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WhatsApp as a tool for meaning negotiation: The use of web-enabled phones to consolidate vocabulary learning among university students in Saudi Arabia

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By

Ghadah Hassan Batawi

Thesis for the degree of <u>Doctor of Philosophy</u>

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Abstract

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The present study investigates the collaborative processes whereby learners of English use WhatsApp as a platform on smart phones to acquire new vocabulary. A review of the literature on mobile learning shows that a number of studies (Lu, 2008; Kennedy and Levy, 2008) conclude that vocabulary acquisition can be improved in this way yet fail to show what cognitive and social processes students employ to learn vocabulary and how learning might take place. In an attempt to fill this research gap, this study focusses on a group of 33 Saudi students from the English language department at a university in Saudi Arabia, who took part in an online class using WhatsApp as a tool to learn and use target vocabulary and to facilitate spontaneous interaction. It seeks to understand how teacher-student and student-student 'chats' lead to learning by analyzing the richness of their conversation in order to understand the dynamic of multiple variables to achieve learning.

The students received bite-sized vocabulary learning messages and took part in two WhatsApp discussion groups over a period of 5 weeks, in addition to their regular language classes. It also investigates the students' acceptance of learning with the use of mobile phones and their readiness to implement it. The research uses a mixed methods approach, in which both quantitative and qualitative data were obtained, to gain a more comprehensive understanding of the participants' vocabulary gain and of their engagement in the process. The WhatsApp chat conversations were analysed in order to understand how learners use this new medium to learn.

Findings showed that all students acquired vocabulary but at varying rates. Differences in vocabulary gain are attributed to many factors including variation in frequency and quality of contributions to the WhatsApp discussions, motivation to learn English, acceptance of mobile phones (WhatsApp) as a learning tool, and to individual self-regulation and individual differences.

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UNIVERSITY OF Southampton

Research Thesis: Declaration of Authorship

Print name:	Ghadah Hassan Batawi

Title of thesis:	WhatsApp as a tool for meaning negotiation: The use of web-enabled phones to consolidate vocabulary learning among university students in Saudi Arabia

I declare that this thesis and the work presented in it is my own and has been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
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Chapter 1

1.1 Introduction

This research exploits the affordances of smart phone technology and a social networking application (WhatsApp) to explore how vocabulary learning takes place using technology (Brown, 2005; Conole & Dyke, 2004; Lu, 2008; Cochrane & Bateman, 2010). It is hypothesised that the potentially rich learning environment offered, will facilitate interaction in a social learning environment to give a vocabulary learning experience (Adedoja & Egbokhare, 2013; Awada, 2016; Sam, 2017; Keogh, 2017) which offers a genuine alternative to classroom learning. The study particularly focusses on how and why students learn using this new platform. It also sets out to explore language learners' attitudes towards the new learning mode and whether it causes a shift in their beliefs around vocabulary learning and the use of mobile phones for learning and whether they are subsequently likely to embrace this approach in future.

The researcher's starting objective was to build on previous research investigating the effectiveness and acceptance of learning vocabulary using mobile phones (Lu, 2008; Thornton & Houser, 2003, 2004, 2005; Chinnery, 2006). The current research takes place in the context of Saudi Arabia, in which little research into the use of mobile technology for learning has taken place. This is despite the fact that Saudi Arabia has the largest number of mobile phone users worldwide with penetration levels reaching 188% (Seliaman and Al-Turki, 2012). However, the research objectives and planned methodology have evolved considerably over the years covered by this research journey, partly due to the earlier lack of relevant research in the area and partly due to the nature of the emerging data. The wealth of qualitative data obtained from a focus on the interactions between the learners (and teacher) using WhatsApp has given another dimension to this research which was not originally envisaged. Rather than carrying out research to simply establish whether learners learn vocabulary better online or not, the additional research direction looks at the learning processes facilitated by online interaction. Since it fits the nature of the data collected, conversation analysis of the learner interactions on WhatsApp is carried out in an attempt to understand how and why participants learn in this new learning

environment and what differentiates it from a traditional classroom-learning environment.

1.2   Rationale for this study and research gap

The acquisition of vocabulary is arguably one of the major challenges for a language learner as the process involves memorization and retention of a great number of words which is time and effort consuming, and undoubtedly boring for many learners (Laufer and Nation, 1998; Goulden and Nation, 2011). Researchers have mostly been negligent in providing clear descriptions and guidelines as to how best ~~to~~ approach vocabulary learning (Schmitt, 2008). This is probably due to the influence of earlier methods of teaching language which focused on grammar at the expense of vocabulary (see 2.3). However, a growing body of research has focused on vocabulary learning and teaching realizing the importance of vocabulary knowledge while using the target language in any communicative situation (Schmitt, 2008). Research into vocabulary learning advocates the combination of implicit and explicit vocabulary teaching approaches in supporting vocabulary learning (Nation, 2006; Sonbul and Schmitt, 2010) (see 2.6). That is, in a typical English as a Foreign Language (EFL) class in Saudi Arabia for example, where students have no exposure to language outside the classroom, learners need some explicit instruction of vocabulary to help them notice new vocabulary items. However, teachers in EFL classrooms prefer to mostly devote precious classroom time to the practice of communicative activities by focusing on the four language skills of reading, writing, listening, and speaking (Al-Hazmi, 2012; Gunn, 2003; Rababah, 2003). Therefore, it can confidently be concluded that students need more time to be helped to overcome vocabulary learning challenges. Living in a digital age means that new technological tools can provide practical and updated solutions to help enrich the vocabulary learning experience and to better fulfill the needs of the students of the twenty first century (Chen & Chung 2008; Yu, 2010).

As a language teacher, I realised that I had adopted an incidental vocabulary learning approach to my teaching in that I used to highlight target words by drawing learners' attention to the properties of the words while in context. However, I also used to impose vocabulary learning and practice tasks on my students to be accomplished

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later at home and provided them with a list of target vocabulary words from each unit of the textbook, accompanied with their English meaning. This was not due to a lack of recognition of the importance of vocabulary in language learning but rather because vocabulary acquisition is generally acknowledged to requires a great deal of memorization and repetition which is ultimately possibility of the learners and in turn would free classroom time for other skill practising activities that could not be performed without the teacher's support.

At the same time, technology has grown exponentially providing additional opportunities for educationalists to raise the quality of the teaching/learning experience. That is, research into second language learning and computer assisted language learning (CALL) shows that the use of technology can support language teaching and learning by enhancing students' achievement, providing more time for language practices, and allowing for a platform for genuine interaction (Lee, 2000; Cook et al., 2008; Cetto, 2010).

Chief among the technologies that have experienced a rapid development in the past decades is the mobile phone. As Sandberg, Maris and de Geus (2011) note, it has seen an evolution from a machine that simply managed calls and texts, to one with seemingly countless applications. Mobile phone learning is defined here as learning using wireless Internet connected devices which enable learners to have access to formal or informal instructional materials and interaction through the learners' mobile devices whenever they can receive transmission signals (Chinnery, 2006; Yu, 2012).   It is argued here that the use of this technology for learning encourages the process of learner-focused learning by enabling students to actively engage with materials rather than simply receive knowledge as a passive agent from a hierarchically superior teacher (Jeapson, 2005). This approach also mirrors some of the main developments in CLT theory where the teacher is seen as adopting the role of a facilitator (Hiep, 2005; Savignon, 2002; Yang & Chenug, 2003). Technology may also be seen as enabling interactions between students and inter-peer learning which CLT advocates (Holliday; 1994, Nunan; 1988, Gunn; 2003).

Evidence from early research (Thornton & Houser, 2003, 2004, 2005; Chinnery, 2006; Lu, 2008) suggests that the effectiveness of using mobile phones technology in EFL has

great potential in providing learners with a wide exposure to the target language wherever and whenever they need it. These studies advocate using mobile phone technology as a means to aid vocabulary acquisition by sending small bite-sized vocabulary lessons via SMS over spaced intervals. It can be argued that these studies did not exploit mobile phone affordances in language learning to the fullest as they did not explore the interactivity aspect of mobile phones. However, they still show that mobile phone learning is useful as it seems to support memory functions aligning with memory theories such as cognitive load and dual effect (see 2.9). In other words, they provide evidence that learners gain more vocabulary using mobile phones when compared with their peers who were using traditional learning methods.

 More recently, further studies have explored additional affordances of mobile phones and their potential to support language learning and improve the quality of vocabulary acquisition together with learners' acceptance of this new learning medium (Adedoja & Egbokhare, 2013; Awada, 2016; Sam, 2017). However, it is worth noting that at the time when the current study commenced, there was a dearth of research showing how learning is constructed in this new medium (Jeapson, 2005). Until recently, I have traced only a few attempts at addressing these areas of relevant to knowledge construction via mobile phones (Castrillo 2014; Keogh, 2017) which gave some support on which to build my study, although they were not well elaborated.

It is important to note that there is considerable lack of consensus regarding whether or not mobile learning, or m-learning, fosters an environment conducive to vocabulary acquisition. Many of the limitations or drawbacks outlined above are tied to issues identified with earlier mobile phone usage (Stockwell, 2008; Kang and Maciejewski, 2000; Koole, 2009; Traxler, 2009). Increased literacy in the use of this technology as it has developed over the past 5 years has fundamentally altered the arena for investigation; many early studies of mobile usage for language learning now require re-evaluation. Increasing familiarity with the technology and principles has led to greater ease of normalisation for such technologies within the classroom.

This thesis draws primarily on the academic research of two main theoretical areas: vocabulary acquisition and mobile phone affordances. In fact, the area of vocabulary

acquisition is quite well researched while the area of technology application is still under researched (Stockwell, 2008; Kang and Maciejewski, 2000; Koole, 2009; Traxler, 2009). Although I found a number of studies that have explored the interdisciplinary area of vocabulary improvement through the use of various modes of technology, the current study is particularly important as it addresses a research gap and provides insight into how learners behave in a mobile phone virtual learning environment in order to achieve learning. It looks at the learning strategies they use to make meaning, and at what particular features of the mobile phone seem to enrich their learning experience and distinguish it from a traditional classroom setting. Given the research context of this case study in a university setting in Saudi Arabia, data regarding Saudi students' acceptance of, attitudes to, and readiness for adopting mobile learning was collected in order to check the feasibility of the innovation in this particular context. In addition to addressing a particular research gap, a particular outcome of this study is that the results could inform Saudi and other educators and policy makers about their learners' readiness towards this innovation and its utility in general. It also would pave the way for more research on the future of education in this area.

The following sections set the scene for the study and highlight the existing literature surrounding foreign language learning in a Saudi context. Then, it outlines the state of CALL and MALL in Saudi Arabia and sets the scene for the investigation that this study proposes

1.3   Setting the scene and context of the study

This study is conducted in two phases and focusses on two groups of female participants using mobile phones for learning at a University in Saudi Arabia. It is deemed important to describe the background to the learning environment, existing mobile phone using habits, and the cultural back ground of the Saudi female in order to better understand the rationale for the study, the methodology used and the findings obtained from each phase of the study.

1.3.1 Language learning in Saudi Arabia

English Language Teaching (ELT) forms a significant part of the education system in the Kingdom of Saudi Arabia (KSA). Throughout the region, English is a highly valued asset particularly in the economic and business domains, and the government has worked hard to promote the teaching of English in schools and universities (Rahman & Alhaisoni, 2013). Alongside this, government reforms have endeavored to increase digital literacy in the classroom and to provide teachers and students with greater amounts of e-resources and facilities (Rahman & Alhaisoni, 2013). Despite these attempts, adoption of CALL and the use of new technologies in EFL contexts are still hindered by many challenges (ibid).

The year 2007 saw the launch of the King Abdullah Project for the Development of Public Education, or Tatwir (Alshumaim & Alhassan, 2010). The principal aim of the project was to make reforms in the acquisition of knowledge and expertise for students all levels of the Saudi education system. As part of the educational reform, English language learning has been placed at the top of the agenda due to the recognition of how an English-speaking workforce can better prosper in economic, political and diplomatic spheres (Alshumaim & Alhassan, 2010). Several studies have attempted to assess the situation of EFL in Saudi Arabia and the Arab world, although more work still needs to be undertaken to provide a comprehensive picture, particularly in light of the reforms mentioned above. Compared to the wealth of literature covering China and Asia, there is a relative scarcity of data and significant room for further understanding.

Of the studies that have emerged, several studies have pointed to a number of problems within English language education in the Saudi context (Al-Hamzi, 2005). These have ranged from the identification of cultural hostility to English, to criticisms of traditional pedagogical approaches, and touched upon lack of resources and effective teacher education (Al-Hazmi, 2005). The primary method of language teaching in Saudi Arabia tends to focus on the audiolingual method and the grammar translation method (Al-Saghayer, 2008). These approaches tend to favour rote-learning, repetition of words, and an overwhelming reliance on the use of grammatical structures to explain and teach the language (ibid). This is contrary to much of the

literature outlined in Chapter 2 with regard to effective vocabulary acquisition strategies and may partly explain the low levels of language proficiency found in many Saudi schools and universities (Al-Seghayer, 2011).

Al-Hazmi (2012) explains that the lack of direct contact with native speakers seems to be a considerable limiting factor for students while learning English in the KSA. Without an appropriate context for language learning and vocabulary acquisition, and without the pressure of using English outside the classroom in genuine settings, students have low levels of motivation to practice and improve (ibid). Another factor that has been cited as a significant cause for language deficiency among Saudi learners is the extensive use of Arabic within the Saudi classroom (Al-Hazmi, 2012). Although other studies assert that careful use of the first language is beneficial in learning a second language, overuse of the mother tongue is considered a hindrance (Khan, 2011). In addition, one of the main issues identified in EFL in Saudi Arabia is cultural attitudes to foreign language learning. Many educationalists report concerns that the target language may have a social and cultural impact, imposing a foreign culture at the expense of a Saudi, or Arabic culture (Al- Al-Seghayer, 2011).

The aforementioned problems of English teaching approaches explain why, despite the large quantity of time devoted to English lessons within the Saudi school system (508 mandatory hours during secondary school years), many students arrive at university with extremely low levels of English (Al-Seghayer, 2013; Javid, *et. al,* 2012). In other words, these more traditional pedagogical approaches demand a great deal of time and effort from students, with no obvious benefit. The challenge of learning English at university level is reported in Javid, et. al, (2012) as students expressed difficulties arising from their low level of English achieved in school. As a result, they arrived at university, where English is compulsory, with low English proficiency levels. Javid et al., (2012) recommended that greater support must be given to English learning at undergraduate level, and stressed the importance of a greater degree of communication activities which would lead to a more interactive learning experience (Javid, et. al, 2012).

Javid, et al, (2012) conclude that challenges in English tuition have led to students' lack of self-esteem and in turn, these are seen as more demoralizing than rewarding.

Therefore, students' low motivation has been reported as a further problem facing English learning in this context (Alsaif & Milton, 2012; Javid et al, 2012; Khan, 2012; Bhuiyan, 2016). In contrast to this literature, a study by Zohairy (2012) found that the motivation among Saudi students of English was actually comparatively high. This study surveyed 120 male and female students studying English as a foreign language at Abha University. The report indicated that the students held positive attitudes towards learning English, and particularly towards the culture of the target language itself, with the highest scores being allocated to the questions surrounding English films. This posits the question of why attainment in English remains low: if it cannot be attributed to a lack of motivation on the part of the students. Therefore, more research needs to be taken to identify the causes of such disparity, whether it is due to demographic, pedagogical, motivational, or cultural reasons.

The element of motivation is particularly relevant to this study. This is due to the fact that learners' motivation to learn English might be an issue that directly impacts on the success of smart phone integration with learning. In other words, it cannot simply be presumed that learners who are fascinated with smart phone technology alone, will be more successful learners, but rather that motivation to learn English is a key influential factor (see discussion 8.4).

The next section discusses learners' use of learning strategies in Saudi Arabia.

1.3.2   Language learning strategy use in Saudi Arabia

Many studies have focused on the traditional pedagogical style adopted by the Saudi education system (e.g. Alsaif & Milton, 2012; Khan, 2011). However, an emerging field of research has been to investigate learning strategies amongst the students themselves. The shift from an authoritative, teacher-focused strategy of learning to one which places the student at the center of the learning process has been a significant development and also requires a new approach to research regarding the way in which students engage with the educational process.

A more comprehensive study conducted by Aljuaid (2010) found that Saudi language learners (and perhaps Arabic language learners in general) appear to be fairly high

users of language learning strategies. Reporting a moderate to high use of learning strategies amongst student, he observed that all categories of strategies were employed among his test group. The highest strategy use was reported for metacognitive strategies and social strategies (Riazi, 2007; Aljuaid, 2010). This contradicts the assumption that the Arabic education system is entirely bound to rote-learning and memorization and instead suggests that teachers and learners are engaging in different strategies to promote deep learning, analysis and evaluative techniques (Aljuaid, 2010)

Alhaisoni (2012) found that there was some gender disparity in the adoption of learning strategies. Women were observed to use more types of strategies than men, and, furthermore, high-achieving students tended to adopt a wider variety of learning strategies than weaker ones. These studies appear to suggest that the one-dimensional view of the Saudi education system as stuck in a conservative pedagogy is an unfair characterization. Rather, there is potentially a great deal of openness among teachers and learners in the adoption of new approaches, which may be profitably exploited with the introduction of new, student-centered approaches to language education.

The next section discusses existing mobile phone use habits in Saudi Arabia in order to provide further support for the need for this study.

1.3.3   Mobile phones in Saudi Arabia

Statistics show that Saudi Arabia has the largest number of mobile phone users per head worldwide. Seliaman and Al-Turki (2012) position Saudi Arabia as the number one worldwide in the use of mobile phones, with penetration levels reaching 188%. The report indicates that the demand for smart phones is expected to rise within the coming years due to the wide spread of low cost 3G and 4G smart phone devices and the availability of a country-wide telecommunication network offering high connectivity and download speeds for smart devices. Many Saudis nowadays, like others around the world, use diverse free social network applications for continuous communication with others, making phone calls less preferable in many situations.

This could be because they perceive the numerous advantages that smartphones allow for, including multimedia messages, video calls, and internet browsers amongst others.

Until 2014, the university regulations in Saudi Arabia prohibited bringing embedded-camera phones to the university female campus for reasons of cultural integrity. Because of this embargo, I was unsure whether this research could be officially conducted. However, students, at that time, were observed by the researcher holding camera-enabled smart phones, having short conversations in the corridors between classes' times, telling other students about missed classes, a change in the schedule, or even discussing evening plans. Nowadays, due to the penetration of smart phone use and the fact that a phone is seen by many as indispensable, and upon universally admitting the affordances of mobile phones, Saudi university regulations now permit smartphone use inside a female campus. Consequently, almost all of the students are seen holding smart phones devices, and are seen mainly occupied with texting or surfing using countless 'smooth touches' rather than making phone calls.

At the beginning of this research in 2014, in order to establish whether WhatsApp was the appropriate educational tool for this research, students were asked about the frequency of use of a number of popular applications used to exchange text and multimedia messages. These included text chat (SMS), multimedia messaging (MMS), e-mail, WhatsApp, Facebook, Twitter, Instagram, Snapchat, and LINE see pre-study questionnaire in Appendix A.1). Findings revealed that WhatsApp Messenger was the most popular social network application among the participants. It gained the highest ratio of use amongst learners in the main study who used it intensively during the day (see Appendix A.1).

The table below shows that the majority (83%) of learners used WhatsApp over 20 times or more a day. The second most popular, the newer app, Snapchat, was used by the majority of participants (66%) over 20 times a day. Apart from these, other participants used a number of applications from 1 to 10 times a day such as email, Instagram, Twitter, LINE and SMS respectively (See frequency table Appendix A.1). This means that the research sample was already adapted to use WhatsApp for everyday socialization, and in turn, for the purpose of this study, there was no need to

give them further training to be able to participate in the experiment. This paved the way to enable participants to experiment in mobile phone learning using WhatsApp.

Table 1: Frequency of use of WhatsApp Messenger

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-10 time	1	3.2	3.3	3.3
	10-20 times	4	12.9	13.3	16.7
	20+ times	25	80.6	83.3	100.0
	Total	30	96.8	100.0	
Missing	System	1	3.2		
Total		31	100.0		

Data from the pre-study focus groups further supports this finding. For example: Nada explained, (in her Pre-FG2_Main), that she intensively used WhatsApp for everyday communication. Nada said:

> My phone calls have become very limited….I prefer to communicate via WhatsApp…it is for free…it is flexible in term I won't feel worry about how to say something…I can exchange multimedia and voice messages swiftly.

