss their presentation

##### 1. Postings by Damia Sizzling group members



**Damia Othman** uploaded a file. ▼  
20 March 2013

Hi all, from the discussion, we have decided to present in the forms of departments. Meaning;  
Damia - Managing Director  
Bihah - Customer services  
Sheryl Emy - Design team  
Syeh Hafiz - Sales dep  
Aishah - Marketing

So we will present in this order and each department will persuade the retailers on why they should buy the products.

---



**Sizzling Corp.pptx**  
Presentation

[Download](#) [Preview](#) [Upload Revision](#)

[Like](#) · [Comment](#)

---

✓ [Seen by everyone](#)



**Rabihah Ab Hadi** ok.thanks damia ✕  
20 March 2013 at 14:24 · [Like](#)



**Damia Othman** Rabihah Ab Hadi your bit explain that kalo customer ada problem, we will service tehm personally. Like Dell call Centre or Apple. If they have any problems, we personally will deal with their problems.  
20 March 2013 at 14:35 · [Like](#) · [👍 1](#)



**Damia Othman** BTW pakai prezi to add your stuff.  
20 March 2013 at 15:45 · [Like](#)



Write a comment... 



**Noraishah Zawawi**

22 March 2013



Guys, I've done my research, since I'm the Marketing manager (chewaah), i thought below 'special features' can make our washing machine stands out from the rest. These are mostly taken from top 5 washing machine in the market.

#### Special Features

##### 14 Minutes Xpress Quick Wash

If you only need to wash a smaller load of 5 or 6 shirts

##### Eco Wash

uses less electricity than standard cycles, yet still cleans your clothes really well. It'll take a little longer than other washes but considering you'll save around £5 extra a year on your bills, it's definitely worth it.

##### Self-Cleaning Cycle

this is great for keeping your machine in good condition. Without regular cleaning your machine can start to smell, which makes your clothes smell too. Running this cycle around once a month means you'll never have to worry about it.

##### Direct Drive Motor

Using magnets instead of a belt, there are fewer parts to go wrong; and it spins so smoothly that it makes half the noise of a normal washer. It's brilliant for open plan living, as it won't disturb you while you're relaxing

##### Power Zero feature

turns off the machine once it's finished a cycle hence saves energy, lesser bills.

##### AntiVibration Design

absorbs the sound of your wash too - at 54 dB it's barely louder than your fridge freezer

[Like](#) · [Comment](#)

✓ Seen by everyone

## Personal messages by the participants

1. Messages created by LS using her smartphone and uploaded to Facebook to get feedback from other group members.



**Azlan Latif**  
22 March 2013 · Exeter

👤 Izzah Zulkifli , ni pulak untuk support point ekin lagi satu. "ada masalah keluarga, desperate for money" izzah bole la cakap, ternampak fon dato sam atas meja lpas tu izzah snap gambar. present tu cerita sket yg izzah da lama syak dia kesempitan duit sebab itu ini itu ini. dan gambar ini telah mengesahkan syak wasangka izzah selama ini...



Like · Comment

✓ Seen by everyone



**Izzah Aziemah Zulkifli** boleh x nak gelak? hahaha! slot samarinda tv3  
22 March 2013 at 15:03 · Like



**Azlan Latif** hahah slot akasia la skarangg  
22 March 2013 at 15:29 · Like

## 2. Personal text message between LS and AZL using iMessage



## 3. Personal text message between AZL and IZ on Facebook Messenger

**Izzah Aziemah Zulkifli** ni chat content sy n alan

22nd march:

azlan (11:34am):apa yg alan boleh bayangkan. esok present jadi macam lawyer, utarakan bukti2 kita utk tuduh dato sam tu..  
contohnya, alan akan cakap je point lisa tu, sambil tujuk bukti dlm bentuk gambar skali..  
pastu alan pnya bukti plak, mgkin nak record video jap, tujuk client slalu dtg office dato sam.. so kita syak dorang ada buat urusan belakang tabir.

azlan(12:29pm):rasanya kita present camni. alan jadi macam lawyer, terangkan apa case kita n kenapa tuduhan ni dilakukan. lepastu alan panggil izzah ke depan untuk ceritakan apa yg izzah telah jumpa di office dato sam. bank statement tu dan mesej.

iza(2:04pm):oo, kiranya i'm an officer ea?

azlan(2:48pm):yea bole gak haha

iza(8:22pm):alan, GDP tu apa?

azlan(8:23pm):gross domestic product. pendek kata, income or hasil negara kita dalam setahun. economist gunakan gdp utk bandingkan income antara negara2

23march

iza(10:03am):alan, nak confirm, u ada slide x?

## Appendix T

Participants' view on the social obligation and social intrusion affordance of smartphones and Facebook.

Participants	Quotations
ZAI	I don't like to mix education and social life. I have tuned myself in that way. Actually I don't mind reading Whatsapp texts and Facebook postings for learning but I have set in my mind that those mediums are for my social life so I do not agree if they are used for education. Perhaps, a specific apps for education should be used instead of using these social network platforms.
ATI	I don't mind. The Whatsapp texts did not bother me because there is no force for me to reply. I did read the text but sometimes I just did not have the time to reply to all the messages. But, I'm noted. I think if I were to use these technologies, maybe I would use Facebook groups or just the classic way, 'chalk and talk'.
SYA	Nop. Maybe because I used to work with politicians so I used to be bothered 24/7. Getting texts anytime, anywhere is a norm for me. For the messages in our group, when ever I get them, I felt that they were meant just to convey some information. It's just something that I need to know and I don't feel that I really need to reply every time the messages were sent. Maybe because I am a Y Generation. Born in 1983. Technology has become parts of my life, that's why it does not bother me.
SHA	I felt ok. For me, getting messages through phone has become a part of my social life. You've been in contact everytime. And it's up to you, you have the power to respond or not. Although we have many Facebook dan Whatsapp groups, we have no obligation to reply to all.

## **Appendix U**

# **Pedagogical Affordances of Smart Mobile Devices Integrated with Web 2.0 Tools to Enhance English Language Teaching and Learning**

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### **ABSTRACT**

I report on the provisional findings of an ongoing research project investigating the pedagogical affordances of mobile learning in combination with Web 2.0 tools for the learning of English for English as Second Language (ESL) learners. Using Design Based Research (DBR) as an approach to conduct this study, this paper presents the finding from an iteration that has completed so far. The initial design framework for the study was developed from the literature. It was tested and developed through a series of iterations and the impact of each iteration was evaluated using interviews and qualitative data analysis. One of the most important finding reported in this paper is the impact of a sense of social obligation whereby participants felt under pressure from their peers to post and to participate. This social obligation effect can have both positive and negative consequences for learning. Future research will focus on exploring ways in which pedagogical designs for m-learning with social networking can take this social obligation effect into account in order to avoid its negative consequences and make best use of its positive consequences.

### **KEYWORDS:**

mobile learning (m-learning), social network, Web 2.0 tools, Design Based Research, Smart mobile devices

### **1 INTRODUCTION**

The use of Smart mobile technology allows all the tools of Web 2.0 to be accessed anytime and anywhere. As mobile technology can be used to be integrated in teaching and learning process, educators need to understand how they can be effectively used to support various kinds of learning (Kukulka-Hulme, A and Shield, 2008) and develop effective methods and materials for learning [3]. The teachers in the study by (Purcell & Buchanan, 2013:p50) also believed that new technologies should be incorporated into classrooms and schools, as long as they enhance the lesson plan and encourage learning [4]. In this paper, I report on a study using DBR to investigate how best to integrate the use of Smart mobile technology (Smart phones and tablets) with web-based social networking (Facebook) in the teaching and

learning of English as a second language with adult students. Participants of the iteration was a group on Malaysian undergraduates studying at University of Exeter, taking various course such as Business Studies, Engineering, Physics, and Law. These participants who range between 21 to 28 years old, volunteered to take part in this research.