Noura, (in her Pre-FG1_Main), added that she checked her WhatsApp almost every twenty minutes and prefers it over email. Noura reported:

> It has become an addiction….I check it almost every 20 minutes…..it is very immediate and you know when the receiver get your message….you don't need to log in every time you use it unlike email

Reem in Pre-FG1 Main compared it with Twitter and preferred WhatsApp. Reem added:

> I mean it depends on your purpose. If you want to chat with your friends and want to have a good time, then it is WhatsApp…if you work on your professional connections, then it would be Twitter….For me it is only WhatsApp

The next section discusses the implementation of technology/mobile phones in learning in Saudi Arabia.

1.3.4 The use of technology in learning in Saudi Arabia

Al-Fahad (2009) implies that one of the aims of the Tatwir project was to prioritize e-learning and the introduction of Information and Communication Technology (ICT) resources in the classroom within the Saudi education system. Digital literacy has been identified as a key objective required to enable Saudis to compete in the global knowledge economy. As part of this, the Ministry of Education has explicitly announced support for distance learning projects, and sponsors several initiatives in the field. An e-learning education portal has been established, in addition to a Saudi national center for e-learning (Al-Fahad, 2009). Several studies have attempted to assess the use and utility of CALL and m-learning approaches within the Saudi education system, particularly in the field of foreign language tuition.

Al-Fahad, (2009), investigated attitudes of female students at King Saud University towards the use of mobile technology in EFL. 186 students were questioned, with the main findings suggesting that the introduction of distance learning and the greater flexibility afforded by mobile learning would be welcomed by the students. The introduction of m-learning strategies in a variety of approaches and on a variety of devices was considered to improve motivation and engage students in the learning process (Al-Fahad, 2009). He found that there was a clear appetite amongst students to employ the use of different technologies and enjoyment of the fact that mobile learning offered increased accessibility to resources and flexibility. The students surveyed changed from passive learners to "truly engaged learners who are behaviorally, intellectually and emotionally involved in their learning tasks" (al-Fahad, 2009: 118).

There is also still a need to move to a student-centered approach for ICT integration, which currently is too often focused on the teacher. A study by Alshumaim and Alhassan (2010) found that many teachers in Saudi Arabia did not feel equipped with the necessary skills and resources required to integrate ICT techniques effectively into the classroom. One major factor discovered in the course of this study was whether or not the teacher has access to a computer at home and how regularly they used it. Those who were found to have regular computer access were far more willing, and felt more able to integrate the technology into their teaching practices (Alshumaim &

Alhassan, 2010). Furthermore, many teachers in Saudi Arabia, whilst computer literate, are not trained in the effective use of CALL in the classroom. This poses a significant teacher based challenge; adoption of CALL in the teaching community has been low, with a high dropout rate. Many teachers seem to feel it is not worth the investment of time and energy and instead prefer to revert to more traditional methods. Teacher training, therefore, is a key obstacle that must be overcome (Alshumaim & Alhassan, 2010).

The next section gives a picture of the culture pertaining to Saudi women and mobile phone use.

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The next section gives a picture of the culture pertaining to Saudi women and mobile phone use.

1.3.5   Cultural representation of Saudi Arabian women

Given the fact that the participants in this study are all female, it is essential to take into consideration the cultural representation of Saudi Arabian women within society in addition to the learning environment and mobile phone use habits. The Saudi environment is, unlike many other modern societies, in that cultural values remain traditional in many ways and society tends to be over protective of women. Pressure exists on young females to obey familial rules. This becomes especially significant in a study such as this one, where participants usually exchange communications in the evenings – a time when many families may not permit their daughters to receive phone calls or engage in online social interaction. One student in the research context, for example, came from an area outside the city where values are likely to be more traditional. She was unable able to participate in the research because her parents only allowed her to use her smart phone on the university campus and she was unable

to use it in the evenings as she had to hand her phone to her parents when she returned home. Given that the aim of the study was to extend English learning beyond the classroom, time needed to be allocated for a series of WhatsApp interactions (see 4.7) throughout the day. Because of the likely issues, the students' wishes were taken into account. The participants were given the option to select between afternoon and evening online meetings in a pre-study focus group, and after some debate, many of them converged on evening meetings, yet time still became susceptible to change depending on the availability of the students (see 4.74.7).

The next section discusses the academic context of the current study.

1.3.6 Research context

The research was conducted at the female campus of King Abdul Aziz University in Jeddah, Saudi Arabia between 2014 and 2016. As a female researcher in Saudi Arabia, I did not have easy access to a mixed research group. The first phase was conducted in the English Language Institute, with Foundation year students (first year). The second phase was conducted in the college of Art and Humanities, English department, with students in their second year (see also the Methodology chapter for further information about the student participants and the programmes they were following). The next section illustrates the research objectives of the current study.

1.4 Objective of the study and research questions

The current study builds on findings obtained from previous studies which reveal that mobile phone learners gain more vocabulary when compared with their counterparts who learn vocabulary using more traditional approaches. The overall research aim is to evaluate the impact of mobile phone learning on vocabulary gain. The specific aim is to understand how language learners learn vocabulary whilst participating in online lessons using WhatsApp. In other words, it aims to explore social and cognitive processes learners employ while using a smart phone application as a platform (WhatsApp Messenger) to work collaboratively to acquire new vocabulary in order to understand how learning might take place in this new virtual environment. It also aims to understand both the learners' and teacher's role in the learning construction

process. A second goal is to explore learners' perceptions of how mobile phone affordances enrich their learning experience and how they made use of them. It also examines the impact of mobile phone affordances on learners' vocabulary learning beliefs and practices and on the learners' attitudes to their mobile phone learning experience. Furthermore, it examines to what extent learners become more self-dependent or autonomous while learning and the obstacles to the integration of MALL with classroom learning.

The research questions derived for this are as follows:

1. What is the impact on vocabulary gain of using web-enabled phones for learning?
    a. In what ways does the quantity of WhatsApp contributions impact on vocabulary gain and retention/loss?
    b. In what ways does the quality of WhatsApp contributions impact on vocabulary gain and retention/loss?
2. In what ways do WhatsApp learning conversations support vocabulary gain?
3. What is the role of mobile phone technology in supporting learning?
    a. What are the affordances of mobile phone technologies which contribute to (vocabulary) learning?
    b. How do the affordances of mobile phone technologies impact on learner motivation?

The next section discusses the methodological approach of the study.

1.5   Methodological approach

The current study uses a mixed methods approach to data collection. Data was collected from 33 English major students in their second year in the European Language College in King Abdul Aziz University in Jeddah, Saudi Arabia using both quantitative and qualitative research tools (See 4.3.1.24.6 for more details). The design of the main study is experimental and was conducted in three parts, before, while, and after the investigation following Creswell's (2006) experimental design. Data was collected before the intervention by using a pre-study questionnaire which was

administered to the research sample in the two research phases. Then, pre-study focus group discussions were run as part of the research methodology to give space for participants to voice their opinions, as evidenced by their responses to the pre-study questionnaire. Following this, a pre-intervention vocabulary test was conducted in order to measure the students' knowledge of the target words which had been taught during the intervention (see 4.6).

The investigation consisted of the researcher as teacher using the virtual environment provided by WhatsApp on the students' mobile phones to send messages to students at intervals on a daily basis. These contained material that was additional to work done in the classroom with the objective of enhancing vocabulary acquisition and memorization. The messages contained mini-vocabulary lessons on various facets of word knowledge, such as word meaning, definition, parts of speech and collocations. Some messages involved multimedia content such as pictures and audio files. Smart phone, WhatsApp Messenger was also used to enable collaborative learning by enabling learners to exchange messages to construct knowledge and to learn by using a variety of negotiation of meaning strategies (see 2.7.3 and 6.2).

After the intervention, multiple research instruments were used to measure participants' vocabulary gain, understand how and why learning took place, and to collect their attitudes and opinions regarding their experience of using mobile phones in learning (see 4.6).

The next section gives an outline of the chapters of this thesis.

1.6   Overview of the thesis

Chapter One has given insight into the research area mentioning the problems associated with vocabulary learning and teaching from a teacher's perspective which were the starting point for this research. It provides a background to the research context, discusses the research objectives and states the research questions. It has also given a brief explanation of the methodology and the research instruments used.

Chapter Two concerns the theories in the area of vocabulary acquisition which contribute to my thinking. It starts by exploring different definitions of vocabulary found in the research literature, discussing word knowledge and its dimensions. It then addresses vocabulary learning strategies and vocabulary learning strategy (VLS) models employed in this thesis. This chapter finally underlines some memory and cognition theories supporting vocabulary learning via mobile phone learning. Chapter Three, builds on Chapter Two, deals with technology and language learning in general, and smartphone and language learning as a new and opportune interdisciplinary area in particular. It discusses the advantages and disadvantages of CALL integration and the use of mobile phones, demonstrates the affordances of technology and mobile phones and how they can benefit vocabulary learning. It also outlines previous studies concerning students and teachers acceptance of m-learning innovation.

Chapter Four describes the research methodology used. It starts with my research questions. It then describes in detail the theoretical approach, the research paradigm, and the research design and research instruments. The design of the intervention in the main study is described in details afterwards. Then, data analysis techniques and software are described, before moving on to describe the researcher's role in the current experiment, together with a discussion on the research ethics adhered to.

Chapters 5, 6 and 7 present the research findings. In Chapter 5, the vocabulary test scores of individual participants are presented in terms of the vocabulary gain, loss and retention together with the quantity and the quality of WhatsApp contributions. Chapter 6 presents an in-depth analysis of participants' interactions via WhatsApp. It highlights major features of participants' conversations in order to understand how they might be conducive to learning. Chapter 7 presents participants' beliefs and attitudes towards vocabulary learning, mobile phone learning, and learning vocabulary using mobile phones.

Chapter 8 presents a discussion of the findings, including the influence of the quantity and the quality of contributions on vocabulary gain and loss, the impact of mobile phone affordances on learners' motivation and on learners' acceptance of mobile leaning. It then moves on to explain how vocabulary could be gained using the mobile

phone medium, teaching presence, learners' engagement, learners' autonomy, and challenges that might hinder the implementation of mobile phone learning in the future, and concludes by answering the research questions. Chapter 9 is the concluding chapter and includes the pedagogical implications of the study, the research limitations, and an insight for future research.

The next two chapters discuss the theoretical framework that this study draws on.

Chapter 2:   Vocabulary

2.1   Introduction

The theoretical framework for this research draws on two distinct areas; namely research into how learners acquire vocabulary in a second language and also into how new technologies can support foreign language learning. This chapter deals with vocabulary learning while Chapter 3 has more of a focus on technology and language learning and specifically on mobile learning. Additionally, it integrates relevant research into vocabulary learning using mobile phones.

This chapter firstly outlines the basic concepts surrounding vocabulary learning and teaching. It starts with identifying the importance of vocabulary learning and the status of vocabulary in terms of learning a language, before defining broader terms. such as 'word', 'vocabulary', and 'vocabulary knowledge'. Following this will be an explanation of vocabulary knowledge and how the sufficient knowledge of a word enhances automaticity and productivity in word use together with a suggested explanation of word levels and how to best select the order in which to teach the items. There will also be a discussion based around the pedagogical theory of vocabulary learning, looking in particular at levels of deliberate and incidental learning of lexis learning/teaching in any vocabulary course, before focusing on vocabulary learning strategies, and the examination of two strategy taxonomies. The end of this chapter will then offer a discussion on cognition theories that promote vocabulary retention and reduce chances of vocabulary loss.

2.2   Importance of vocabulary

Vocabulary is a critical aspect of second language learning. In Schmitt's words (2000), "lexical knowledge is central to communicative competence and to the acquisition of a second language" (p. 55). Shen (2003) believes that limited vocabulary in a target language impedes successful communication, even if language users are able to produce correct grammatical structures. Language learners also realize the need to have enough words in order to be able to express meaning if they wish to

communicate in the L2. This can be observed by the fact that most people who travel tend to carry dictionaries with them, as opposed to grammar books, thus suggesting the importance of vocabulary, a fact that many regularly express (Alqahtani, 2015). Nation and Meara (2002), Read (2007), Alqahtani (2015), Shen (2003) and others assert the importance of vocabulary in the classroom setting too. Read (2007) and Nation (2011) have both pointed out that the acquisition of vocabulary is fundamental for completing tasks in all language skills (i.e. listening, speaking, reading, and writing). In addition, Alqahtani (2015), argues that the acquisition of extensive vocabulary is essential for successful second language use because without adequate vocabulary, it is difficult to use the structures and functions learned for comprehensible communication. Research in reading also demonstrates that second language readers depend heavily on vocabulary knowledge and that its lack is the main hindrance for successful L2 reading comprehension (Sedita, 2005).

Despite the prevalent importance of vocabulary learning, early methods of language instruction sought to focus on grammatical knowledge due the influence of the Grammar Translation Method and this was often at the expense of vocabulary acquisition (Mehring, 2005). However, because of the abundance of second language research, vocabulary learning has emerged, in recent years, as a cornerstone of EFL, with the emergent belief that vocabulary provides a contextual knowledge that enables language use (Nation, 1987). Before offering an understanding of how vocabulary is learned and a discussion of current trends in its teaching, a definition of key terms used in this thesis will be offered, and will include those of 'word', 'vocabulary' and 'vocabulary knowledge'.

2.3   Word/ Vocabulary

The first term necessitating a clear definition is that of *word*. Carter (1998, p. 5) states that the definition of a word can be summarized through the following statement: "a word is a word if it can stand of its own as a reply to a question or as a statement or exclamation." Furthermore, Biernacki (2000) adds that words are the conventional symbols that make up a language, encompassing written and oral forms as well as signs. He also suggests that words can be described as being single, compound or

idioms and their meaning is based on the experience of the specific individual, owing to each individual having different life interactions, social contacts and views of the world (Biernacki, 2000).

The second term defined in this section is *vocabulary*. Vocabulary is defined by Hatch and Brown (1995) as a list of sets of words for a particular language used by speakers of that language in order to communicate effectively. Lowenstein *et al*. (2012) also define vocabulary as a system of words, and representations of concepts and objects used by individual speakers of a language for communicating, thinking and acting over a range of activities. A further description of vocabulary is provided by Gore (2012) who divides vocabulary into two categories: oral and written. That is, the oral category of vocabulary refers to word acquisition through hearing and the ability to say the word. Written vocabulary on the other hand, requires the individual to understand how letters (symbols) connect to the sound of words, and hence it is not possible to do this until the individual is capable of developing the 'decoding' skills of reading and writing. Folse (2004) uses the two terms, word and vocabulary interchangeably and divides vocabulary into single words, set phrases, variable phrases, phrasal verbs, and idioms.

Concurring with the diverse aforementioned descriptions of the terms words and vocabulary, I find that the two terms reflect complementary and acceptable definitions which enable them to be used interchangeably throughout this thesis, since they both refer to the conventional symbols / units of a particular language known by language users in order to convey meaning.

As the main purpose of this thesis is to measure whether the efficiency of vocabulary learning might be enhanced through the integration of technology in the process, specifically that of smart phones, it seems reasonable to explain at this point to explain what exactly this concept of enhancing the efficiency of vocabulary learning actually means in this particular context. Thus, the following section will show core aspects of vocabulary knowledge and dimensions of it that both teachers and learners need to be aware of in order to attempt to measure vocabulary gain.

2.4   Vocabulary knowledge

A third term that needs to be defined is *vocabulary knowledge*. Understanding vocabulary knowledge and how it is developed leads to understanding how language learners "process and produce" the language (Zhang, 2011, p. 117). The term vocabulary knowledge is relatively broad and used in a number of contexts. Researchers have provided two distinct yet complementary definitions of the term vocabulary knowledge. First, vocabulary knowledge is viewed as a "range of interrelated aspects of knowledge" (Zhang, 2011, p. 118). These involve aspects of form, meaning, and use (Nation, 2001; Zhang, 2011). That is, the *form* of the word, as Nation (2001) shows, involves the spoken and the written form, and word parts that make up the word such as a prefix, root, and suffix. Acquiring the form, as he states, requires observing or noticing, and this may be by reading the same text several times. Nation (2001, 2007) explains that *meaning* concerns how the concept (meaning) and (form) work together and the image associated in the mind with this expression. Meaning, as he states, is acquired by more deliberate attention, such as use of images. Nation (2001) notes that *use* involves the grammatical functions of the word or phrase, collocations that go with it, and any limitation of its use. This can be achieved, as he shows, from implicit learning activities like repetition, and explicit learning activities following expert teaching and feedback, respectively.

 In the same vein, Sedita (2005) describes vocabulary knowledge as being a collection of all the words an individual knows including spoken and written forms that enable users to express concepts and to interact and communicate with others, as well as being able to learn new skills or understand information. Researchers propose that knowing words comprise knowledge of written and spoken forms, grammatical functions, collocations, and constraints in use (Nation, 2001, 2007). This definition provides better understanding of how well a word is mastered as several components of word knowledge are to be tested, (Zhang, 2011). Also, Nation (1987) suggests that vocabulary knowledge includes being able to recognize the word when it is heard or seen; differentiating the word from other words that are similar; and assessing whether the word sounded and looked correct. Oral vocabulary, (Sedita, 2005), is easier to acquire than written vocabulary owing to its non-verbal aspects of

communication, such as voice intonation and body language, as well as the physical surroundings in which the words are used, whereas reading plain text has none of these external indicators and thus requires decoding skills (Nation, 2001).

While form, meaning, and use are important indicators of a learner's vocabulary knowledge, they may not fully reflect the complex nature of vocabulary knowledge (Nation, 2001, Zhang, 2011). Therefore, another definition of word knowledge, offered by Laufer and Nation (1998, cited in Zhang, 2011), placed vocabulary knowledge in a continuum starting from unknown to knowing. That is, this continuum consists of several levels, "starting with superficial familiarity with the word, and ending with the ability to use the word correctly in free production" (Nation and Laufer, 2001, p. 8). Thus, as they explain, each word a learner knows is located at a certain point in the continuum.

Following the continuum perspective, Henriksen (1999) cited in Zhang (2011), proposes a number of dimensions from which to look at vocabulary knowledge that reflect the complexity and the multi-dimensional nature of word knowledge. As the main purpose of this thesis is to measure whether the efficiency of vocabulary learning might be enhanced through the integration of technology, specifically that of the smart phone, it is now necessary to offer explanations of different dimensions of vocabulary knowledge in order that teachers and learners can better attempt to measure gains.

2.4.1 Dimensions of vocabulary Knowledge

Research in vocabulary asserts the complexity and multi-faceted nature of lexical knowledge (Nation, 2001; Meara, 2006; Read, 2007; Zhang, 2011). It reinforces the position that lexical competence implies not only knowing the word but also further knowledge like the links between words and what their limitations are, and hence teaching, should be more than just encouraging language learners to memorize words (ibid).

Henriksen (1999) cited in Zhang (2011) proposes three dimensions to evaluate word knowledge. These comprise of the partial-to precise, depth / breadth dimension and the receptive / productive dimension.

2.4.1.1 Partial-to-precise and Depth / breadth dimension

The partial-to-precise dimension indicates that knowing a word is incremental and moves from unknown, partially known, to precisely known. The partial-to precise dimension, also referred to by Nation (2001) and others (Meara, 2006; Read, 2007; Zhang, 2011) as the depth of knowledge dimension, is concerned with the quality of knowing the word. That is, it could neither be simply described as knowing the superficial meaning of a word nor matching a word to a picture or to a synonym, but rather as a multi-faceted concept which refers to how much is known of a word. This embraces aspects such as pronunciation, spelling, meaning, register, frequency, collocations, morphological and syntactic traits. In contrast, the breadth dimension is defined as the number of words a person knows. In other words, it relates to the quantity of vocabulary knowledge or the size of vocabulary knowledge (Nation 2001). Researchers indicate that vocabulary size affords information about learners' ability in reading, writing, speaking, listening, and general academic performance (Laufer& Nation, 1995; Yu, 2010; Zhang, 2011).

In a study looking at vocabulary competence, Ooi and Kim Seoh (1996) focused on 110 undergraduates, who had been taught in the medium of English for several years, seeking to determine the participants' lexical competence. Twenty of the participants were native speakers, while 90 were not, and the sample was divided into the categories of 'highly proficient', 'intermediate' and 'low'. Two general interest texts were used during the experiment, each with deleted words which participants were asked to replace appropriately (i.e. a gap fill exercise). Whereas the native speakers and highly proficient learners demonstrated almost equal ability to use the original words that had been deleted, the non-native speakers, particularly in the other two groups, were unable to do so. This lack of lexical competence was stated to be a consequence of the poor knowledge of words (depth and breadth) that non-native students had learned. This debate about vocabulary knowledge as based on size (breadth) or lexical competence was also referred to by Dubin (1989), who suggested

that, after spending twelve years in the state school system, an individual knew 100,000 words of their native language (citing Nagy and Anderson, 1985) whereas an advanced level second language course book contained approximately 5000 words.