## **2 RESEARCH AIM**

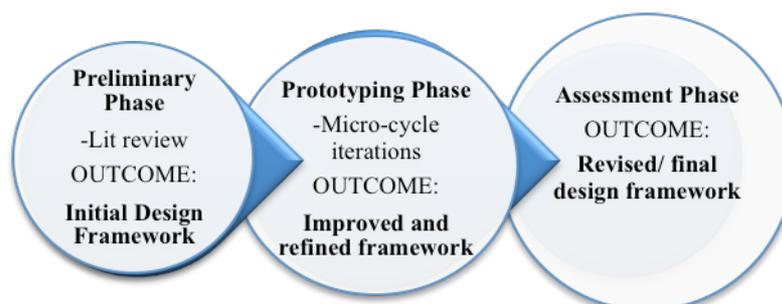
Reporting work in progress, this research aimed to find the affordances of integrating the tools of Web 2.0 and Smart mobile devices for the teaching and learning of English for English as a Second Language (ESL) students and under what circumstances do the affordances work best. As the study investigated the use of the combination, it hoped to investigate to what extent learning through Smart mobile devices and Web 2.0 tools support collaborative learning.

## **3 METHOD**

Adopting a DBR methodology, this study involved designing, developing and evaluating a number of educational interventions for students studying English language via Smart mobile devices and Web 2.0 tools. As defined by Wang & Hannafin (2005: p6), DBR is “a systematic but flexible methodology that aims to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories” [5]. It involves designing interventions that are tested, evaluated, refined and adjusted (Cobb et al., 2003) [2]. These practices reflect DBR’s continuous cyclical and iterative characters, which aim to produce design principles, learning theories, interventions of curricular products, instructional tools, and or practical solutions which can be continuously refined and improved.

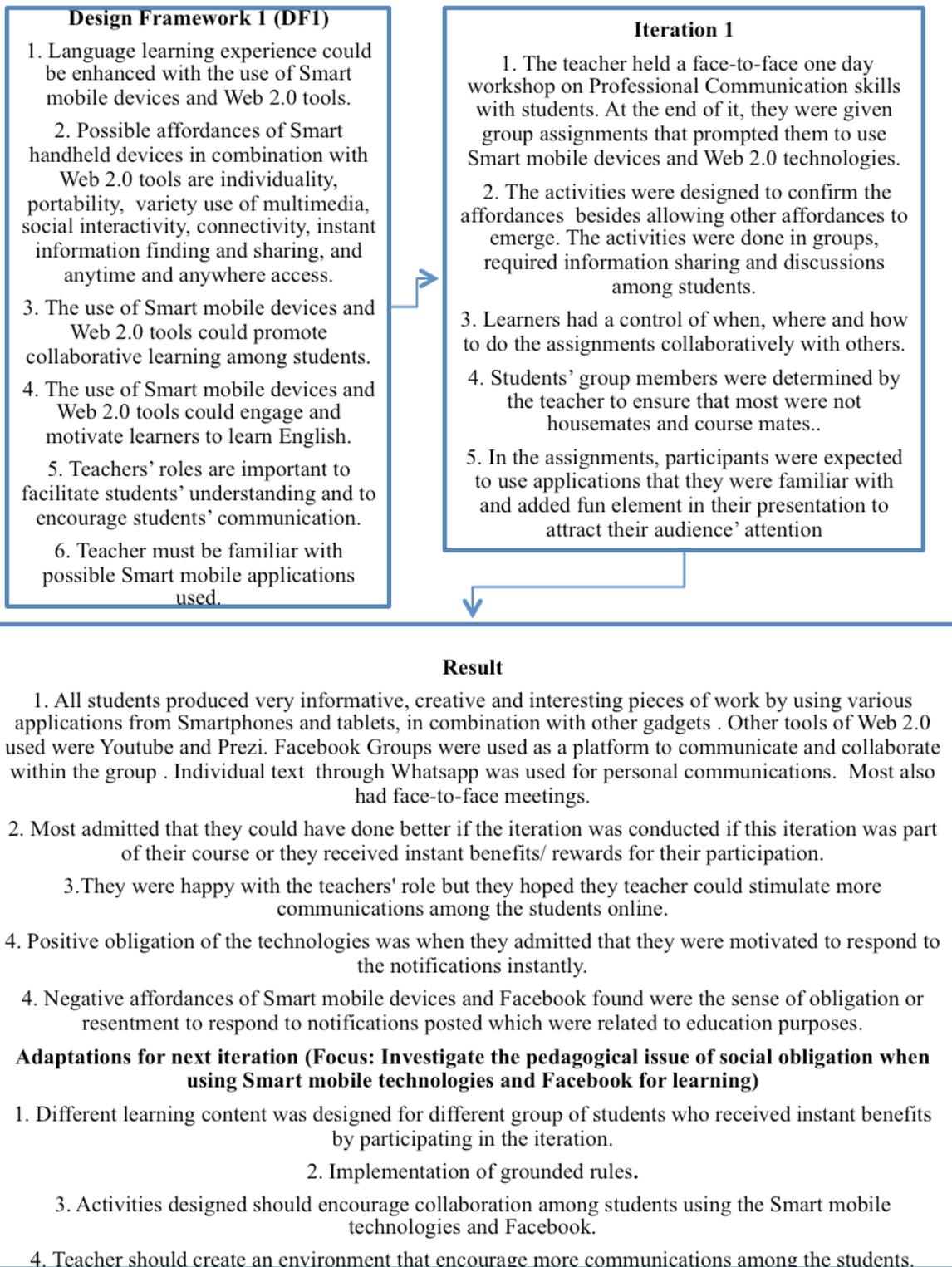
This study was motivated by few conjectures. The first conjecture was language learning experience could be enhanced with the use of Smart mobile devices and Web 2.0 tools, and their integration into a tertiary education curriculum for ESL learners could promote collaborative learning among students. The second conjecture was learners’ uses of the technologies were shaped by the learning activities that they were engaged in and teachers’ roles were important to facilitate students’ understanding. The third conjecture referred to the pedagogical affordances of mobile learning and social networking that could enhance learning. Possible affordances of Smart handheld devices in combination with Web 2.0 tools were individuality, portability, variety use of multimedia, social interactivity, connectivity, instant information finding and sharing, and anytime and anywhere access. As shown in

Diagram 1, this study has three main phases. Preliminary Phase was completed; the study is now in the Prototyping Phase.



### **Diagram 1. Three main stages in Design Based Research**

The Preliminary Phase acted as a theoretical and empirical foundation of the whole study. In this stage, comprehensive review of literature was conducted to clarify the key research terms used in the research, finding the affordances of Web 2.0 and Smart mobile devices for language learning from the literature, and understanding the theoretical principles that underpinned most mobile learning projects and related them to the needs of English as Second Language (ESL) learners. The outcome for this stage was a development of an initial design framework (Design Framework 1) as shown in Diagram 2 below. Then, I tested and developed the framework through a series of two iterations. Each iteration, being a micro-cycle of research with formative evaluation as the most important research activity, aimed at improving and refining the interventions to produce Design Framework 2, and Design Framework 3. To test the affordances of Smart mobile devices and Web 2.0 tools for learning in every iteration, all the tasks designed prompted the participants to use the technologies and were done in groups because this study hoped to find how they learn collaboratively. In Iteration 1, the respondents were given tasks that required them to use their Smart mobile devices like Smartphones or tablets and the social networking site, Facebook to search for information, contact their group members to discuss and plan their work and share information for their presentation on their Facebook Group. There was no time restriction of when the students should do the task with their group mates so long that they could complete them before the day they were assessed. They were free to use other tools of Web 2.0 that they found useful to complete their task. The outcomes of their group work were group presentations. Participants' perceptions of the impact of each intervention were evaluated using semi-structured qualitative interviews (Bryman, 2012) [1].



**Diagram 2. The first iteration, main findings and the adaptation for next iteration**

## 4 FINDINGS AND DISCUSSION

The findings from the iteration confirmed the positive affordances of mobile learning and social networking in enhancing teaching and learning. Generally, all the respondents of this study used their Smartphones and tablets and social networking site, Facebook to do the tasks due to the affordances of the technologies as found in the literature. Besides the online communication via Facebook groups, Facebook messafe and personal texts via *Whatsapp*, most relied on face-to-face meetings to discuss about the tasks. To share the work that they did collaboratively with each other, they used Facebook and other tools of Web 2.0 such as YouTube and Prezi. All used their laptop to prepare their presentations and to find information. Smartphones were used to take photos and videos and also to find information while they were on the go. With the fact that the Smartphones and tablets are their personal belonging, they had a total control of when and where to do the research and discussed about it with their group mates as the devices provided anytime anywhere access through portable/wireless delivery mechanisms. Using various applications found in the gadgets, most produced a very informative, creative and interesting piece of work. All students were excited to be collaborative in their learning as they could use various kinds of multimedia in their presentations. But all admitted that they would commit to the iteration more if it their participation was part of their course, where it rewarded them credits. They were satisfied with the teachers' role but they hoped they teacher could stimulate more communications among the students online.