Hastrup & Henriksen (2000), Read (2004), Milton (2013), propose a slightly different definition. They view vocabulary knowledge as a network linking words together and words are stored in sets in the mind. That is, the stronger the link between one word and another, the better the word is known (deep knowledge). Thus, the networking approach explains how words associate and interact with each other, how they collocate, when the use of words is restricted according to register and context, what different meanings a word may carry, and how they function grammatically (Moghadam et al., 2012). Nation (2001) further breaks down each of these aspects into receptive and productive knowledge, which is perceived as another dimension of word knowledge.

2.4.1.2   Receptive / productive dimension

Nation (2001), Sonbull and Schmitt (2010), Zhang (2011), and Moghadam (2012) indicate that a crucial distinction when evaluating word knowledge is whether the knowledge is receptive (also called passive) or productive (also called active). Nation (2001) defines receptive knowledge as "perceiving the form of a word while listening or reading and retrieving its meaning" (p. 24-25). In other words, words that are generally recognized when heard, read or seen typically constitute a person's receptive vocabulary (Sonbull & Schmitt , 2010). These words may range from well-known words to much rarer or ambiguous ones. Productive vocabulary, on the other hand, is defined as "wanting to express a meaning through speaking or writing and retrieving and producing the appropriate spoken or written form" (Nation, 2001, p. 25). That is, they are words which can be produced within an appropriate context and match the intended meaning of the speaker. As with receptive vocabulary, however, there are many degrees at which a particular word may be considered part of an active vocabulary. Knowing how to pronounce, sign, or write a word does not necessarily mean that the word has been used to correctly or accurately reflect the intended message of the utterance, but it does reflect a minimal amount of productive knowledge. Thus, some researchers, including Laufer and Nation (2001) and Pignot-

Shahov (2012) place receptive and productive knowledge on a continuum, where receptive knowledge gradually moves towards productive mastery as a result of more learning of the vocabulary item.

Laufer (1998) argues that the process of learning a word, which is considered by some linguistic experts as involving receptive knowledge being converted to productive knowledge, does not occur purely by memorizing a word or even deliberately repeating it unless the meaning is understood and the word is used in an appropriate context. It is this distinction that differentiates productive from receptive vocabulary and accounts for the fact that passive vocabulary (or recognition) is more easily acquired than productive knowledge (or recall). Therefore, receptive vocabulary size is normally bigger than productive vocabulary.

The current study which is designed to foster depth of vocabulary knowledge by sending messages to participants containing mini-vocabulary lessons about multifaceted aspects knowledge of target words (see Appendix M) builds on this concept of breadth and depth of vocabulary knowledge. It also gives participants room to identify new word properties by encouraging them to search for further knowledge about words and exchange their findings via virtual WhatsApp chat. It also allows for identifying various features of words by meeting target words in various contexts, which in turn may enhance the quality of vocabulary gain (depth of vocabulary knowledge).

The differentiation between the productive and receptive dimensions of word knowledge is at the heart of the thesis. Learners, in the current study, receive various facets of vocabulary knowledge, after which they are encouraged to convert passive knowledge into productive knowledge. Virtual class discussions are conducted at regular intervals to negotiate meaning and recycle target words to be used in new contexts. It is hypothesized that participants who are frequently exposed to target words, recognize various aspects of vocabulary knowledge, practise different vocabulary learning strategies and are better able to convert passive knowledge into productive forms (see chat analysis in Chapter 6:

After identifying various aspects of vocabulary knowledge that learners need to acquire while building up their mental library of vocabulary so that they can function well in a given context, it seems crucial to understand which vocabulary should be learnt. This will be covered in the next section.

2.5   Vocabulary levels

Nation and Meara (2006), explain that which vocabulary to learn is susceptible to two main considerations: a learner's needs and the usefulness of the word. They indicate that the usefulness of the vocabulary item and learners' decisions to learn particular words are determined according to vocabulary levels.

 According to Nation (2001), vocabulary is divided into four levels: high frequency words; academic vocabulary; technical vocabulary; and low frequency words. High frequency words are the most frequent 2,000 words of English and they cover around 80% of the academic texts and newspapers, and about 90% of conversations and novels (Nation 2001). He indicates that all function words and content words fall under this class. Chung and Nation (2003) assert that high frequency words can be used in all language learning topics no matter what the purpose of the discourse might be.

Academic vocabulary refers to specialized words used by learners with academic goals (Nation and Coxhead, 2001). In other words, Hyland and Tse (2007) define it as words appearing in academic texts that are important to those learning a language for academic purposes, such as English for Academic Purposes (EAP) or for Special Purposes (ESP). Chung and Nation (2003) find it "a specialized extension of high frequency words." (p. 104). Academic vocabulary covers about 8.5% of academic text, 4% of newspapers and less than 2% of novels (Chung and Nation, 2003). Although this type of vocabulary is common in a wide range of academic fields, they are not general high frequency words, yet are high frequency in the academic context and academic word class is not related to just one academic area (Nation and Coxhead, 2001).

 Technical words, the third level of vocabulary, cover about 5% of the words in a particular specialized area, but chances of occurrence in other fields are very low (Nation, 2001). The fourth level of vocabulary consists of the rest of English words, low

frequency words. Chung and Nation (2003) indicate that there are thousands of these words and they typically cover around 5% of the running words in a text.

Nation and Meara (2003) suggest that high frequency words should be the main goal of both teachers and learners. This is because, as they elucidate, they appear very frequently in any text, and thus learners should take the time to ensure mastery of them, whilst in contrast, the scarce appearance of low frequency words means that these should not be a priority for learners (Nation and Meara, 2003). They add that learners should learn low frequency words after mastery of the high frequency and only in their own time in order to avoid wasting valuable class time.

Word clustering is one of the widely accepted strategies proposed by educationalists when deciding which vocabulary to introduce. A review of studies in this are reveals two types of lexical clustering: -semantic and thematic clustering. Semantic clusters, as Gholami and Khezrlou (2013) explain, concerns "groups of words that are related in their meanings" (p. 151). In other words, they are sets of words that are linguistically derived and usually have the same headword. They give example of groups of words belonging to body parts such as *eye, nose, ear, mouth,* and *chin.* Despite evidence being found in the literature that justifies the use of semantic lists, a growing body of research shows that semantic clustering may hinder rather than facilitate learning, making it more difficult as it tends to interfere with the learning of similar words (Nation, 2000; Mirjalili, 2012; Gholami and Khezrlou, 2013).

Alternatively, scholars advocate the use of thematic clustering as strategy for semantic clustering. Thematic clustering is defined as grouping words that "share a similar schema or frame. Thus, learners categorize the words as themes or schemas in their mental lexical network, which is made possible by use of previous background knowledge" (Gholami and Khezrlou, 2013, p. 156). It can to help learners to overcome the more negative effects related to the approach of semantic clustering and can aid learners to better remember the newly learned words. That is, when encountering a topic in reading or listening, the reader activates their back ground knowledge and this will have great impact on how well the words will be comprehended, learned, and remembered.

In this thesis, the choice of target words is heavily dependent on the level of word frequency. That is, in Phase one in the current study target words are selected from the high frequency word level as each unit in the participants' textbook introduces frequent words clustered thematically. This is because learners at this level (see 4.5 for more details) still need to enlarge their repertoire of high frequency words. In Phase two (Main study) where learners are English major students, word selection was made both on the grounds of frequency and theme and drew from the academic words related to their discipline (see 4.7.1.2 and Appendix L). After identifying which words to learn, it seems reasonable to know how these words should be learned, and as such the next section discusses different types of learning.

2.6   Types of vocabulary learning

Nation and Meara (2002) and Nation (2006) pinpoint four consecutive strands of vocabulary learning: learning vocabulary from meaning-focused input; learning vocabulary from meaning-focused output; deliberate vocabulary learning, and, developing fluency with vocabulary across the four skills (Nation and Meara, 2002. p. 39-43). Learning from meaning-focused input entails picking up words, incidental vocabulary learning, while listening and reading (Nation and Meara, 2002). Unlike native speakers who can benefit enormously from this type of learning, three conditions need to be met to enable learning for nonnative speakers to take place with this type of learning. First, new words should not constitute more than two percent of the text / token, which means one new word in fifty words. Second, substantial reading/listening needs to be available to a learner, about one million words per year. Third, chances of learning will be remarkably higher if more attention is paid to target words through "consciousness-raising" activities (Nation and Meara, 2002. p. 40.)

A second strand of vocabulary learning is from productive word use or meaning focused output which takes place through speaking and writing (Nation and Meara, 2002: Nation, 2006). Enforcing this type of learning is essential for learners' receptive knowledge to become productive. Thus, since learning a word is a cumulative process, learners need to be encouraged to use the new vocabulary or partly well-known words in writing and speaking activities several times to deepen the knowledge of the word.

The third aspect of vocabulary learning, which this study focuses on, is deliberate vocabulary learning (Nation and Meara, 2002; Nation, 2006). Nation (2006) says that deliberate vocabulary learning, which is encouraged by deliberate vocabulary teaching, is an important part of a vocabulary-learning program. It can result in a rapid more lasting increase of vocabulary size that can be strengthened by meaning focused input and output. Nation and Meara (2002) elucidate that deliberate vocabulary teaching can have three major objectives. First, it can aim to deliberately focus on the new words. That is, by spending enough time on new words, teachers can provide "rich instructions" to highlight various aspects of the said new words such as, spelling, pronunciation, word parts, meaning, and grammar and so on. Second, it can serve for "raising learners' consciousness" of target words so they can be "noticed" when seen again (p. 43). Macis (2011) asserts that noticing is an essential condition for learning. Noticing as a concept suggests that what learners pay attention to is going to be their intake (Macis, 2011). Third, deliberate vocabulary teaching can highlight useful learning strategies which can help learners remember vocabulary from context or identifying word parts thus enabling learners to potentially learn much more vocabulary (Nation and Meara, 2002).

The fourth aspect of vocabulary learning is developing fluency with vocabulary (Nation and Meara, 2002). To know a word is important, but what is equally important is to be able to use the word fluently and correctly in an appropriate context, which they call automaticity. Therefore, researchers stress the necessity of designing fluency development activities that increase the automaticity of using the newly learned words (ibid) with the use the target vocabulary in listening, speaking, reading, or writing activities and tasks (Nation and Meara, 2002). There are two main methods to develop fluency: firstly, by repetition, which is considered a direct way to obtain fluency, and secondly, by the making of many connections and associations with other already known words. The former approach, called "the well-beaten path approach", involves engaging learners in repetitive rehearsal of the same material in order to gain fluency, while the latter path, called "the richness approach" entails manipulating the newly learned word(s) in differing contexts (Nation and Chung, 2002).

To conclude this section, it can be said that learning words across all vocabulary learning strands is essential in a well-balanced vocabulary-learning program. As can be seen,   deliberate vocabulary teaching is only one of the vocabulary learning strands. Therefore, the amount of time spent on this should be "balanced against the other three strands of meaning-focused input, meaning-focused output, and fluency development" (Nation, 2006). This is because deliberate learning alone does not provide a rich context to enable learners to acquire knowledge about grammar, collocation, association, reference, and constraints on use that can be best acquired through encountering the words in context (Nation and Meara, 2002).

Table 2 shows how time should be allocated to the different strands of vocabulary learning according to Nation (2007).

Table 2: Opportunities for learning language   (Nation 2007)

Meaning-focused input
Meaning-focused output
Language-focused learning Pronunciation **Vocabulary**   strategy development intensive reading word card learning **vocabulary teaching** Grammar Discourse
Fluency development

However, Nation's view of vocabulary teaching is not supported by exhaustive empirical evidence. Other researchers including Elgort (2011), Hulstjin (2001), and Sonbull & Schmitt (2010) disagree with Nation's view, and assert that learning new vocabulary should not depend heavily on deliberate vocabulary teaching. They argue that although the balanced approach among these learning strands can be beneficial to native speakers, second language learners need to spend more effort focusing on overtly negotiating vocabulary meaning to achieve better learning outcomes than simply learning words as a consequence of another activity. Their findings demonstrate that while learning can take place to some degree when there is little or no structure and

guidance, it is enhanced when these factors are added In conclusion, although Sonbull and Schmitt (2010) concur with Nation (2001; 2006; 2007) on the point that that a more balanced combination of deliberate and implicit learning is preferable to enrich vocabulary knowledge, they do stress the importance of paying more explicit attention to vocabulary when teaching second language learners.

As such, this thesis generally adopts a similar view of the aforementioned studies by stressing the role of deliberate teaching to foster foreign language learning, yet presumes that informal vocabulary instruction is both the teacher's and students' responsibility outside the classroom. That is, vocabulary lessons utilized in the current experiment deliberately teach words combined with vocabulary learning strategies exhibiting various aspects of vocabulary knowledge, including definitions, L1 meaning, synonyms, antonyms and pronunciation (see 4.7.1.1 and Appendix M for more details).

To facilitate the task of vocabulary learning to students and to reduce the "learning burden" of a new word, learners should learn to adopt essential vocabulary learning strategies for better learning outcome (Nation, 2000). Nation describes a learning burden as "the amount of effort "learners exert while learning new words (p. 23). The notion of vocabulary learning strategies and their emergence is discussed in the section below.

2.7   Vocabulary learning strategies

Schmitt (2000) notes that vocabulary learning strategies form a sub-class of language learning strategies. Researchers have recognized that the relationship between both vocabulary learning and language learning strategies should not be overlooked (Schmitt, 2000). Indeed, this area is becoming increasingly researched, with it having being largely neglected previously due to most past research focusing on language learning as a whole(Nation, 2007).

Researchers have identified certain actions or mechanisms that need to be acquired as learners‐ attempt to consciously learn second language vocabulary (Schmitt, 2008; Hedge, 2000; Oxford, 1990; Sokmen, 1997). These actions, which are also referred to as techniques, approaches, or conscious actions are named Language Learning

Strategies LLSs (ibid). Language learning strategies are defined differently according to the perspectives of various scholars. Ellis (1994), for example suggests that learning strategies are "the behaviours or actions that learners engage in, in order to learn or use the L2. They are generally considered to be conscious or, at least potentially conscious." (p.712). Rubin (1987) further explains that learning strategies have a direct impact on learning and can improve independent learning if learners are taught to use these strategies outside the classroom.

Concurring to Schmitt (2008), Hedge (2000), Oxford (1990), and Sokmen (1997), the current study uses the term vocabulary learning strategies to refer to techniques or tools consciously employed by learners to facilitate this process. Throughout the investigation, the given vocabulary lessons actively encouraged strategic learning in that they supported some of these strategies as they were introduced indirectly while discussing target words. Learners practised using them while solving vocabulary learning problems and negotiating meaning, hoping to build confidence and to be able to consequently learn vocabulary independently in the future.

When considering strategy training, it is important to consider which strategies to focus on. The following sub-section presents several key taxonomies of vocabulary learning strategies identified in the literature.

2.7.1 Taxonomies of vocabulary learning strategies

Hedge (2000), Oxford (1990) and Sokmen (1997) illustrate how to use various techniques to learn vocabulary that might promote retention. Sokmen (1997), Chin (1999) favour Nation's "mixed approach" which believes that employing a combination of strategies is more useful than using only one. Holden (1999) further justifies this by indicating that it is important for teachers to present a number of strategies for learners to choose from, since not all will respond to learning materials in the same way given possible differences in learning style. Brown and Perry (1991) offer a further justification for using a mixed approach by noting that words are "stored in associative networks" that can be strengthened by using multiple strategies (cited in Tassana-ngam, 2004. p. 100).

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Schmitt (1997, pp. 207-208) and Nation (2001, p. 218) have respectively developed two well-used vocabulary learning strategy taxonomies. These taxonomies comprise a combination of strategies believed to promote vocabulary learning. Schmitt's (1997) taxonomy is based on Oxford's (1990) notion of a language learning strategy taxonomy, in which there are concrete examples of many vocabulary learning strategies. Schmitt grouped fifty-eight of these into two main groups: Discovery Strategies and Consolidation Strategies. The first group involves ways to seek primary information about new words, such as identifying word parts, while the second group is used to help learners to memorize words when taught or encountered, such as generative use of words (Schmitt, 1997).

The fifty-eight strategies were again classified into a further five groups including: Social, Memory, Cognitive, Metacognitive, and Determination strategies (ibid). Social strategies refer to those that are used for interaction with other people to improve language learning, such as discovering new meaning through group work activities. Memory strategies are those that relate new material to existing knowledge, for example using a semantic map. Cognitive strategies manipulate or transform the target language, i.e., word lists, whereas metacognitive strategies are a conscious overview of the learning process allowing for decisions to be made about planning, monitoring, or evaluating the best ways to study, or example, using English language media (songs, movies, or newscast). Finally, Schmitt argues that determination strategies are those that discover a meaning to a new without resource to external expertise e.g., analyzing a part of speech.

 The classification of some of the above selected strategies can at times be unclear. Schmitt (1997) notes that there is no definite line can be drawn between different strategies in the various categories. For example, analyzing word parts could be considered as both determination strategies as well as memory strategies. Therefore, it seems reasonable to dedicate suitable time to train students to master how best to divide words into their component parts in order to support memory functions.

The second important vocabulary learning strategy taxonomy has been developed by Nation (2001), in which he pinpoints eleven vocabulary learning strategies. This particular taxonomy has been frequently used, and seems practical for use by both

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teachers and students; it reduces complexity by not giving an exhaustive list of strategies in the model, unlike Schmitt (see above). Placing strategies in a limited number of broad categories could ease the pedagogical burden for teachers and learners as they can be potentially internalized and utilized effectively. Nation (2001) places vocabulary learning strategies into three categories: Planning, Sources, and Processes. Each of these includes a number of strategies. For example, planning involves four sub-strategies: choosing words, choosing the aspects of vocabulary knowledge, choosing strategies, and planning repetition. Sources also include four types of classes; analyzing the word, using context, consulting a reference in L1 or L2, and using parallels in L1 or L2. Processes comprise three strategies: noticing, retrieving, and generating.

Nation (2001) elucidates the notions under each vocabulary learning strategy category. That is, Planning, involves students needing to identify vocabulary aims and then to indicate the target words needed to learn. Accordingly, they should specify facets of word knowledge that needed in order to accomplish various language tasks across all language skills (reading, writing etc.). That is, learners need to know more than the meaning of the word to use it correctly in the different skills areas. Next, learners should also identify which strategy to apply; which one to use first and which can be used later. Finally, learners should plan for useful revision for words, once learned.

The second sets of strategies under the umbrella of Sources are, according to Nation (2001), analyzing word parts, using context, consulting a reference source, and using parallels with other language'. These strategies are concerned with finding information about words. The first two strategies are likely to enable learners to guess the meaning of unknown words and help memorize them. Consulting a reference source refers to living references such as teachers, classmates, native speakers, or to non-living references as dictionaries, glossaries and thesaurus. The last strategy draws on the idea that learners might learn L2 by comparing the target language with their native one.

The last category of strategies, Processes, contains three subclasses: noticing, retrieving, and creating (Nation, 2001). Noticing strategy is about recording new words in a notebook, on word cards, or on a list. Nation (2001) stresses that noticing strategy

also comprises of the repetition of words, both aloud and silently. This is classified as one of the cognitive strategies in Schmitt's (1997) taxonomy, as through repetition, learners are expected to execute an effort to recall the words.

Retrieving strategies are those that are concerned with recalling previously introduced words (Nation, 2001). Such recall requires certain cues such as receptive/productive cues. That is, learners should notice receptive cues in written or spoken forms in order to be able to recall the meaning or the use of the word. Similarly, learners need to make use of productive cues like meaning or use to remember the written or the spoken forms. Additionally, learners can use oral or visual cues to help them remember words and Nation (2001) argues that the more learners read the target words silently or out loud from their notebook, the more likely the retrieval of information. Finally, Generating Strategies means associating new knowledge of words with old knowledge to reinforce learners' memorization processes. Generating, as Nation (2001) suggests, includes using a new word in a new context and making sentences with it.

In comparing both Schmitt and Nation taxonomies, I draw on Schmitt's vocabulary learning strategies taxonomy as it better serves the purpose of this study as it gives concrete descriptions of vocabulary learning strategies under each category. That is, the study uses a number of strategies from both of the broad categories, discovery and consolidation, which are under the sub categories: determination, social, cognitive and metacognitive strategies. From determination strategies, the analysis of parts of speech, analyzing word parts, and guessing from context are chosen aspects from social strategies, with group negotiation of meaning and discussing meaning being core to ~~of~~ this study. From cognitive strategies, the identification of collocations is used, and from metacognitive strategies the focus is on English language used in the media (see Table 6).