The use of Facebook Groups was found to be a suitable platform for students to share their work and to supply interpersonal and social communication network between students to communicate and also promote their work. Through investigating this combination of m-learning with social networking, the main finding of the iteration was a powerful social obligation effect in the combination. Positive affordance of the technology was that it motivated the students to respond to the notifications received as soon as possible as they got the notifications on their phones. They admitted that they would not do it later if they procrastinated. Nevertheless, as well as motivating, the social obligation effect can also have some negative consequences for learning. Smartphones and tablets may facilitate learner self-initiation and control to do the activities assigned but when they were expected to share their work to a bigger audience, some students were not happy. Postings that were made to Facebook wall can be seen by anybody on the web if the settings to limit the viewing were not changed. They felt embarrassed to show their work to the public as it might reveal the mistakes that they might have done in their work. They felt pressured as they knew they were competing with other participants whom they felt might be more advanced learners. Some

participants also admitted that they felt embarrassed to ask questions in their Facebook Group page. They felt that their questions were too simple to be asked in public. So, rather than sharing their doubts to their groups and also their teacher, most participants chose to ask questions personally to their friends by sending personal messages through their mobile devices using *Whatsapp* application. Some also had face-to-face meetings. Other negative aspect of the technologies was when students felt obliged to respond to notifications that were automatically sent to their smart mobile devices. About half of the participants were uncomfortable to receive notifications about the research on their mobile phones and they experienced this as an intrusion into their social space. Some reported that they changed their phone setting so that they did not receive any notification about their work on their phone. Some also ignored the notifications because they were in the midst of doing their revision for their exams. Another issue that was related to the negative affordance of the technologies was that since the work can be done anytime and anywhere, nearly all participants also admitted that they completed the work assigned at the last minute. The participants were given two weeks to do the tasks but based on their postings and discussions in their Facebook Groups, most only started to do the work at the end of the second week. This finding suggested that some changes need to be done in the next design to avoid participants to produce work at last minute.

It is interesting to find in the next the iteration of how these negative aspects of m-learning and social networking can be addressed. Focussing more on pedagogical issues, next iterations will investigate how mobile learning teaching that incorporates the idea of social obligation should be conducted. Firstly, the participants of next iteration will be carefully selected to ensure that they gain benefits by taking part in the iteration. Secondly, grounded rules will be imposed to guide the participants on how to participate in the iteration. Thirdly, the activities designed should encourage collaboration among students using the Smart mobile technologies and Facebook. Fourthly, the teacher should create an environment where students were welcome to ask questions and discuss anything to clear any misunderstanding about the task.

## **5 SIGNIFICANCE OF THE STUDY**

The findings of the first iteration so far suggested the importance of social obligation effect for the design of m-learning with social-networking. It was not just mobile learning but it was the integration of mobile learning and web 2.0 tools (Facebook) that lead to the social obligation effect because it involved social network and learning. As this study researched on the pedagogical affordances of mobile learning integrated with Facebook, it hopes to explain the situations where it is not good to use the technologies, when to use it, when not to use it

and also how to use it for teachers. The next stage of this study will focus on exploring the motivating power of social obligation in combination with m-learning issue further. Particularly, the design for the next iteration will focus on how teachers should create a motivating and supportive online learning environment, how much notifications are just right and how much is too much and how the activities should be designed to explicitly demonstrate collaborative work among students.

## 6 CONCLUSION

Overall, the affordances of Smart mobile devices and Web 2.0 tools which were tested in this study confirmed the conjecture on the abilities of these technologies to enhance collaborative learning of English among ESL learners. However, respondents' uses of the technologies were shaped by the learning activities that they were engaged in and this study found that teachers' roles were important to facilitate students' understanding. The findings from the iterations in this study also revealed that the integration of mobile learning and Web 2.0 tools has an effect of giving obligation to its users to respond to notifications of message that were sent to their mobile devices which can be both positive and negative for engagement and learning. The next iteration of this ongoing design-based research explored how to make the social obligation effect of combining m-learning with social networking positive for learning and how to avoid its potential negative consequences.

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