Below is a description of the use of vocabulary learning strategies this study.

2.7.2 Strategy selection and use in traditional and online environments

Following Schmitt's (1997) Taxonomy, this section selects and discusses vocabulary learning strategies as used in this study. These include social strategies, cognitive strategies, repetition, analysing word parts, recognizing collocations, identifying affixes, and guessing meaning from context.

A great emphasis here is given to social strategies, which are the main purpose behind employing mobile phone technology to support authentic cooperative learning activities (Keogh, 2017). Strategies under this category include using negotiation of meaning strategies while cooperating with peers to make meaning, and becoming aware of the thoughts and feelings of others (see 2.7.1 and 2.7.3). Students-student and teacher-student interaction are emphasized by Schmitt as an important determination in which students can learn cooperatively to intensify their learning. Within group discussion, cognitive conflict leads to higher order thinking skills and higher levels of reasoning, Piaget (1932, cited in Webb, 2009), and thus leads to better knowledge retention (Horder, 2010). That is, when conflicts arise in terms of differing views or opinions among group members, questioning and negotiation will lead to learning. On similar grounds, in Vygotsky's Zone of Proximal Development (ZPD) (1978, cited in Webb, 2009), learning is more likely to occur in a social group when an expert adult - a teacher or a more capable language learner – helps less expert ones by guiding the discussion and helps them to understand difficult concepts and corrects their misunderstandings. Learners also benefit from sharing their backgrounds and supporting one another's weaknesses (Payne & Monk-Turner, 2006; Wichadee, 2007; Badache, 2011), (see 8.5.1).

Cognitive strategies are obviously important in most learning contexts and are more directly related to individual learning tasks that entail direct manipulation or transformation of the learning materials (Brown & Palincsar, 1982). Strategies under this category include formally practising with sounds and writing systems, recognizing patterns, analysing expressions, translating, taking notes, and summarizing. What is more, planned repetition is one of the strategies under this category. Hulstijn (2001) asserts that "lexical information simply must be reactivated regularly" to enhance memory retention and also to ensure automatic access in real-time communication (p.

286). Besides, repetition is essential because vocabulary learning is cumulative and one encounter with a vocabulary item is insufficient to understand the multifaceted nature of word knowledge such as syntactic, pragmatic, phonological, derivational, morphological aspects, (Nation 2001). Thus, research from psycholinguistics and cognitive psychology reports on the enhanced effectiveness of distributed repetition. That is the reviewing of vocabulary over different time periods, compared to that of constant intensive repetition in a single setting. This is a concept that this is emphasized by the spacing effect hypothesis (Bloom and Shuell 1981; Bahrick and Phelps 1987; Dempster 1987; Gathercole and Baddeley, 1990).

In addition, since most forgetting occurs soon after initial learning, first reviews should occur very early, with multiple reviews along longer intervals as the item will thus be is better rooted in memory (Schmitt, 2000). In other words, since vocabulary learning is mainly a memory task, the threat of forgetting should not be underestimated meaning that learners will need help in adopting planned essential repetition of the vocabulary to be learnt (Schmitt, 2000). During the current study, planned repetition of target words is considered (see 4.7.1.1). Target words are practiced and revised regularly, at least twice at different intervals, sometimes on the same day, and at other times one or two days or even a week later.

In this sense, Nation (2001) gives the example of a schedule of five three-minute review sessions spread over a period of ten days resulting in much better retention than a single fifteen-minute review session (p. 76). Gathercole and Baddeley (1990) postulates the cause of this phenomenon may be that time is required for certain neurochemicals in the brain to regenerate, although further research is necessary to verify this (1990). Self-testing of items can be used to determine the length of time between repetitions; intervals should be longer after easy retrievals and shorter after difficult or incorrect attempts (Schmitt, 2000; Nation, 2001).

Analyzing word parts, according to Schmitt (1997) could be seen as a discovery strategy, a determination as well as a memory strategy. Biemiller (2001) indicates that the upper elementary grade is a suitable time to start teaching how to use word parts (prefixes, roots, and suffixes) in order to help learners identify words meanings, arguing that the analysis of word part strategies are useful as they it allows students to

learn and remember new words. Nation (2001) adds that teaching how to break words into prefixes, roots, and suffixes will facilitate the learning of longer words for those who may feel inhibited by such items. According to Nation (2001) training in how to separate words into their component parts is necessary, a point he exemplifies by arguing that teachers should demonstrate how different parts of words function and the effect of these on meaning. Further practice in adding and removing these parts will help students to become more skillful in this separation of the different components. The use of this strategy of learning about different word parts will provide students with more tools for vocabulary growth, however it will be more effective if it is combined with other word learning strategies such as guessing from context.

In addition, following the ideas of Schmitt (1997), recognizing collocations, is a consolidating strategy. Macis (2011) argues that language is "not broken into individual traditional grammar and vocabulary, but is often made up of multi-word prefabricated chunks" (p. 352). These chunks include collocation, fixed expressions, and idioms (Junying & Xuefei, 2007). Collocations are, as defined by many researchers including Macis (2011), "the tendency of one or more words to co-occur frequently with other words (p. 352). This combination is "not determined by logic or frequency, but is arbitrary, decided only by linguistic convention" (p. 353). Macis (2011) explains that native speaker fluency could be attributed to the fact that they store vocabulary as larger chunks which can be reclaimed from memory once needed as a whole unit. Therefore, it is essential to train second language learners to pay attention to new words in the surrounding environment (Macis, 2011). In training, teachers will help students to identify collocations, to then organize, record, and use them in their expressions (Macis, 2011).

Guessing meaning from context is a strategy for discovering the meaning of new words (Schmitt 1997). Nation and Meara (2002) assert that guessing the meaning of a new word from contextual clues is the most useful strategy for meaning discovery. Researchers including Nation (2001), Nation and Meara (2002), and Webb (2008) emphasize that learners should see new words in context and consider how their meaning relate to other words around them. That is, as they demonstrate, providing

several sentences in which a target word is used differently can demonstrate how the meaning of a word can be manipulated and shifted to serve the overall meaning of the given sentence. For guessing from context to be efficient, Nation (2001) asserts that 95% of the words of a text have to be known by a reader. Nation (2001) indicates that though native speakers may learn up to 10 % of unknown words using this strategy, second language learners need to compliment it with more direct learning of the same word to enrich their experience with the target word (Nation, 2001). Therefore, training learners to guess from context will result in improving successful guessing (Nation, 2001). Training should focus on "linguistic clues" in the immediate context of the unknown word, clues from the wider context including conjunction, relationships, and common sense and background knowledge (Nation and Meara 2002, p.45).

The next section identifies and discusses the negotiation of meaning strategies as the heart of social learning and mobile phone learning.

2.7.3   Negotiation of meaning strategies

Prior to identifying the negotiation of meaning strategies which are the focus of the analysis of the quality of WhatsApp text chat, it seems appropriate to discuss the theories they rely on. Negotiation of meaning is founded on Krashen's (1981, 1982, 1985) hypothesis which stated that knowledge of a second language is acquired through exposure to comprehensible input (Swain 1997). In other words, this input must be, according to Krashen, only a little beyond the learner's present L2 level (i+1), in order to be likely understood and acquired. According to Foster and Ohta (2005) the comprehensible input can be obtained through "interactional adjustment" which is the interlocutor's attempts to overcome difficulties of understanding so that incomprehensible or partly comprehensible input becomes fully comprehensible through negotiating meaning (P. 405).

 Swain (1997) affirmed that negotiation is more than a source of comprehensible input, but also pushes learners to produce output. She elucidated that output is important as it serves language learning in many ways. First, it forces learners to exert more mental effort to process language, which is proved to have a more positive

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causal influence on learning (see 2.9.4 and 8.5.1), than input does. Second, output in the form of speaking or writing could expand learners' interlanguage in order to meet the communicative goal. Consequently, learners' generated production can help with the discovery of what they can and cannot do. Moreover, not only can output enhance learners' fluency as it allows for language practicing, but it can also stimulate learners to improve accuracy in that it facilitates noticing, hypothesis testing, and reflection. These characteristics of output provide additional value and justification for the use of the negotiation of meaning in this study.

Online chat-text (written interaction) which has a strong connection with oral conversation requires the use of almost a similar set of negotiation of meaning strategies while discussing meaning (Jeapson, 2005; Cook, 2015 and see 4.8.3.1.3 for further justification of using the negotiation of meaning strategies in this study).

Therefore, a number of negotiation of meaning strategies of oral discourse, identified in the relevant literature, were prevalent in participants' WhatsApp text chat in this study. In an attempt to classify these strategies and to organize the data for the data analysis chapter accordingly (see Chapter 6:), these strategies were organized into three broad categories corresponding to information from the literature: Modification, comprehension check, and feedback (Oh, 2001). Then, additional emergent (new) negotiation techniques were incorporated that were used by the participants to accommodate the nature of the WhatsApp environment (see Table 18 below).

Modification is an essential negotiation strategy learners employ to understand input. Oh (2001) looks at two types of modifications, those of simplifications and elaboration. She argues that simplified input show features such as more basic level vocabulary and syntax, shorter utterances, or deletion of morphological inflections. On the other hand, elaboration tends to clarify the input by giving learners more opportunities for interpretation by exhibiting features like slower speech, clearer articulations, explanation, paraphrase, or stress (Oh, 2001). Despite simplification being essential for comprehensibility of written input, it does have some disadvantages. One of these is that although simplified input helps learners to improve comprehension skills, it eliminates unfamiliar linguistic items which are important for L2 development.

Therefore, Oh (2001) prioritized elaboration strategies as it gives learners the opportunities to manipulate with language and create new linguistic forms to achieve comprehension.

Comprehension difficulty is another broad negotiation of meaning strategy that can demonstrate how learners deal with communicational breakdowns. Oliver (1995) and Cook (2015) indicate that there are signals of comprehension difficulty, including requests for clarification, confirmation and comprehension checks, plus repetition. Clarification requests are when one speaker has difficulty in understanding and asks for assistance to clarify the speaker's utterance by asking questions, such as "What does it mean?" or imperatives such as "Please repeat"(Pica, 1987; Oh, 2001; Jeapson, 2005; Kawaguchi, 2015; Castrillo, 2014; Cook, 2015). Clarification requests in particular push speakers to produce modified and more accurate output in terms of tense and syntax (Pica, 1987; Oh, 2001; Jeapson, 2005; Kawaguchi, 2015; Castrillo, 2014; Cook, 2015).

Confirmation checks refers to when a listener seeks confirmation of their own understanding of the other preceding interlocutor utterance through repetition, with rising intonation, or a question "Do you mean….?. Comprehension checks are utterances used to check whether an interlocutor has understood. For example, "Do you understand?" is an expression used to know whether an interlocutor has understood (Oh, 2001).

Corrective feedback resulting from negotiation of meaning strategies is essential for second language acquisition (Castrillo, et. al, 2014; Kawaguchi, 2015; Bower, 2012). Ccorrective feedback provides opportunities for language learners to pay attention to specific linguistic forms and in turn may lead to incidental, implicit language learning, which is proved to be effective in increasing communicative competence (Bower, 2012). Exchanging explicit and implicit feedback among WhatsApp group members was a prevalent characteristic of WhatsApp chat in the current study such as requesting feedback, giving feedback, and recognizing feedback, self-correction, and recast (see 6.2.3.1).

In this study, emoticons use was an online strategy incorporated to all types of negotiation of meaning strategies as participants use them as a paralinguistic technique to negotiate meaning (seeTable 8).

The following section discusses the benefits of allocating some of class time for vocabulary training.

2.7.4 Strategy training

The outcome of a number of research studies on vocabulary learning strategies has implications for teaching. For example, researchers call for vocabulary learning strategy training to facilitate the task of vocabulary learning for students, which will in turn reduce the "learning burden" of a new word (Nation, 2000). Nation (2000) describes a learning burden as "the amount of effort "learners exert while learning new words (p. 23). Thus, in order to minimize the learning burden, learners should be trained to utilize essential vocabulary learning strategies to facilitate this task and to obtain better learning outcomes (Nation, 2000). In addition, Rasekh and Ranjbary (2003) assert that making learners aware of the different strategies available to them will accelerate the learning process. That is, strategy training is said to enable learners to select appropriate strategies that will help them in three ways (Chamot , 1999; Chamot & O'Malley, 1994; Rasekh & Ranjbary, 2003):

1. It can help them to become more effective learners,

2. It can help them to become more independent learners,

3. It can help them to become more motivated as learners will come to realize the relation between their use of strategies and how these facilitate them in being better language learners.

To ratify this premise in the area of vocabulary learning, research shows that vocabulary instruction itself is important for vocabulary learning to actually occur, as learners cannot learn significant amounts of it incidentally just through reading, listening, speaking, and writing. As such, there is a real need to be taught vocabulary

learning strategies that can consequently act as guidelines to promote more individual lexical learning (Ellis, 1994; Rasekh & Ranjbary, 2003).

Researchers describe two approaches in teaching vocabulary strategies (O'Malley &Chamot, 1990; Rasekh & Ranjbary, 2003). There is the direct learning approach in which learners are instructed overtly about the value and the purpose of such strategies, or the embedded approach, which refers to learning strategies that are "embedded in the task materials but not explicitly defined to the learners as strategy instruction" (O'Malley & Chamot, 1990, p. 230). However, embedded strategy instructions have been criticized in that learners cannot transfer the covert strategies to future vocabulary learning tasks beyond a given class (Wenden, 1986).

The next section explains which words language teachers need to consider when planning to teach vocabulary.

2.8   Vocabulary choice

One of the most important questions that need to be asked before vocabulary instruction is what words to teach. Although word choice is mostly determined by course books or syllabus designers, there are too many unknown words in textbooks used in schools / universities to all are taught (Nagy and Hiebert, 2011). This gap between the number of unknown words in textbooks and the number of words that can be taught is increased by such factors as intensive time needed for quality vocabulary teaching and the differences of existing vocabulary size amongst students (ibid). Therefore, teachers (and researchers) should make informed decisions when selecting words for teaching to avoid difficulties in evaluating the materials, to understand why particular words must be taught, and to explain to students why they should learn these words.

Experts working on vocabulary identify a number of features that affect vocabulary selection, including frequency, range, availability, learnability, and learner needs (White, 1989; Richards, 2001; McCarthy, 1990; Sainclair and Renouf, 1991). Wallace (1988) explains that determining word frequency can be established by counting it in a large number of texts and is one of the most basic methods giving information about

effective word selection. That is, it seems sensible to teach words that are mostly encountered before the more uncommon ones, as learners use them recurrently in versatile situations when using the target language.

Nagy and Hiebert (2011) view frequency as a continuum ranging from highly frequent words, occurring mostly in all texts, to low frequency words which are more morphologically complex. High frequency words include articles, conjunctions, prepositions, and pronouns, while low frequency words are more morphologically complex such as nouns specific to particular field and mostly have only one meaning (Nation, 2011). However, Schmitt (2000) suggests that determining the frequency of lexical items is more complicated than it initially appears and it is unlikely for course book designers to adhere solely to it. This could be because the most frequent words are not necessarily the most useful ones for learners (ibid). He suggests, rather than relying on common sense, vocabulary instruction should be organized on a subject/topic basis so that learners can acquire the most useful words in that area. However, in the eighties researchers countered the emphasis on frequency as a basis for vocabulary selection due to its inherent limitations (Nagy and Hiebert, 2011). That is, frequency might contradict with other word properties like "conceptual difficulty of familiarity" (p. 390). For example, as they show, some words are very frequent in print but they are difficult to learn and define (e.g., the), while other words are unusual in texts but not necessarily difficult to learn (e.g., t-shirt). Nagy and Hiebert (2011) suggest that vocabulary instruction should be organised by selecting frequent words in subject area/topics rather than relying on common sense.

Range is a second word feature, according to Richards (2001), that is complementary to frequency and that informs decisions in word selection. Unlike the property of word frequency which entails counting occurrences in one specific subject area or text, words of high range are those which are encountered across a wide variety of domains, and in turn are important to teach due to their utility (Nagy and Hiebert, 2011). Therefore, the most useful words for learners are those that are frequently found in a variety of texts, as learners are also likely to encounter them in other subjects (ibid). However, although Nagy and Hiebert (2011) consider range as one of the factors- among- many that should be considered when selecting words for

teaching, they argue that some words with low range are also important to teach, despite their restricted use as they are essential in specific spheres. They conclude that teachers need to select words with the most useful range depending on experience or a dictionary, which is already commonly implemented in the design of well-respected course books.

Availability is another principle that informs researcher choices for selecting suitable vocabulary for teaching. Wallace (1988), White (1989), and Richards (2001) define it as the learner's readiness to remember and use the word. Wallace (1988) adds that availability describes words that are relevant to particular situations in which learners finds themselves in or which are found in the learners' physical contexts. For example, in a classroom learners need to understand the vocabulary for objects like blackboard or chalk - although they are low frequency and low range items. In addition, Grains and Redman (1989) explain that another area that should be explained to language learners is the instructional language used to initiate, manage and accomplish language activities. They suggest designing activities that contain many of these words to accelerate understanding and to minimise confusion in learners.

Furthermore, the teacher's decision to either teach a word or postpone it may be heavily based on word learnability (McCarthy, 1990; White, 1989; Richards, 2001), and McCarthy (1990) says that the level of difficulty of a word dominates its frequency and range. White (1989) and Richards (2001) identify a number of factors to determine learnability, which include similarity of L2 word to L1, word teachabiliy, brevity, regularity of forms, learning load, opportunism, and interest. That is, similarity between L2 words and L1 equivalents promotes chances for learning and remembering. Additionally, teachable words are those which are easy to demonstrate and to define and should be taught earlier than others as learners can learn them without too much effort. For example, pictures can more easily illustrate concrete words than abstract ones.

In addition, White (1989) and Richards (2001) demonstrate that brevity and regularity of forms are a further two features that impact word learnability. Thus, shorter words are easy easier to learn than longer ones and verbs with regular inflections are more

easily mastered. Finally, they ~~show~~ demonstrate that learners' motivation relates to ~~their~~ interests or needs to learn the words suggested by the teacher or course book and this should be considered due to the potential impact on motivation levels in learners. However, teachers could be challenged when their choices contradict with individual learners 'choices (Richards, 2001). To overcome this, a teacher might allow students to select words they want to learn and encourage them to search for knowledge about desired words along with the conventional vocabulary work in a course book, which permits learners to realize their needs and promote their ability to search for knowledge in a productive way (ibid). Other issues affecting learnability are words with spelling or pronunciation difficulties, words with difficult syntactic properties and those that are very close in meaning and difficult to distinguish in use (e.g., make/do).

Conforming to literature about vocabulary choice and which words to include, the word choices for this investigation was on a topic basis to help learners to acquire the most useful words in the topic under study. These words are used while they practise other language skills activities like speaking, listening, or writing in the classroom-based language course. They are a mixture of short and long words and with regular and irregular forms to help assess whether this new medium could enhance learnability (see Appendix L.2).

The next section examines factors supporting memory functions.

2.9   Memory and cognition theories supporting vocabulary retention

The following subsections discuss some theories that could have an impact on memory functions.

2.9.1   Cognitive load

The above sections have attempted to explain the differences surrounding vocabulary knowledge and the approaches undertaken in its teaching in this thesis based on the findings of other researchers. However, vocabulary knowledge may be limited by cognitive load. In simple terms, cognitive load is a phrase that refers to the working

memory having a limited learning capacity which, if overloaded, will inhibit learning (Sweller, 1994, 2005). The human memory is described by de Jong (2010) as consisting of two major aspects, with those being long-term memory, which can store large quantities of information, and short-term memory, or working memory, which is only able to retain small amounts of information. Short-term memory has two parts consisting of one part that retains video-spatial information such as text and graphics, and the other part which retains phonological information in the form of narratives (Baddeley & Hitch, 1974 cited in de Jong, 2010).

Three elements are attributed to cognitive load: intrinsic, extraneous and germane (Merrienboer et al., 2004). The intrinsic load concerns the content of the information to be learnt, whereas the extraneous load is a consequence of the manner in which the content is presented, and is therefore dependent on the material form this takes. The germane load is that inflicted by the actual learning process and the use of learners' working memory resources to deal with intrinsic cognitive load (de Jong, 2010). These three elements are additive; if the three elements exceed the memory load the short term memory can accommodate, cognitive overload will occur and learning will be considerably lessened or may not take place (Pass et al., 2004). However, the focus of cognitive load research is to decrease the levels of extraneous cognitive load, which can be adjusted by various instructional designs (Pass et al., 2004).

Also, the size of the load will vary according to the context of the learner, for instance a learner in the early stages of learning a language, termed a 'novice', is likely to have a much higher level of germane load than an expert learner. Hence, the type of information that a novice might receive in learning materials could impede progress. On the other hand, if an expert learner receives learning materials with too low a cognitive load, learning is also impeded (Pass et al. 2004).

As a result of what previous researchers have found with respect to cognitive load, it needs to be carefully considered within the realm of this thesis. This is because my study examines vocabulary knowledge through multiple means, including throughout the use of multimedia. Because the cognitive load imposed on learners may positively

or negatively influence their learning, Mayer and Moreno (2003) propose important principles for designing multimedia instructional materials, two of which are related to this study. One is the modality effect, which states that when identical learning information is presented via dual modalities, visual and auditory, the capacity of humans' working memory is increased, and the cognitive load is reduced. The other principle is the temporal contiguity effect, indicating that when instructional materials in dual modalities are presented simultaneously, the cognitive load imposed on learners may be decreased. As such, the effects caused by cognitive load, especially in relation to the principles outlined by Mayer and Moreno (2003) have been carefully considered in the creation of this study (see 4.7.1.1)

2.9.2 Dual coding theory

The dual-coding theory presented by Allan Paivio (1986) was the first measurement on the effects of imagery on learning (Wang and Shen, 2011). The dual coding theory, which uses imagery as a memory aid, is founded on the premise that the cognitive system is based on two quite separate subsystems: one processes verbal language and audio, and the other one processes nonverbal objects or imageries. Wang and Shen, (2011) explain:

> A given task may require one or both kinds of mental processing, and the interconnectedness of these cognitive systems facilitates a better interpretation of the overall environment. Human cognition is unique. It accommodates linguistic input and output such as speech or writing, while simultaneously manages nonverbal objects, events and behaviours.

These verbal and nonverbal signals have a deep influence on memory, recall and cognition and, together, can improve learning (Piavo, 2006).

In language learning these two systems (verbal and image) are said to co-operate to different degrees depending on the language learning task (Paivo, 2006). It is suggested that learning outcomes are enhanced when more than one of the senses is employed, for instance, simultaneously seeing and hearing, so that more connections are made (Chen et al. 2008). The interconnection between the two sub-systems may occur by one system indirectly stimulating activity in the other, but the two

subsystems are thought to have different ways of processing the verbal and non-verbal items. For instance, the word 'bird' might stimulate the image of a bird, and when the individual has to recall that stimulus it could be via the word or the image (Sternberg, 2003).

Dual coding could be also applied to vocabulary learning. That is, it is suggested that concrete and abstract words undergo different processing, with concrete words employing both systems while abstract words only employ the verbal system (Mayer & Sims, 1994). An example was given by Paivo (2006) to explain this concept, for instance the 'white horse' is concrete whereas 'basic truth' is abstract because the concrete word has an image associated with it, whereas the abstract does not, making it more difficult to recall. Hence, the use of the two subsystems, verbal code and non-verbal code, in the case of concrete words provide a greater capability of the learner to remember concrete words. This is extended to other senses collaborating in word recall, such as smell, or scent, studies by Lewin et al (2010).

 Nation (2001) conceives a continuum of words that cannot simply be divided into concrete and abstract, but that include various combinations that are inferred by the context in which they are used. Concreteness may not only refer to short words, but to longer phrases, sentences and long passages. Despite some division, Paivio (2006) appears to support the notion that combinations of words can be concrete, and suggested that this aspect could double the memory recall. However, he argues that the effect of concreteness was also crucial in associating words more powerfully, since learners could recall the word by seeing a picture or hearing the word, reinforcing the idea of the "additive effect" of the verbal and non-verbal sub systems working collaboratively.

The Dual Coding theory is not universally supported, however. Critics of the theory suggest that there is insufficient research evidence to suggest that only words and pictures enable human memory of items, and that many of the studies that have been used to reinforce the validity of the theory have required participants to concentrate on the manner in which items are interlinked with each other (Reed, 2012). In addition, there is sufficient medical evidence to support the idea of the two coding stimuli, since electro-physiological imaging and blood flow measures have strongly

suggested that visual imagery and perception occur in distinct parts of the brain (Reed, 2012).

In case of mobile learning, Wang and Shen (2012) assert that Dual coding conditions exist in m-Learning, and therefore, the modes of information that learners receive should be taken into consideration. They elucidate that some content is better transmitted with images, text, or audios presentations, while other content is most effectively conveyed through combining multiple modes of multimedia display. They reported the findings of another study conducted by Teng, Bonk, Bonk, Lin and Michko (2009) about learners' attitudes towards using multimedia content in classroom instructions. It shows that participants found the videos combined with text, pictures and voicing are more engaging and creative than the text-only content, which were perceived as informative but boring.

This study adopts the idea that the development of mobile phone technology introduces new learning multimedia that could accelerate a change of learning concepts when combined with earlier theories and paradigms, which could consequently provide new modes of interactive learning. Accordingly, it makes use of the mobile phone/ WhatsApp multimodality affordances in learning vocabulary abiding to the Dual coding hypothesis (see 3.3.1.6 and 4.7.1).

2.9.3   Spacing effect

Another aspect of vocabulary learning relates to the retention of words over a longer period of time. Generally, information, in the practical sense, is stored in short-term and/or long-term memory. Nairne (2002) explains that short-term (working) memory is a term given to temporary recall, in which learning for a small amount of information (around 7 items or even less) can be accessible instantaneously, but lost automatically very quickly 10 or 15 seconds.

However, information can be retained and recalled whenever needed when a 'conscious' effort is made to do so. Therefore, transferring information from short-term memory to long-term memory is a necessary step toward retention. Transferring information to long-term memory for more permanent storage can be enhanced by

mental repetition of the information or technically referred to as 'rehearsal', even more effectively, by associating it with other previously acquired knowledge (Nation & Meara 2002).

While various processes have been suggested by researchers relating to the scheduling of vocabulary lessons which maximize retention, generally researchers tend to agree that vocabulary learning needs to occur over a period of time in order for vocabulary retention to occur (e.g. Nation & Meara 2002; Pavlik & Anderson 2003). These researchers assert that in order to memorize vocabulary and to retain it on a long term basis, the individual should have a number of lessons that are well-spaced out in time, rather than concentrated, multiple sessions known as cramming; this fact is the basis of the vocabulary learning model known as the "spacing effect."

A quantitative review of the literature on spacing effect or distributive practice, conducted by Cepeda et al. (2006), revealed that delivering vocabulary lessons to individuals regularly over a series of days, instead of intensive learning at one session, led to better retention levels. However, if the space between sessions, known as the inter-session interval (ISI), reached a certain length of time, then there was no further increase in retention. In Cepeda et al. (2006), the retention level was measured using a recall test.

In a study by Dempster (1978), second language learners' vocabulary retention was tested in various ways. While some participants learned a large number of words in one session at three intervals, others learned the same words over three separately spaced sessions and all participants were given the same type of instruction and were taught in both their L1 and L2. Findings from Dempster (1978) suggested that the retention level was much lower for those students who learned the vocabulary in one session than for those who learned the vocabulary in spaced repetition. However, these findings were particularly influential in the design of this study, as it was important to balance the number of vocabulary items given to my participants along with the spacing of intervals of learning. While the goal of my study was to maximize the retention of vocabulary, it is recognized that interval spacing is not an exact science and there have been many different viewpoints on what appropriate intervals might be (see Nation & Meara 2002; Pavlik & Anderson 2003). As such, the spacing

effect is considered when designing the vocabulary lessons in the current study (see 4.7.1.1).

2.9.4   Further aspects supporting memory functions

Remembering new pieces of information is not merely ensured by employing memory strategies, but is also heavily dependent on the ""Depth of Processing Hypothesis". Depth/Levels of Processing Principle (DOP) proposes that learners who deeply engage in their language learning processes employ strategies that require in depth processing, which will result in more effective retention of information (Craik and Tulving, 1975; Cohen, 1980). Schmitt (1997) also applies DOP to pedagogy, suggesting that vocabulary learning tasks and strategies that require more cognitive energy to negotiate meaning and analyze words should lead to higher retention than receiving simple input. Furthermore, Craik and Tulving (1975) claim that learning vocabulary meaningfully is a condition for effective retention. They also provide concrete examples of vocabulary leaning strategies that require deep and shallow processing. They indicate:

> "How well people remember something depends on how deeply they process it. Repeating words as string of sounds is low-level processing and badly remembered; working out how words fits in the grammatical structure of the sentence is deeper and leads to better memory; using the meanings of words together within the whole meaning of the sentence is the deepest level of processing and ensures the best memory" (p. 53).

Therefore, the purpose of the regular class discussions employed in the current study, is to provide sufficient time for negotiating meaning and to discover new meaning and uses for the target words (see 8.5.1).

Another factor that might enhance memory function could be using mobile phone as personal computers to store data, which is a further advantage I use to support memorization, since target words and vocabulary learning strategies are presented via smart phone technology. Shakarami et al.(2011) posit:

> "The Net-Generation learners feel no reason for piling their minds with unnecessary materials as a consequence of wide access to online affordances that enables them to hunt for needed information in lightning speed. Learning, in effect, seems not to be based on the compilation of information in their mind. The focal point for learning seems to be on the learners through online searching, exploring, and sharing the knowledge with their peers rather than memorizing long pieces of information. They

use the net and social networking to share their knowledge, cooperate with their peers and learn from the interactive virtual spaces." (p. 356-357).

The next chapter discusses research into technology and mobile phones and their potential to support second language learning and vocabulary learning.

Chapter 3: Technology in learning

3.1   Introduction

Since this thesis focuses on aspects of web-enabled phone technology in combination with the use of vocabulary learning strategies, the current chapter focuses on exploring some of the research into the use of technology in learning. The first section begins by presenting working definitions of Computer Assisted Language Learning (CALL), its emergence and how it is used for learning. It moves on to define Mobile Assisted Language Learning (MALL) and it looks at the affordances of technology / mobile phones and how they could benefit learning. Next, it reports on the findings of influential studies which investigate the effectiveness of MALL. The chapter continues to present a number of models demonstrating users' acceptance of MALL, before the advantages and disadvantages of MALL integration are discussed. The last subsection explores the new learning opportunities provided by smart phones and Web 2.0, and finally it shows how social network sites and applications, particularly WhatsApp – the focus of this study, are utilized in learning by reporting the findings of some relevant studies.

3.2   Computer Assisted Language Learning (CALL)

Lee (2000) states that in the early 90s, education has been influenced by the introduction of computer Assisted Learning (CAL) in schools and universities. Starting with using word processors for assignments to the development of Computer Mediated Communication (CMC) activities, technology has gradually become a reliable learning tool (ibid). That is, in their review, Cook et al., (2008) show that since the introduction of the World Wide Web in 1991, the internet was recognised as an instructional tool. A number of evaluative studies were published afterwards to investigate the effectiveness of internet based instruction (ibid). Many of those studies reported that online learning allows for more flexible study in terms of time and place, introduces teachers to new teaching methods, and helps them to customize

instruction to the needs of different learners (ibid). Consequently, internet- based learning has increasingly become more acceptable. Although the potentiality of the technology in education has not been fully explored, it is clear that we have entered a new information age in which there is a link between technology and TEFL have already been established (Lee, 2000).

Technologically based language learning techniques, collectively referred to as Computer Assisted Language Learning (CALL), have been available as a teaching and learning approach for more than 30 years (Warschauer, 2012). Computer-Assisted Language Learning (CALL) is defined as the applications of the computer in language teaching and learning (Hubbard, 2009). Thus, according to Warschauer and Healey (1998), the initial main goal of CALL at the end of the twentieth century, was to search for possibilities of using computers for the purpose of teaching and learning the language. Examples of this include guided drill and practice, simulation, games, multimedia CD-ROM, and internet applications, including e-mail, chat and the World Wide Web (WWW) for language learning purposes. More recently, Snape and Fox-Turnbull(2011) state that technology has been developed to the point that students can work collaboratively in the development and production of a technological outcome or product that meets a previously identified learning objective. The authors suggest that the teachers' role is now to facilitate learning and to guide students through their technological practice, in that some teachers are often deeply involved in discussion and problem solving with individuals or small groups, while others work quite independently.

It was apparent that even in the early years of information technology, computers were seen as beneficial. This was indicated by Fox (1984), when he notes that the computer is an effective intervention for enhancing second language reading and writing skills and, if used effectively by the teacher, is a means to create a 'rich and stimulating learning environment' for students. Currently, research in Second Language Acquisition (SLA) and Computer assisted Language Learning (CALL) sees technology as "a tool that can enhance teaching and learning by augmenting input, providing additional opportunities for language practice, and serving as a platform for interaction and task-based learning activities" (Cetto, 2010).

Recently, Mobile Assisted Language Learning (MALL) has been emerging as an approach to language learning that is supported by the use of a mobile device (Begum, 2011; Keskin and Metcalf, 2011).

The next section explores mobile phone technology for language learning.

3.3   Mobile assisted language learning (MALL)

A review of the literature on mobile learning reveals a huge variety of perceptions of what mobile learning (m-learning) means. MALL is a subset of both Mobile Learning (m-learning) and Computer-assisted language learning (CALL), in which mobile technologies, such as mobiles phones, MP3 /MP4 players, PDAs, and laptop computers are used (Kadirire, 2009). Mobile phone learning implies that the usage of mobile phone devices exceeds the usual daily tasks of making phone calls and sending SMS messages, to comprise of more educational purposes (McKinsey, 2012), which can enhance educational outcomes rapidly. One of the primary features of MALL is its support for learner centered approaches as the device is employed to access language learning materials, consume content, to interact with data sources as well as with teachers and peers, to create data or text at any time. This puts learners in control of what and when they study and alters the perception that learning only taking place in a classroom (Ove et al., 2012).

Like other technological devices, mobile phones have many distinctive characteristics. The portable feature of mobile phone devices imparts mobile learning an ever-present or ubiquitous characteristic, termed 'u learning' (ubiquitous) or 'p learning' (pervasive), which is a suitable vehicle for personal or group learning (Kukulska-Hulme and Shield, 2008; Ng et al. 2009; Begum, 2011). That is, the main description of 'm-learning is concerned with being 'wireless', according to Alexander (2004), since a mobile device can be carried without the presence of wires suggesting the use of the term 'ubiquitous' to more accurately describes 'm-learning'.

However, in defining mobile phone learning, emphasis i on the definition suggests a paradigm shift from the technology being at the core of the process to the individuals driving it (Ng et al.'s, 2009; Ronchetti, 2012). Mobile phone learning is a new discipline

that is gaining increased attention due to its potential to improve the learning environment by providing supplementary practices even outside the classroom, due to its widespread use and flexible features. Thus, for the purpose of this study, it can be hypothesized that by combining mobile phone technology with vocabulary acquisition strategies, difficulties experienced by learners in vocabulary memorization can be overcome and it may help them to make better use of their free . Klopfer et al. (2002) posit a number of affordances of mobile devices which can produce educational benefits: portability, social interactivity, context sensitivity, connectivity, and individuality. These are grouped below under the umbrella of communicative affordances of the mobile phone

The succeeding section discusses the notion of the affordances of mobile technology and how it benefits learning.

3.3.1   Technology / mobile phone affordances

The notion of affordances provides distinctive perspectives when describing and understanding the use of online technology when interacting with other elements including learners, teachers, and the physical environment for educational purposes (Conole & Dyke, 2004; Kabanda, 2014; Schrock, 2015). However, before using the notion of affordances to hypothesize the relationship between technology and learning, we need first to define the concept of affordance. The term "affordances" is coined by the psychologist, Gibson (1979, cited in McGrenere and Ho, 2000), who used it as a major element of his ecological theory of human perception. Gibson conceptualizes affordances as what the environment offers the organism, defining it as "an action possibility available in the environment to an individual, independent of the individual's ability to perceive this possibility" (McGrenere and Ho, 2000). Gibson (ibid) identifies essential properties of an affordance including, enabling action possibilities in the environment in relation to action capabilities of a particular organism. That is, an affordance provides support for one organism, but may not exist for another. Secondly, according to Gibson an affordance is independent to the organism's experience, knowledge, culture, or ability to perceive it. Thirdly, it is an inherent property of an object which does not change when the needs and goals of the

organism change. Finally, Gibson claims affordances either exist or do not, and in turn, the action can be completed or not. That is, Gibson does not refer to the possibility of completing the action with difficulty (McGrenere and Ho, 2000; Kabanda, 2014; Schrock, 2015).

Applying the notion of affordances, to current technology application is helpful in developing a better understanding of how online technologies could be used to support teaching and learning (Schrock, 2015). Conole and Dyke (2004) construct a theoretical basis for the use of ICT to support learning by outlining a taxonomy for ICT affordances and describing its components. In developing this taxonomy, Conole and Dyke analyze current social theories as well as the literature on the current use of technologies, after which a list of common features was drawn up to form a taxonomy including: Accessibility, Speed of change, Diversity, Communication and Collaboration, Reflection, Multimodal and Nonlinear, Risk, Fragility and Uncertainty, Monopolization, and Surveillance. Later on, Schrock (2015) synthesizes a typology of communicative affordances from the previous decade of literature of mobile communication, showing how mobile media could enhance communication and enable a wide range of uses. Schrock's framework of mobile communicative affordances includes: Portability, Availability, Locatability, and Multimodality.

The following sub-sections describe and discuss those technology affordances from the framework of both Schrock and Conole and Dyke that are relevant to the current study.

3.3.1.1   Mobility

According to Schrock (2015), portability or mobility is defined as the "perception of physical characteristics such as size, weight, as well as those evaluated through use, such as battery life" (p. 1236). Portability is a feature of mobile devices that allows them to be integrated in various social contexts, as they can be carried and transported everywhere (Treem & Leonardi, 2012; Schrock, 2015). Sharpel (2007) shows that laptops, mobile phones, and wearable technologies (that can fit on the finger, around the neck, or on the wrist) have varying degrees of portability, which

allow users to learn away from their usual study environment, and in turn have better control over their learning (see 8.3.1).

Vocabulary learning research has made use of the portability/mobility affordance as it is found to support vocabulary learning in many ways (Lu, 2008; Kennedy and levey, 2006; Stockwell, 2005, 2007). Firstly, , following the hypothesis that multiple exposure to a range of vocabulary knowledge helps to make better connections in the brain, vocabulary learning is interrelated and best acquired by repetition (see 2.4). Portability allows for multiple exposures to target vocabulary since the receiving knowledge could be anywhere and anytime, as long as there is mobile phone signal. Secondly, the relatively small size of the mobile phone screen could be made use of as it enables the learner to divide knowledge into smaller chunks which aligns with the cumulative nature of vocabulary knowledge (see 2.4.1.1). The fact that lessons delivered by mobile phones are likely to be smaller in size could also have an effect on reducing learners' cognitive load (see 2.9.1). Thus, there is no need to study from elaborated and complex texts or to carry heavy textbooks as in traditional learning.

Moreover, portability could allow learning over spaced intervals since vocabulary lessons can be received anywhere and anytime the mobile device is with the learner. This conforms to the spacing effect hypothesis, which in turn could boost memory function (see 2.9.3).

Having looked at the issue of portability, the following sub-section will focus on the issue of accessibility.

3.3.1.2 Accessibility

Accessibility is another technology and mobile phone affordance that is described by Conole and Dyke (2004) as an easy online access to abundant information through various different channels such as portals, websites, knowledge networks, or shared community users. Accessibility allows technology and mobile phone learners to access information quickly, which is not available in traditional learning (ibid).

Accessibility can also expose learners to numerous authentic resources which are rich sources of target language knowledge and examples (Alsied and Pathan, 2013; Mayer, 2003; Sharples, 2000; Conole and Dyke, 2004). This advantage obtained by the affordance of accessibility, according to Conole and Dyke (2004), is called 'diversity'. Conole and Dyke (2004) argue that since learning requires sharing of ideas and an exchange of experiences, technologies offer effective ways by which users could learn by accessing a wide range of various websites, subject experts, and exposure to experiences different from their own. However, narrating experiences raises questions about authenticity of the reported experience, as one cannot distinguish between what is real and what is fabricated via technology.

In terms of vocabulary learning, accessibility enables vocabulary learners to broaden the depth and breadth of their vocabulary knowledge (see 2.4.1.1). This would relieve teachers from being the only source of target language (Alsied and Pathan, 2013). Consequently, technology as Mayer (2003) and Sharples (2000) indicate, could move the learning environment from the traditional teacher-centered to the learner-centered approach, enabling learners to take a much more active role in the process by allowing them to take the initiative to work independently. They are able to collaborate   with others to build productive working relationship, subverting the traditional authoritarian role of the teacher as a transmitter of information, and places students in the position where they search for and construct their own knowledge (Akras and Self, 2002). Therefore the affordance of accessibility could benefit vocabulary learners, as it would help them to take initiatives and look for facets of vocabulary knowledge from countless online resources and have more exposure to vocabulary in various authentic contexts.

In addition, Conole and Dyke's (2004) and Sorgenfrei (2013) demonstrate that the affordance of accessibility allows for Multimodal and Non-linear modes of learning. Conole and Dyke (2004) explain "ICT enables learners to move beyond linear pathways of learning ……and to adopt more individualized strategies and pathways" (p. 119). This could be obtained, as they demonstrate, when learners follow multiple paths/ways using web search engines and hypertext to acquire the information needed. However, they point out that non-linear modes are not efficiently utilized as

most computers based tutorial packages still follow the linear styles of learning. This particularly distinguishes technology/mobile learning from traditional styles, as learners learn at their own pace and do not necessarily follow sequential learning mode (Lurillard, 2007; Koegh, 2017). In turn, vocabulary learners can have individualized learning by making use of the affordance of accessibility, as they can decide what to study , learn at their own pace, and select which modality to use during this process(see 8.5).

However, this large amount of available information due to the affordance of accessibility has some drawbacks. One of these is, Conole and Dyke's (2004), 'information overload, which requires users to verify, evaluate, and use obtained information. Conole and Dyke (2004) claim, "the challenge is not accessing material, but rather in knowing how to use what is available" (p. 116). Furthermore, Conole and Dyke (2004) consider the speed of change a core feature of technology. That is, new technologies, they state, enable fast access which rapidly changes information and world current events. However, they add, concerns about the quality of information and sources may also emerge due to this speed of access. In addition, the speed of change may also reduce the user's ability to reflect on or criticize the material, promoting surface learning (Conole and Dyke, 2004).

Interactivity as another important mobile phone and technology affordance will be discussed in the next sub-section.

3.3.1.3   Interactivity

Communication and collaboration are considered the main ICT / mobile phones affordances which enable learning by engaging with others (Alsied & Pathan, 2013; Mayer 2003; Sharples, 2000; Conole and Dyke, 2004). This is because new technologies, as they point out, open up dialogue among new online communities, from being involved in forums discussing specialized topics, to joining chatrooms. Learning through communicative discourse and acknowledging diversity align with essential theories/approaches of learning including Vygotsky's approaches to learning (Conole and Dyke, 2004 and see 2.7.2 and see 8.5.1). In vocabulary learning, the

communicative affordance enables learning from meaning-focused output, since learners are encouraged to post their entries, exchange knowledge about target words, and engage in making meaning (see 2.6). Communicative affordance could also allow for developing leaners' fluency and automaticity since they have the potential to encounter target words in many places and see how they are used in different contexts (see 2.6). Most importantly, the communicative affordance permits learners' receptive knowledge to be transferred to productive knowledge (see2.4.1.2). This is because it allows learners to engage in authentic dialogues in which they produce their output via testing their hypothesis, asking questions, asking for feedback, modifying their output, and then making meaning (see 2.7.3, 4.8.3.1.3, and 6.2).

The next sub-section will focus on the affordance of availability.

3.3.1.4   Availability

Different from accessibility which looks at access to learning materials, availability is a key communicative affordance of mobile phones which refers to connectivity (Schrock, 2015; Sorgenfrei et. al., 2013). Schrock, (2015) demonstrates that mobile phones offer the potential to be constantly connected. Yet, the feature of availability is used "in more or less strategic ways" (p. 1236). That is, mobile phone users direct the affordance of availability according to their specific goals. Schrock (2015) provides an example of when individuals can turn off the push notification of their mobile Facebook, while allowing voice calls to remain active. Schrock (2015) believes availability to be a combination of "multiplexity, direct contact, and increased frequency" (p. 1237). Multiplexity according to Haythorne and Thwaite (2005) and Schrock (2015) means that mobile phone users are available and simultaneously connected to people they intend to communicate via multiple mobile phone media such as texting, calls, and social media. Schrock (2015) explains directness to be the capability of individuals to execute communications in a way that is as direct as making a landline phone call. Finally, increased frequency is referred to by Licoppe's (2004) and Schrock (2015) as the notion that the characteristic of mobile phone

communication is altered by permitting frequent short interactions rather than longer ones (see 7.4.2.6).

Immediacy is explored in the following sub-section.

3.3.1.5   Immediacy

Immediacy is a further affordance caused by ICT (Conole and Dyke, 2004; Rettie, 2003) Immediacy means when users exchange information extremely rapidly via smartphone, they are expected to respond almost immediately or after a short time frame, as recipients or other interlocutors expect them to do so. This feature strengthens online social relationships and enables learners to be aware of each other even outside classroom, which is not the case in a traditional learning setting (see 7.4.2.3). The sub-section below looks at multimodality as being a significant affordance provided by mobile phones and social network sites.

3.3.1.6   Multimodality

Multimodality implies that different modalities, such as sound, image and text, are viewed as a whole to make meaning using this multiple media (Conole and Dyke, 2004; Hrastinski et. al, 2015). In other words, many people use their mobile phone devices to read and exchange messages, take photos and videos, record sound, look at pictures, watch movies, and listen to podcasts. Thus, multimedia could offer diverse opportunities to communicate and share experiences with other people (Hrastinski et. al, 2015; Anastopoulou, Sharples and Baber, 2011).

Relevant research in language learning indicates that mobile learning and multimodality could be useful for formal learning. Looi et al. (2009) conducted a study about how mobile technology and multimodality could support English lessons. In their study, learners were asked to make their own choices about how to complete their homework assignments. Findings demonstrated that giving students the opportunity to select from a range of different modalities on mobile devices outside the classroom was useful to students' learning. Conclusions were drawn which showed that allowing students to accomplish tasks in different ways was beneficial to students as it would

accommodate different learning styles. Looi et al. (2009) do not reveal or discuss any disadvantages in the use of mobile devices and multimodality.

Willemse and Bozalek (2015) discussed a similar set of affordances provided by WhatsApp and Facebook. These include readability, vewability, writability, accessibility, browsability, linkability, listenability and watchability. They explain that the affordances of WhatsApp and Facebook allow students and educators to discuss issues about real life and become able to share course-related information.

The affordance of multimodality provided by mobile phones and WhatsApp could allow for improved opportunities for vocabulary learning. That is, by WhatsApp's diverse multimedia input (pictures, videos, and audio files along with printed text), learners can be presented with multiple modes of vocabulary knowledge which could accommodate different learning styles (LooI et al., 2009, Wang and Shen, 2011). In addition, it could facilitate the acquisition and the consolidation of both concrete and abstract vocabulary items when combined with multimodal articulations (see 2.9.2). The use of Multimedia in vocabulary learning is largely supported by the dual coding and cognitive load hypotheses (see 2.9.2). Chen and Wang (2008) and Wang and Shen (2011) advocate combining text with one or more multimedia content to maximize the instructional effectiveness. They also emphasize considering the principles of cognitive load theory when designing the instructional mobile phone learning messages by blending images, spoken languages, and text in an effective combination to enhance the learning outcomes.

The following sub-section shows how the affordances of mobile phones impact the design of the intervention in this research.

3.3.1.7 The application of mobile phone affordances in the current study

This study makes use of mobile phone affordances in the design of the vocabulary lessons which constitute the intervention. For example, considering the portability of the mobile phone, it seems difficult to read elaborate materials whilst engaged in other daily tasks. Therefore, lessons were designed to focus on small units of meaning (see 4.7.1.1 for more details). This enables learners to read them and memorize them

on the move or away from their conventional study environment. Vocabulary lessons also make use of accessibility provided by the mobile phone as learners can gain quick access to them any time as long as their mobiles are charged and have signal. Accessibility also enables learners, who only receive a bite size amount of information about target words, to search countless resources online in order to collect enough knowledge about these target words so they can discuss their findings later in virtual meetings.

The design of these vocabulary lessons also exploits the mobile phone / WhatsApp multimodality. Many of the target words were combined with one or more modality to enhance the likelihood of learning. For example, some words were combined with text, pictures, audio files, or more than one modality, to help learners infer their meanings and were then followed up with a question or a caption to elicit learners' responses.

In addition, Interactivity is an essential affordance which the design of this study relies on. Learners exchange messages to negotiate the meaning, the form, and the use of the target words. Moreover, the level of intrusiveness caused by sending frequent WhatsApp messages is regulated by making use of the affordance of availability. Learners should also feel enhanced connectedness due to the affordance of immediacy (see also 4.7.1, 7.4.2, and 8.4.2).

The next sub-section describes previous attempts to implement mobile phone learning.

3.3.2   Early studies using mobile phones as a language learning tool

One of the early ground-breaking projects to assess the role of the mobile phone as an effective learning tool was conducted by Stanford Learning Laboratories, and described by Brown (2001). A range of learning activities was supplied to the participants, such as the introduction of new words, word and phrase translation and saving vocabulary to a notebook. All activities were based on individual learning preferences, styles and requirements, as well as listening based activities for speaking and listening. The initial findings suggested that the portable nature of the phone

meant that access was 24/7, and this increased the frequency of learnersfor to participate daily and enhanced their motivation to learn. However, these factors were dependent on the technology being appropriate and reliable, as well as the learning activities being aligned to technological capability.

Concurrently, Thornton and Houser (2001) sent three spaced lessons to students daily, over a period of time. The conclusion of the study suggested that this mode of vocabulary learning was effective since elaborate, spaced rehearsal took place. Mobile phone learners outperformed learners using other vocabulary learning techniques, such as using PC email or printed papers. The justification for mobile phone mode preference is that traditional, crammed vocabulary learning was difficult, since the learners had one scheduled class per week. This links well to the vocabulary retention principles outlined above (see 2.9.3). Thus, Thornton and Houser (2001) conclude that even in a situation where the institution has allocated one scheduled class per week, with mobile learning, students are able to take advantage of the spacing effect in order to better retain their vocabulary knowledge (cited in Cepeda et al., 2006) .

As technology surrounding the mobile phone has improved, further studies have taken place to examine the capabilities of the mobile phone in relation to language learning (Thornton and Hauser, 2005; Stockwell, 2007; Quinn, 2011; Saran and Seferoğlu, 2010; Kennedy and Levy, 2008; So, 2009). The overall findings of these studies are that students are positive about language learning in this medium and find reading and viewing video on small screens acceptable. These studies also assess the efficacy of mobile phone use for language learning and vocabulary learning. These studies adapted to the capabilities of mobile phone technology and sent messages consisting of 'bite size' activities, and then measured learning outcomes (vocabulary gain).

Findings of most of these studies suggest that sending text messages and short emails to learners' mobile phones, was found to encourage more regular study and to be an enjoyable learning technique. In addition, learning outcomes were higher in the experimental groups than in the controlled groups, where the former was motivated by the experience of learning a language on the phone. The specific advantage of the mobile phone for vocabulary building was expressed by the experimental group in

Saran and Seferoğlu's study (2010), as they were able to view the visual images at the time of learning the word, which enabled them to recognize words when reading in a text later. In addition, Kennedy and Levy's study (2008) also reported students' motivation and enjoyment with the activities (vocabulary and grammar) which concurred with that of other mobile phone studies.

However, , despite findings that students were motivated and creatively stimulated by the m-learning activity conducted in So's (2009) study, it emphasized the limitation of being able to use SMS only for bite size learning activities, and considered it unsuitable to be used as a replacement to or in isolation to e-learning. In addition, So (2009) also identified cost as a potential disadvantage for use, unless it was possible to acquire low cost SMS packages or to capitalize on mobile to mobile free SMS, only available through the same network provider in some parts of the world.. More recently, SMS messages are now offered free as part of a larger package by providers, so cost is no longer as big an issue. So (2009) highlighted the problems of slow SMS transmission, the size of the mobile device and limited battery life. Overall these studies suggest that SMS/MMS messaging could complement other language learning activities well and lead to enhanced outcomes in vocabulary size and knowledge (Koole, 2009; Traxler, 2009; Quinn, 2011), provided that the cost is not prohibitive (So, 2009). Challenging, interesting bite size activities are employed and the need for messaging frequency is agreed to be important (Kennedy & Levy, 2008).

A number of studies were conducted in Saudi Arabia, the context for the current study, where the mobile phone usage styles are different. Unlike studies conducted in Japan (Thornton and Houser, 2005), Al-amri and Suleiman (2011) reinforced the need for cultural or local awareness, as their study revealed that teachers in Saudi Arabia have concerns that mobile phone based learning will be more of a distraction than a support to learning. This is due to a lack of proof that the performance of language skills is boosted, and the fear that students will not use the phone appropriately. This may be a matter of acceptance of technology or of different cultural influences.

It is clear from the studies conducted on early mobile phone use, that there were implications for the development of language learning and the implementation of MALL. Researchers examined the usefulness of SMS and MMS as ways of promoting

student development in learning. Advancing from this, Thornton and Hauser (2005) suggested that students and teachers were becoming more comfortable with using this type of technology. Besides, the contributions of these studies give an understanding of which applications learners use, how they perceive the size and features of the device, as well as indicating the application and appropriateness of the vocabulary learning strategies and theories underpinning vocabulary acquisition which support the use of the mobile phone as a learning tool. Yet, this was limited to a specific region of the world, as acceptability of the technology was still in its infancy stages in other parts, as attitudes towards the use of the technology may have been relatively much less developed.. Also, cultural differences also imply that different applications and types of activity should be specifically designed to meet the stage of development of each society with mobile learning (Bahrani, 2011; Alamri & Suleiman, 2011). In conclusion, the early use of mobile phones as language learning tools has progressed significantly over the last decade, allowing for much more room for discussion on how to maximize the benefits in the language learning setting.

A number of models explaining users' acceptance of mobile phones adoption are discussed below.

3.3.3   User acceptance of mobile phone services

In order to understand how and why people adopt mobile services, the literature proposes a number of theoretical models to understand the concept of mobile phone acceptance (Phan and Daim ,2011). Phan and Daim (2011) state that one of the most prominent models is the Technology Acceptance Model (TAM) which was first proposed by Davis(1989). TAM is widely accepted and used by a number of studies which focus on mobile users (Phan and Daim, 2011). The essence of TAM is to focus on the two major constructs of users' perception of usefulness and ease of use as main determinants of technology adoption (ibid). Phan and Daim (2011) demonstrate 6 constructs of TAM including External Variables, Perceived Usefulness, Perceived Ease of Use, Attitudes towards Use, and Behavioral Intention. These factors will be explained below while demonstrating other technological acceptance models.

Hepler & Mazur (2007), Phanand Daim (2011) and Liu et al., (2010) demonstrate that the Analytical Hierarchical Process (AHP) and the Unified Theory of Acceptance and Use of Technology (UTAUT) are another two recent and more comprehensive models proposed for measuring technology acceptance. They explain that AHP lists the factors determining users' acceptance in a hierarchy for easier evaluation. These include service quality, simplicity, innovativeness, visual factors, speed, time efficiency, enjoyment, cost, mobility, content, habits, technology, and social factors. The top level of the hierarchy, as they show, is attitude toward using mobile technology which leads to the adoption of the mobile service. The second level shows factors that might influence the attitude toward use. These include ease of use, usefulness, social factors, technology, and habits (Phan and Daim, 2011). Then, ease of use and usefulness factors are further classified into subclasses; ease of use comprises service quality, simplicity, visual factors, speed, and innovativeness, while usefulness consists of enjoyment, mobility, content, and time efficiency (ibid).

Another popular, sophisticated, and recent model in information technology acceptance is the Unified Theory of Acceptance and use of Technology (UTAUT) (Venkatesh et al., 2003). UTAUT synthesizes and compares elements from prior technology acceptance models and incorporates them into its model (Venkatesh et al., 2003, 2012). Venkatesh et al., (2003, 2012) explain that the UTAUT has four key factors that directly determine the behavior of the technology user and four other individual differences variables that are found to moderate the effect of the four determinants on the intention and behavior of the user. UTAUT postulates that performance expectancy, effort expectancy, social influence, and facilitating conditions directly determine the intention and the behavior of the user, while gender, age, experience, and voluntariness of use are moderating factors Venkatesh et al., 2003, 2012; Abu-Al-Aish and Love, 2013). Thus, the four factors give clear explanations of the model, whereas the moderating factors help in understanding the characteristics of users (Abu-Al-Aish and Love, 2013).

The first determinant of UTAUT is performance expectancy which is defined as the degree users think that using technology would be useful for them in terms of job performance, outcome expectation, and extrinsic motivation (Abu-Al-Aish and Love,

2013; Venkatesh et al., 2003, 2012 ; Chen and Wang, 2008; Wang et al, 2009). The second determinant is, effort expectancy which is defined as the extent of ease that a person believes they have when using technology (ibid). In other words, it refers to the ease of use and the degree of complexity of information technology. The third construct of UTAUT is social influence, which is defined as the degree to which users see the significance in the belief of others in the new information system, such as family, friends, or teachers (Abu-Al-Aish and Love; Venkatesh et al., 2003). The fourth determinant of Venkatesh's et al., (2003) model is the quality of service which is defined as users' satisfaction with the service being provided in terms of the security and the validity of content (ibid). Thus, the students' view of the quality of the online support service is an essential factor in affecting their acceptance of m-learning.

 Finally, personal innovativeness, the fifth construct, concerns people's readiness to explore new technology (Lu et al, 2005). In other words, Lu et al (2005) explain that users with a high level of innovativeness hold positive ideas about trying new information technology, and are more able to take risks compared with individuals with lower levels of innovativeness.

Venkatesh et al., (2012) adapt the UTAUT by adding three constructs: hedonic motivation, price value, and habit, in order to complement the current UTAUT. That is, they note, as UTAUT at first emphasized the importance of extrinsic motivation which is tied with performance expectancy as a major predictor of technology acceptance, hedonic motivation (which is defined as fun/pleasure resulting from technology) similarly plays an important role in technology acceptance and use. The Second construct added by Venkatesh et al., (2012) is price or cost which aligns with the quality of service in determining consumer acceptance and use of technology (p. 161). Thus, they define price value as "consumers' cognitive trade-off between the perceived benefits of the applications and the monetary cost for using them" (Venkatesh et al., 2012, p. 161). They further explain that the price value is positive when the benefits derived from using technology are greater than the cost, and in turn the price will increase the intention to use technology.

Furthermore, experience and habit are interlinked whilst at the same time being distinctive constructs added by Venkatesh et al., (2012). They indicate that experience

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reflects the time spent learning and using the technology, while habit relates to the concept of automaticity. In other words, it is the degree of using technology automatically after experiencing learning using technology. Thus, studies show that when the habit of using technology is formed, the intention to use technology is less important as users' behaviour becomes more automatic (Venkatesh et. al., 2012).

The current study uses common elements of the above Technology Acceptance Models while investigating participants' attitudes and acceptance of WhatsApp or Messenger via smartphones as a means to learn vocabulary. That is, the post-study questionnaire includes statements that inquire about the ease, the usefulness, and level of enjoyment, while other factors emerge while interviewing participants such as automaticity and innovativeness (see 7.4.2 and 8.4.2).

The next section identifies advantages of MALL integration.

3.3.4   Advantages of mobile phone learning

Owing to its relatively large storage capacity, learners can access audio files, for instance, which were an incidental informal form of learning, and they can even learn the alphabet in the target language through listening to phonics (Koole, 2009). In addition, the possibility of reading text at their own pace means that learners can spend time thinking about the meaning of the words from which it was composed, hence managing the cognitive load themselves.

A research study carried out by McKinsey (2012), suggests that in general educational terms, mobile learning has the potential to enhance educational performance in many ways. Initially, access to content and to a specialist in the subject area is easier because of the flexibility of use. Barriers such as time, geographical location and inability to work collaboratively are eliminated. Learning programs can be matched specifically to individual learners' needs, including pace of learning and levels of difficulty, by means of the software available. Finally, the global educational inefficiencies, such as teacher shortages or lack of skills can be reduced (ibid). The study of the use of mobile phones in EFL classrooms by Alamri and Suleiman (2011) reinforced and extended these advantages, emphasizing there would not be resource and location issues for teachers,

as learners no longer require computer rooms or language learning laboratories to gain access to the internet.

Although, these advantages are significant, there are a number of impediments to the integration of mobile phones for learning and these are highlighted below.

3.3.5 Limitations to mobile learning

The previous section outlined research arising from the employment of mobile technology on a broader context. Several key limitations of mobile learning have emerged, which will be summarized here and must be addressed during the course of this research.

3.3.5.1 Psychological barriers

A report by Wang and Higgins (2006) identified several issues with the use of m-learning in the classroom. They suggest that there is a significant psychological barrier to the use of mobile phones for learning purposes, since their primary use is for communication. It takes time for personal habits to change and new attitudes to be developed towards the use of the mobile phone for learning purposes. Although it could be argued that the technology has advanced significantly since 2006 and it may be that both students and teachers have actually adapted to the mobile phone as a piece of technology acceptable for language learning.

Wang and Higgins (2006) cite the example of many continuing to buy books and physical resources for use in language learning, despite the proliferation of online technologies and resources. Whilst this is true, the normalization of online materials in the classroom has accelerated since the time of this study and many more students feel comfortable incorporating e-resources into their learning process (Traxler, 2009). Furthermore, the use of such technological methods does not preclude the use of traditional resources; rather, the two approaches may be adopted concurrently to maximize efficacy. Mobile learning exists to complement other strategies and approaches to language learning and vocabulary acquisition, not to completely replace them (Koole, 2009).

How mobile phones are interpreted in the classroom by both teachers and learners are an important factor for this thesis, however as mentioned above, it may be the case that students are more willing to adopt m-learning as a supplement to their classroom learning. While these barriers were relatively easy to overcome, other factors such as environmental and psychological factors as well as the financial commitment, were considered to be more difficult to resolve (Stockwell,2007). Psychological barriers were perceived to be based on the learners' misunderstanding of what they would accomplish by using the mobile phone as a learning tool. Furthermore, Stockwell (2007) suggested that the student might not comprehend how the skills acquired were transferable to other elements of the language learning experience.

Other psychological factors might include design factors or the students' own beliefs about using the mobile phone for learning. The environmental factor described by Stockwell (2007) also embraces personal values, for instance a learners' lack of confidence or personal feelings about online chat as a means of language learning, as well as perceiving that more time and effort was needed to learn using a mobile phone. Stockwell (2008) suggested that a key intervention to determine preparedness and acceptability was to investigate the learner's specific use of the mobile phone on a daily basis, and therefore to be able to devise learning activities that would be more acceptable and suitable for their stage of development as a mobile phone user. In order to address the effort issue, activities could be 'bite-sized' or consist of less demanding tasks in order to reduce the cognitive load.

3.3.5.2   Teacher, student and institutional engagement and acceptance

An important consideration in the employment of m-learning as a language learning tool, is how well the learner and teacher are likely to accept the technology, in other words their preparedness. If there is a negative attitude, the underlying reasons would need to be understood, otherwise implementing the use of phones for language learning would not be appropriate and could reduce motivation to learn. This factor was investigated by Stockwell (2008), since his perception was that little was understood about attitudes or individual preferences regarding the use of mobile

phones as opposed to CALL activities employing a PC or traditional learning materials and techniques.

The research by Stockwell (2008) involving 75 Japanese students provided them with the option of using a mobile phone or a PC for vocabulary learning, in which a vocabulary tutor was accessible and identical learning activities were provided. These students had prior experience of learning by means of PC based activities. The outcome of the study was that few chose to use mobile phones for learning and the percentage of students using them over the period of the study declined. Findings of Stockwell (2008) corroborate to the findings of Phase 1 in the current study pertaining participants' attitudes and behaviors (see 4.4). Stockwell (2008) concludes that adapting to a new technology inevitably takes time. This needs to be taken into account in this study, in that the learner might take time to adapt and will need to be supported to make the transition. The barriers to using the mobile were cited by Stockwell, as being factors concerned with the screen, inputting using the keypad size, as well as teaching pedagogy. Furthermore, there were specific concerns regarding slow page loading for the technology and that the employment of the phone as a learning tool was not an integrated part of the pedagogical approach, but rather an 'add on'. In terms of curriculum design the inference is how to ensure that the learning activities intended through use of the mobile phone, link to the entire learning program and to the other CALL techniques employed.

However, although many teacher and learner attitudes are positive and vocabulary based activities can be enabled, cultural, economic and institutional issues could present limitations. As stated above, in the Japanese context (Kang and Maciejewski, 2000), there is a desire for m-learning in the classroom, but such is not always the case. In today's society, the 'type' of mobile phone a person carries is almost a status symbol and therefore bringing that into a learning environment may cause distress for students with the wrong 'type' of phone (Traxler, 2009). There is also some question about the institutional position on mobile learning, as although websites and activities can be used for learning, there is also the possibility that a mobile device could become more of a distraction than a tool (ibid). Therefore Institutions need to balance this limitation.

3.3.5.3   Pedagogical limitations

Wang and Higgins (2006) also identify issues within pedagogical approaches, asserting that it is difficult for teachers to follow up on the particular progress of individual students, largely as a result of the distributed nature of the tuition. Conversely, it has been argued that this process may be facilitated on a mobile device, as a result of the increased connectivity and ease of data storage and transfer (Naismith, et.al, 2006). Regardless of this, it is clear that the nature of the interaction between student and teacher fundamentally changes and that this may impede development of certain students, depending on their precise requirements and learning preferences. Furthermore, the cultural barriers to mobile learning typically arise in a situation where teachers are not adequately trained in CALL techniques, or sufficiently convinced of its usefulness as a learning method. Normalization of the technology, in addition to attitudes towards m-learning and e-learning are not uniform throughout the world. As my study will be conducted in Saudi Arabia, the cultural limitations need to consider the families' attitude towards the innovation when examining the usefulness of m-learning, as this may have a profound impact on the readiness of both students and teachers to incorporate such technology.

3.3.5.4   Security and motivation

In addition to the pedagogical implications, examination and verification may also be impeded when using m-learning, as the course providers have no guarantee that the answers are coming from the individual to be tested. Once again, solutions are being developed to assist with this problem; as more and more assessment takes place remotely, new methods of authentication must be established. Wang and Higgins (2006) also cite the relatively high dropout rate of students who do not complete online courses which require remote learning (20-30%). They argue that personalized and remote learning exerts greater demands on the student, who must be more self-motivated and diligent to persevere with the study. While this may be acknowledged, it is also clear that this precisely ties into the notion that student-centered approaches require a greater active role to be taken on the part of the student in the learning process, thereby increasing deep learning and providing many overall benefits. Similarly, it is also asserted that the environment itself may limit the capacity for the

student to learn (Wang and Higgins, 2006). If the user is always on the move, then they may frequently be in situations with many distractions, thereby increasing cognitive load and reducing learning efficiency. These types of issues led directly to the technical limitations currently being experienced within m-learning.

3.3.5.5   Technical limitations

Technical limitations have also played a part in the varying success for mobile learning. Many phones have small screens and a low resolution, making navigation and perusal of information very difficult. Many users have reported high levels of fatigue when looking at information on a small screen for large quantities of time (Wang & Higgins, 2006). Although this is improving exponentially with the development of a wide variety of smartphones with much higher capabilities, it should be noted that in countries where smartphone penetration is low, mobile technology is still relatively basic, and such considerations continue to inform mobile language learning strategies. However, the ascendency of the smartphone has transformed the mobile learning arena and ushered in a new era of potential with regard to m-learning strategies and tools (ibid).

 Smart phone development and the opportunities associated with this type of technology will be discussed below.

3.3.5.6   Summary

The above section has outlined the nature of m-learning from a historical context, although history, in the case of mobile technology, is a fairly recent and rapidly developing area,. Not only has this review touched on the benefits and drawbacks to mobile learning, it has introduced the concept of mobile technology for the purpose of language learning and the tools that have been available to students thus far. It has also been acknowledged that technology is not a universal concept and the use of m-learning is affected by culture and other demographical and economic issues. A gap has been identified, specifically that there has been little research done on vocabulary learning and the use of mobile technology. Therefore, the next section will not only address the development of mobile technology to include the use of the smart phone,

but will also examine how the smart phone might be used to assist learners with their vocabulary acquisition.

The next section shows how social networking sites are utilized in language learning.

3.3.6 The Smart Phone and Web 2.0: New opportunities

Guo et al. (2004) indicate that definitions of the smart phone are ambiguous and it is not entirely clear where the line is to be drawn between ordinary feature phones and those that command more advanced functionality. They define it as a trend that combines internet and telecommunication:

> Smart-phone is the trend of unified communications which integrate telecom and Internet services onto a single device because it has combined the portability of cell-phones with the computing and networking power (p.1122).

What is more, Guo et al. add that it connects internet and telecommunication at a low cost which gives a further reason for this trend. Park and Chen (2007) describe it as an amalgamation of Personal Digital Assistant (PDAs) and the cell-phone which provides additional capabilities. Nosrati et al., (2012) explain that the development of early smartphones in 2007 was a combination of a personal digital assistant (PDA) and a mobile phone functionally, whereas additional functions were added in later models such as media players, compact digital cameras and video cameras, GPS navigation units, high-resolution touchscreens and web browsers for showing regular web sites and mobile-customized pages. Also, Wi-Fi now provides high speed data access due to the growth of 3G and 4G networks. Most importantly, smartphone devices from 2012 onwards can run third-party Apps that allow applications to be integrated into the phone's software (ibid).

The development of the smartphone gives us a new phase of accessibility and creates a new interaction paradigm that has revolutionized the smartphone industry. Larger screens with high resolution alleviate concerns about fatigue when looking at a small mobile screen for a long period of time. Touch interaction provides a more user-friendly approach to browsing information, and the use of a touch keyboard means that typing becomes easier. The increasing use of tablets has also brought considerable

benefits (Godwin-Jones, 2011; Yang, 2013). The introduction of tablets means a more enjoyable way to browse data, developing portable devices with all the same capabilities as a mobile device, but with a larger screen (ibid).

Godwin-Jones (2011) suggests that the greatest advantage that comes with the advent of the smartphone is the use of individual apps and the mobile internet browser, Safari which allows users to search for information. Given the success of the browser, many mobile phone apps are now web based rather than native. The app store and the advent of native apps have been remarkably successful with the development of the Android and Apple app store (Godwin-Jones, 2011). The rate of change in the industry, both technologically and in terms of advances of user interface design and interaction, is incredibly fast. As this technology is in its infancy, we are still learning a great deal about the ways in which users will interact with it and many more studies need to be undertaken in order to understand the ways in which it will develop in the future (ibid).

3.3.6.1   Using Smartphones in learning

Park and Chen (2007) indicate that the use and adoption of smartphones in various academic disciplines has gained increasing popularity and acceptance in all sectors, especially among the healthcare sector. Similarly, the smartphone has increasingly penetrated language learning contexts and has become a relatively new tool in the language classroom. Examples of the range of specific language applications that the smartphone enables were cited by Barrs (2011) , for instance; capturing work completed on the whiteboard, using the phone as a voice recorder, accessing applications such as a database on informal English phrases (Cloudbank), flashcards (ANKI) and support for more accurate pronunciation by means of an application called *Sounds*. As a consequence, the learner is less dependent on the teacher and able to make his or her own choices (Barrs, 2011; Stockwell, 2007; Yang, 2013). The current usage of smartphones by 80 Japanese students was investigated by Barrs (2011) in a study that had parallels with Thornton and Hauser (2005); where the degree of ownership of smartphones amongst his language students was explored and how they made use of them for second language learning was researched. The survey in early 2011, found that 25% owned smartphones and the other 75% other types of mobile

phone; 15 of those with smartphones had used them for language learning in some form (Barrs, 2011).

The types of application which would be useful to learning as indicated by Barrs (2011) include: copying the board on which the teacher had written; the use of the voice recorder to capture a presentation, which the student then self-assessed against the criteria set by the teacher. One learner had used a Google search using the voice app functionality and had enjoyed noticing if the app understood her pronunciation of the words. Several accessed Gengo flashcards, which permit the learner to convert his/her photograph into personalized flashcards, to which text could be added and feedback in different languages was possible. In addition some learners were able to access English language news programs. The reasons given for not using the smartphone for language learning were generally, lack of knowledge of how to do so, with the exception of one student who preferred traditional textbook learning. The conclusions from the study were that use of the smartphone for learning was not yet normalized in Japanese society, however Barrs (2011) predicted that would change within two years, and that educational policy would need to be redefined.

The advanced features of the smart phone were perceived by Barrs (2011) as being the most effective way of using technology for language learning in an 'invisible' manner and hence reduce the normalization barriers. Barrs (2011) adds that the technologically advanced features, enabled by the operating systems, allow the learners to use the phone in formal and informal environments, in any location and at any time. On the other hand, the relatively low cost of the smart phone means students normally own one, however, the low cost may be a factor that is dependent on the country of use (Barrs, 2011). In addition, (Guo et al., 2004; Barrs, 2011;Catrillo, 2014; Awada, 2016; Keogh, 2017) assert that the smartphone can be used for social learning with groups of learners engaged in text conversations, voice conversations and video conversation, as it has multiple avenues of connectivity, allowing users the choice of Wi-Fi, Bluetooth or tethering to another device. Also it is used for accessing location and information, and as a computational tool. Simply, the smartphone represents incredible educational potential, and much of this functionality could be employed in language learning settings, such as vocabulary learning.

Some research has been less optimistic about both the appropriateness and acceptability of the smartphone as a key language learning device, and the speed with which it will be normalized within teaching. Although learners were found to be motivated by the use of the smartphone for second language learning, the issue of screen size was raised as a serious one by South Korean learners that were participants in Kim and Kim's (2012) study, indicating that this limitation was not as easily overcome as Stockwell (2007) suggests. Their research argued that, despite all the ways the vocabulary could be represented using smartphone functionality, a high extraneous cognitive load resulted. This was not only demotivating, but hindered the thinking and reasoning processes. Therefore, in order to overcome these limitations, the screen size needed to be considered further if the effectiveness of this mode of learning vocabulary was to be further enhanced. It was proposed that the issue was within the content, in many cases, and that teachers needed to break it down into smaller chunks (Mayer and Chandler, 2001). Also, early barriers to use, such as keypad issues (Thornton and Houser, 2005) have been overcome with the advent of the touch pad, and multimedia development has improved sound and picture quality (Ghadirli & Rastgarpour, 2012). The external noise issue has also been rectified by the noise cancelling microphone (Quinn, 2011), hence aiding learning by eliminating load intensifying attention splitting (Guo et al., 2004).

In conclusion, the proliferation of learning content via smartphones, that was accessible at the learners convenience, including audio and video files, accessing documents and web pages, as well as communicating with others in a variety of ways using social networking sites, plus text or voice messaging suggest that mobile phones have the potential to be a powerful learning tool (Quinn, 2011). However, the paucity of studies is a limitation in predicting in exactly what manner and how they are useful (Mayer and Chandler, 2001; Quinn, 2011).

The next subsection discusses findings of some recent studies using WhatsApp messenger as a learning tool.

3.3.6.2   WhatsApp Instant Messenger as a tool enhancing language learning

Proponents of CLT support the idea that genuine interaction promotes language learning (Gunn, 2003). Therefore, social network sites / smart phone applications which are an increasingly popular communication phenomenon could be viewed as tools to encourage authentic communication among language learners and facilitate target language use among social network users (Bouhnik and Deshen, 2014). A chief among these apps which has gained popularity among users is WhatsApp. WhatsApp Messenger is a smart phone application for instant messaging which operates on almost all devices and operating systems (Bouhnik and Deshen, 2014). They demonstrate that WhatsApp can be viewed as a social network that allows people to run long conversations and access information rapidly. Similarly, Bouhnik and Deshen (2014) explain that some teachers prefer to create WhatsApp groups for their learners acting as a "simple social network" to communicate informally with their students (p. 219). Though at the time of commencement of the current study there was little, if any research investigating the impact of WhatsApp on learning. However, a number of recent studies have emerged afterwards to investigate the effectiveness of using WhatsApp while learning diverse language skills (Sam, 2017; Rambe and Bere, 2013; Castrillo, 2014; Abdul Fattah, 2015; Awada, 2016; Keogh, 2017). These studies draw a number of shared conclusions, including the powerful ability of mobile phone learning using WhatsApp to extend learning time, support collaborative learning, provide equal opportunities for group members, and enable quick access of information. They also show how mobile phone learning could enhance learners' scaffolding and interdependence, increase learners achievement compared to traditional learning, and allow for ownership and control over learning.

WhatsApp instant Messenger has some unique affordances that support social communication, and then learning. Bohnik and Deshen (2014) illustrate a number of reasons why many people use WhatsApp as a preferred communication channel. First, they consider the "low cost" of the application as a main reason for WhatsApp adoption; an infinite number of messages could be exchanged for $0.99 per year. Immediacy is demonstrated by Bohnik and Deshen as a second reason why people

adopt WhatsApp. Since WhatsApp's predominant feature is to send instant messages, users are able to conduct ongoing conversations with many friends simultaneously, as long as they have an internet connection. Third, Bohink & Deshen (2014) add, people tend to use WhatsApp to feel "a part of a trend" (p.219). In other words, they need to be joined with their community of family or friends. Fourthly and most importantly, they demonstrate that the sense of "privacy" is a major characteristic of WhatsApp in comparison to other social network sites. However, users also report some drawbacks of the application including users' feelings about the informality of this channel and the flow of excessive irrelevant messages (Riyanto, 2013).

Building on these studies, the current study aims to examine how learning is constructed using WhatsApp instant messages virtual environment as a tool to promote vocabulary learning

The next chapter discusses the methodology used in this research.

Chapter 4: Methodology

4.1   Introduction

This chapter describes the methodology adopted in the main study and is divided in to 10 sections. It starts by explaining the research questions before moving on to elaborate on the theoretical approach research paradigm and the research design. Two study research phases are identified in the following section. Section 5 describes research participants in both of the research phases and section 6 introduces research instruments. Section 7 illustrates the design of the use of the research materials, while section 8 discusses the data analysis procedure, the software used to analyse different types of data together with a description of how the data is prepared for analysis. Section 9 identifies the researcher / teacher role, while section 10 discusses research ethics of relevance to this study.

The next section explains the research questions.

4.2   Research questions

The research questions for this study have been carefully selected based on the consideration of previous research in the area, as well as what this study can contribute to the overall field of knowledge. As such, the research questions for this study are:

1. What is the impact on vocabulary gain of using web-enabled phones for learning?
    a. In what ways does the quantity of WhatsApp contributions impact on vocabulary gain and retention/loss?

    c. In what ways does the quantity of WhatsApp contributions impact on vocabulary gain and retention/loss?
    d. In what ways does the quality of WhatsApp contributions impact on vocabulary gain and retention/loss?
2. In what ways do WhatsApp learning conversations support vocabulary gain?

3. What is the role of mobile phone technology in supporting learning?

   a. What are the affordances of mobile phone technologies which contribute to (vocabulary) learning?

   b. How do the affordances of mobile phone technologies impact on learner motivation?

Question 1 asks about whether participants gained vocabulary after 5 weeks of mobile phones learning intervention. The two sub-questions investigate the impact of the quantity and quality of contributions on vocabulary gain and retention. Question 2 examines how learners construct learning in the mobile phone learning environment and what strategies they use to learn. Question 3 asks about how technology contributes to learning. Part A of this question asks for participants' opinions about mobile phone affordances as they perceive them to be in terms of usefulness in (vocabulary) learning. Part B examines how learners' experience with mobile phone learning affects their beliefs and attitudes about mobile phone learning.

The next section discusses the theoretical approach of the study.

4.3 Theoretical approach

4.3.1 Research paradigm

Research is a systematic and critical inquiry that aims to produce and expand the body of knowledge (Hussain et. al., 2013; Braun, V. and Clarke, V., 2006). There are some major characteristics inherent to good research. Among these are research purpose, having an appropriate theoretical underpinning, and using an organized and sound method of data collection (Ritchards, 2003; Braun and Clarke, 2006).

The term paradigm was first introduced by Kuhn (cited in Hussain et. al., 2013), who defines it as group of essential concepts, variables and problems linked with a matching methodological approach and tools. Teddlie & Tashakkori (2009) define the term paradigm as "a worldview, together with the various philosophical assumptions associated with that point of view" (p. 84). Mertens (2005) defines it as a theoretical framework that influences the way knowledge is studied and interpreted. Mac Naughton, G., Rolfe S.A., & Siraj-Blatchford (2001) further provide three components

of a paradigm including belief about the nature of knowledge, a methodology, and criteria for validity (p.32). In the same vein, Creswell (2003) indicates that philosophically researchers should start their project with certain assumptions about what knowledge to look for, how to know it, what processes are involved in claiming knowledge, how to validate it, and how to write about it, and this what constitutes a paradigm. Mackenzie and Knipe (2006) demonstrate that it is the choice of paradigm that determines the intent, motivation and expectations for the research, and that without nominating a paradigm as the first step, there is no basis for subsequent or informed choices regarding methodology, methods, and literature or research design. They note that paradigms are not discussed in all research texts and are given varied emphasis and sometimes contradictory definitions.

A number of theoretical paradigms are discussed in the literature including positivist (and post-positivist), constructivist, interpretivist, transformative, emancipatory, critical, pragmatism and de-constructivist (Mackenzie and Knipe, 2006). However, in an endeavour to pave the way for the paradigm best suited to the current study, the most two prominent paradigms in education research, those of Positivism and Interpretivism are discussed here. Creswell (2009), Hussain and Elyas (2013), Onwuegbuzie and Leech (2007), Morgan (2007) reach a consensus that positivist researchers believe in the existence of a singular reality which is independent of the observers. In other words, they propose that the world is stable and governed by laws/theories, and that the role of a researcher is to test and refine these, to lead to a better understanding of the world. They also assume that there is "only one universally acknowledged and best solution to any problem" (Hussain and Elyas, 2013, p. 237). Furthermore, positivists propose that the social world can be studied from a scientific lens prioritizes the systematic, empirical, and controlled features of research. In that sense, ~~they use~~ quantitative measurements and statistical analysis are employed to study causes and effects of studied problems (Creswell, 2006; Hussain and Elyas, 2013; Onwuegbuzie and Leech, 2007; Morgan, 2007).

Another paradigm that we might consider reviewing before considering the paradigm of the current study is interpretivism. Unlike positivists, interpretive researchers aim to understand values, beliefs, and listen to human experiences to develop meaning of

social phenomena (Hussain and Elyas, 2013). This is because interpretative researchers advocate the assumption that there is no single reality and reality is a socially constructed concept. In other words, they hold the view that individuals develop subjective and multiple meaning of personal experiences depending on different circumstances and contexts. This leads to interpretative researchers looking at the "complexity of views rather than narrowing meaning into few categories or ideas" (Creswell, 2006, p. 6). Therefore, the goal of this research is to examine the participants' personal views and responses which are best collected by qualitative methods such as focus groups or interviews.

Aiming to fit together the insight provided by the purist positivists and interpretivists into a workable solution, pragmatism sidesteps what has been called the "paradigm war" (Feilzer, 2010). The next section will define pragmatism as a suitable paradigm for this study and describes research methods that align with it.

4.3.1.1   Pragmatic paradigm

Pragmatism could not be considered a paradigm as it does not align with any philosophical system (Hussain and Elyas, 2013). However, Hussain and Elyas (2013) continue that it could be considered a research approach regardless of whether the reality is conceptualized as singular or constructed differently by individuals. That is to say, pragmatism does not belong to any one system of philosophy or reality. Feilizer (2010) puts it differently, pragmatism "accepts, philosophically, that there are singular and multiple realities that are open to empirical inquiry and orients itself toward solving practical problems in the ''real world''" (p. 8). Consequently, "pragmatism allows the researcher to be free of mental and practical constraints imposed by the ''forced choice dichotomy between positivism and constructivism'' (Creswell & Plano Clark, 2007, p. 27). Instead, pragmatist researchers focus on the 'what' and 'how' of the research problem (Creswell & Plano Clark, 2007; Creswell, 2003; Tashakkori & Teddlie, 2003; Husain and Elyas, 2013). In other words, the pragmatic paradigm prioritizes research questions and "applies all approaches to understanding the problem" (Creswell, 2003, p.11). Consequently, data collection and analysis methods should be chosen to best provide insights into the questions with no philosophical

alignment to any paradigm (Creswell & Plano Clark, 2007; Creswell, 2003; Tashakkori & Teddlie, 2003; Husain and Elyas, 2013).

Pragmatism is seen as the paradigm that provides the underlying philosophical framework for mixed-methods research (Tashakkori & Teddlie, 2003; Somekh & Lewin, 2005). That is, researchers are free to utilize mixed quantitative and qualitative research approaches at varying degrees aiming to look for what works best to answer research questions with disregard to the underlying philosophical assumption (Onwuegbuzie and Leech, 2007).

To serve the purpose of this study, I have placed my research problem as central and chosen to be free of any philosophical position. I have adopted the pragmatic paradigm as it allows me to practically choose the most likely appropriate data collection methods by which I can mix both qualitative and quantitative strands to answer the research questions with no philosophical loyalty to any of the dichotomous paradigms.

4.3.1.2   Mixed Methods Research

In general, adopting a mixed methods research approach is when the researchers combine quantitative and qualitative research techniques, methods, approaches, concepts or language into one study (Cresswell & Plano Clark, 2007; Yin, 2006). That is, as a methodology, it permits the employment of multiple philosophical approaches to answer research questions instead of limiting researchers' choices (Cresswell& Plano Clark, 2007; Johnson and Onwuegbuzie 2012). As a method, Creswell and Plano Clark (2011) , Creswell (2015), Yin (2006), and Johnson and Onwuegbuzie (2012) state that it is an approach in which the investigator collects both quantitative and qualitative data. The two sets of data are analysed, and interpreted with the results based on the complementary strengths of both strands of data to better answer the research questions. This would not be possible if only qualitative or qualitative data were collected.

Mixed methods research, as Yin (2006) and Leech and Onwuegbuzie (2007) state, follows a continuum, whereby fully mixed method designs are placed at one end of

the continuum with exclusive use of either quantitative or qualitative methods at the opposite ends, whereas partially mixed method designs are placed somewhere in the area in-between.

When undertaking a mixed method research study, decisions about mixing qualitative and quantitative techniques within one or more stages of the research processes or across the stages should follow a specific design (Cresswell, 2006; Johnson and Onwuegbuzie 2012; Cresswell, 2015). Creswell (2015) explains that identifying a research design is vital for a researcher as it guides the decisions a researcher takes during the study, dictates the procedure of the study, and indicates the logic by which data is interpreted.

Creswell (2008) refers to research design as "the plan or proposal to conduct research, involves the intersection of philosophy, strategies of inquiry, and specific methods" (p.3). In the same vein, Johnson and Onwuegbuzie 2012 define them as rigorous models/typologies for conducting research differentiated by priorities given to each type of data, the sequence in which two types of data are collected, and whether data will be analysed separately or collectively. Mixed method methodologists have devised more than 15 mixed method designs classifications drawn from diverse social science disciplines (Johnson and Onwuegbuzie 2012). Yet, Creswell (2015) indicates that there are more similarities than differences among these taxonomies. Therefore, in an attempt at providing a more practical classification, he proposes four major designs: Triangulation/convergent design, the embedded design, the explanatory design, and the exploratory design (Creswell, 2006). In line with Creswell (2006), Johnson and Onwuegbuzie (2012) advance a similar classification: convergent design, explanatory design, exploratory design, and embedded design. However, in his latest publication, Creswell (2015) divides mixed method designs under two broad classes, "basic mixed method designs"(p. 35) and "advanced mixed method designs (p. 42). The former comprises convergent design, explanatory design, and exploratory design, while embedded design, called intervention design, has been regrouped to be under the advanced design which also involves social justice, and multistage evaluation designs.

The current study expands on the intervention / embedded design as it is employed throughout the study procedure. The next section describes the embedded experimental model.

4.3.1.2.1   The embedded experimental model

The embedded experimental model is selected when the researcher collects and analyses both quantitative and qualitative data within a traditional mixed method study and in which one data set is embedded in a study based largely on the other data type (Creswell, Plano Clark, et al. 2003; Creswell, 2005, 2006, and 2015). For example, a researcher could add a qualitative strand to a quantitative methodology by conducting an experiment or intervention trial, or might embed a quantitative element in a qualitative methodology like a case study. Creswell (2015) assumes that this design is particularly useful to answer different research questions that require different types of data.

Creswell (2015) provides an explicit description of the procedure of the intervention design. He clarifies that a problem is studied by conducting "an experiment or an intervention trial" within which a control group and an experimental group are identified. The experimental group only should undergo certain intervention for a period of time. Then, both groups would be pre- and post-tested to determine whether the intervention has an effect on the outcome of the experimental group in comparison to the control group which did not receive it (p. 42). Creswell (2015) shows that the researcher could add qualitative or qualitative data into the experiment at any phase either before, during, or after the intervention. The inclusion of qualitative data before the experiment, as Creswell (2006), (2015) and Johnson and Onwuegbuzie 2012) indicate, could be for the purpose of recruiting participants for the trial, helping in the design of the trial, or raising participants' awareness of the objectives and procedure of the upcoming trial. During the intervention, Creswell (2015), explains that qualitative inclusion aims to detect participants' experiences with the intervention activities, whether or not these activities gain participants' acceptance, and what amendments subjects suggest in improving their experience. Lastly, as he notes, the intervention design can integrate qualitative data after the said intervention as a

follow up on the results allowing for qualitative understanding and to provide a more detailed explanation of the results, together with the statistical findings.

The current study favours pragmatism as a research paradigm as I aimed to liberate myself from rigorous research confines and use whatever methods seems practical to answer the research questions. Creswell's (2015) mixed method embedded experimental design was selected by collecting data using quantitative and qualitative instruments along various experimental stages, before, while, and, after the experiment to increase the overall validity of the study. This is due to the combination of advantages that can be obtained by using both qualitative and quantitative data, while simultaneously being able to minimize the limitations.

As such, triangulation, which is the "combination of two or more data sources, investigators, methodologic approaches, theoretical perspectives or analytical methods" (Thurmond, 2001: p .253), was used within this study. Triangulation was necessary in order to increase internal and external validity and reliability within the research, but also to gain a more multi-dimensional perspective. It also reduced the overall bias within this research, which is an issue commonly noted in previous research and is therefore a way to counterbalance the weaknesses of one method with the strengths of another (Mitchell, 1986).

As such, before the commencement of the experiment, quantitative measures like questionnaires were used to collect the participants' current beliefs about vocabulary learning and expectations of usability of mobile phone learning. This was followed by qualitative measures like pre-focus group discussion to prepare participants for the upcoming experiment and to discuss some of the sophisticated concepts participants might have been faced with in the pre-study questionnaire. Following this, pre-tests were administered to identify participants' current knowledge of target words. Then, after the intervention, qualitative content analysis for WhatsApp contributions was conducted in an attempt to understand participants' roles in learning, frequency and quality of contributions and vocabulary learning strategies used. This was essential to understand how and why learning took place (see sections below for more detail).

After the experiment, similar post intervention quantitative measures were used (post-study tests and post-study questionnaires) to observe the impact of the intervention on participants' vocabulary gain and whether it caused improvement in their beliefs and practices towards vocabulary learning and mobile phone learning. Additionally, interviews were conducted in the post-study phase to investigate participants' acceptance of overall mobile learning experience. Moreover, the behaviours and progress were traced   of a number of cases closely during the study in an attempt to explore patterns and pinpoint irregularities during the study intervention time (Stake, 1995).

The inclusion of a control group is necessary in the experimental design since it aims to establish possible cause and effect relationship between the independent and dependent variables (Creswell, 2012). In other words, when the independent variable affects the dependent variable, we can conclude that the independent variable is caused by the dependent variable. This impact is assessed by giving an intervention to one (experimental) group and withholding it from another (control) group and then determining how both groups scored on an outcome (ibid).

However, Creswell's embedded experimental design has been modified to better serve the main objectives of the current research. That is, rather than dividing the research sample into an experimental and a control group to examine the cause and effect relationship between the use of mobile phones and learning, I decided to use the whole research sample as an experimental group for the following reasons.

First, this study takes into account the findings of previous studies, which report vocabulary gain of an experimental group using mobile learning when compared to another control group (Thornton and Houser 2005; Lu, 2008; Kennedy and Levy; 2006). As a step forward, the current study builds on these studies and becomes predominately occupied with how learners learn using mobile phone technology by investigating the learning processes within the experimental group, rather than simply comparing their achievement with an equivalent control group.

Second, using the whole research sample (33 participants) as one experimental group and examining their interactions would enable a better opportunity to gain rich data than examining only half of the sample (about 15), when it is divided into a control and an experimental groups. That is, having a larger sample size would enable the construction of two WhatsApp groups (LOTM1) and (LOTM2) rather than one. This would create more space for individuals with diverse learning styles to construct learning. In other words, a more comprehensive picture of how they interact, which strategies they use, how they overcome language problems, how they exchange feedback, how they fix errors, and how they obtain perception will be established. This would provide more insight into these processes and how learning was achieved. In addition, understanding views of a larger sample size would give a more comprehensive picture of participants' attitudes and acceptance of mobile phone learning.

Third, this study examines evidence of learning by triangulating the rich data of the larger sample size, identifying patterns, and highlighting irregularities, rather than by examining the cause and effect relationships. In other words, the larger sample size would allow for the identification of the similarities and differences among cases and clarify justifications for participants' behaviours which enable a degree of generalizability, and thus facilitating the drawing of conclusions.

Accordingly, findings of the current study regarding vocabulary gain and their correlation with the mobile phone learning could not be described as a definite cause and effect relationship as we could not compare vocabulary gain obtained by mobile phone learners with counterparts who learn without using one. Also we could not attribute vocabulary gain in this study to mobile phones learning only as learners might also use traditional learning methods throughout the intervention. Therefore, findings pertaining to the correlations between the dependent variable (vocabulary gain) and the independent variable (learning through the use of mobile phones) are described with less definitiveness rather than in terms of a straightforward cause and effect relationship. In other words, I will be cautious in making decisions about the strength of the claims I am making.

The next section outlines the different phases of the research.

4.4 Research phases

This research has undergone two research phases. Firstly, a pilot study was conducted with eight students from level 3 in an English Language Institute in order to test the research instruments (including questionnaires and tests). Following the pilot phase, the instruments were refined and simplified according to participants' comments which recommended simpler language for some questionnaire statements since they were in English. Then, phase 1 of the main study was conducted and terminated shortly afterwards due to the participants' gradual withdrawal during the third week since they were no longer motivated to continue. Despite its mixed findings, this phase gave insight into the different variables at play that interfered with the flow of the intervention and which in turn yielded unreliable results. In other words, the withdrawal of the participants' was disappointing to an extent; however, it led to further investigation of the factors causing what we have called 'failure'. It emerged that language proficiency level and motivation to learn English were two prominent contributory factors of this 'failure' which were identified in the participants post study interviews (see 7.4 and 8.4). Additionally, lack of a research culture seemed to be another factor that interfered with the findings of this phase as many participants questioned their aptitude to be committed to a four week investigation without directly benefitting themselves.

4.4.1   Phase 1: Pre-Intermediate level, 103

Phases 1 of the study was conducted in an English Language Institute, with students in the foundation year of a four Year Degree Programme and were in level 103. Enrolling in 103 requires successful completion of ELI 102 or an Oxford Online Placement Test score corresponding to elementary proficiency level. ELI 103 is a pre-intermediate level course which aims to improve language proficiency from A2 level on the Common European Framework of Reference for Languages (CEFR), which leads to becoming a basic Independent user of language, defined as B1 Threshold Level of the CEFR. It is a seven-week module course with 18 hours of instruction each week. Successful

completion of ELI 103 and ELI 104 gives students the necessary credits to meet the Foundation Year English language requirement (Instructional pack; Faculty handbook 2013). Research materials used in phase 1 of this study are complementary materials to the students' core textbook by Oxford University Press: New Headway Plus, Pre-Intermediate, *Special Edition:* 103 level.

In one full academic module of 7 weeks, the course aims to develop students' language skills to read and comprehend the main ideas of various texts, listen to and understand the main ideas in short oral communications and participate effectively in a short conversations using appropriate language. Also, it aims to enable students to write a range of text types using coherent and cohesive paragraphs and appropriate vocabulary in a developed response. The course is also concerned with helping learners to gain control of a number of target vocabulary items (from the word lists of units 3-12) and grammatical structures (Instructional Pack; Faculty Handbook, 2013).

To demonstrate successful learning and achievement of students' learning outcomes, they must undertake teacher-generated short quizzes and work in individual and group tasks as well as in-class and homework assignments covering all skills on a weekly basis. Over the module, further evidence of achievement is gathered by the use of ELI standardized assessment tests measuring students' achievement (Instructional Pack; Faculty handbook, 2013).

Faculty are encouraged and expected to utilize suitable supplementary materials to facilitate achievement of the learning outcomes. Great caution is required to ensure all supplementary materials are culturally appropriate.

4.4.2 Phase 2: Reading 1, Lane (212)

The main study (phase 2) was conducted in the English department of the College of Art and Humanities in the Reading 1 class (Lane 212). This course is given to students in their second year in the English department. It is a three-hour per week credit-bearing course designed to improve reading skills. Successful completion is a prerequisite to attain Reading 2 (Lane 215). The core textbook for this course is Heinle's PATHWAYS 4, *Reading, Writing, and Critical thinking.* The learning materials

developed for the main study are complementary materials to this course
(see 4.7.1, 4.7.1.1, and Appendix M) .Students take other subjects such as Listening
and Speaking 1 (211), Writing (213), Islamic culture 2 (201), Introduction to Natural
Science (205), Youth and Citizenship Values (210) with total of 17 hours per week in
their third semester.

The reading course aims to develop students' abilities to skim for main idea and scan
for details, improve speed of reading, build academic vocabulary, and use vocabulary-
learning strategies to improve their vocabulary repertoire. Also, it aims to increase
vocabulary size to enhance fluency and comprehension, help learners to make use of
contextual clues to infer meanings of unknown words from context, and to summarize
and paraphrase information in a text. Other course objectives include helping learners
to differentiate main ideas from specific details / facts from opinions, and make
inferences and predictions based on comprehension of a text. Students also indicate
author's purpose and tone, discuss and respond to content of the text orally and in
writing, and reflect on and evaluate learning. Some subsidiary objectives include
realising behaviour and attitudes suitable to a university environment such as working
collaboratively, managing time, being prepared and conforming to academic rules
(Watkins, 2011).

Throughout the semester students are evaluated according to the following measures:
Book Presentation: 5%, quiz 1, 15%, quiz 2, 20%, quiz 3, 20%, and final Exam 40%,
 (Watkins 2011).

The next section identifies participants over the two study phases.

4.5 Participants

Over the two phases of the study, I used two Saudi female research sample groups
with different ages, language levels, and different language learning goals as well.
Findings obtained from Phase 1 informed participants' selection in the main study (see
Research phases 4.4). The reason for using female students within the study is that
male and female students are taught on separate campuses at the research site and I

had easier access to female students. Access to male students would have meant the need for a male co-researcher.

Research sample for phase 1 was one class of 30 learners from the Foundation year program in English language in ELI, KAU, with ages ranging from 17-18 years old. This sample group were basic language users who were at elementary level, A2 of the Common European Framework. They were placed in the level 3 class, out of the 4 levels in the Language Institute.

It is worth noting that while students in the Foundation year, including this group of participants, perhaps recognize the importance of learning English, many may never actually use it in academic settings other than in English classes or with the native English speaking population. Furthermore, it is possible for these students to select to subsequently enrol in one of the large array of schools in which their studies are only taught in Arabic such as Economics, Laws, Psychology, Religious Studies, or Social studies, suggesting that English may not be a priority for many of them.

In this vein, a number of research studies have suggested that learners' desires/goals to learn English can be fundamentally linked to the need to use it. That is, these studies suggest that those who *need* English or those who are able to immerse themselves within the language (i.e. by travelling to a country where English is the primary language) are more likely able to succeed in language acquisition (Gunning & Oxford, 2014). In this population, such a need may not exist and may consequently have affected the results of phase 1 of the study.

As the foundation year is a crucial year for students, primarily due to the link between the Grade Point Average (GPA) and acceptance into the future desired college, students may be hesitant to embark on a four-week experiment around a topic they may feel lacking in significant personal benefits. They are not accustomed to a research culture and may not see its value, or cannot perceive a direct benefit for them. That is, only a few of them filled out the online pre-questionnaire, and when given hard copies during class time, some of them submitted them empty with no responses, while others might have checked questionnaire boxes carelessly resulting in an unexplainable internal inconsistency. Research seems to suggest that actually noticing a benefit may increase the likelihood of seeing improved results in the English

language classroom (Gunning & Oxford, 2014). This notion was one of the key barriers while conducting research with this particular set of participants.

Due to the experience and findings obtained from phase 1, I arrived at an understanding that in order to conduct the research successfully, the choice of research sample needed to be modified to comprise older students with more oriented learning goals, clearer reasons for learning English, and higher language levels. Participants of the main study (phase 2) were a class of 33 female students from the Reading Class 1 (see above) with ages ranging from ages 20-24. This class was randomly selected by the administration of the university and all of the students within this class participated in the study.

This group of participants presumably have better reasons to learn and use English since they are entirely immersed in English language instruction. They are in their second year and have a better command of English than the phase 1 students and are thus are considered to be independent users. Accordingly, this group of students can understand the main ideas of complex texts, including discussions in their field of specialization, can interact with a degree of fluency that makes regular interaction with native speakers quite possible, and can produce clear detailed texts and explain views on diverse topics (Watkins, 2011).

Since this selected sample is specializing in English language, they will have valid reasons to learn English or have better awareness about the importance of English in the future workplace. Therefore, after eliminating the variable of low motivation for language learning, the participants in the main study would better allow an evaluation of the impact of the new learning mode (mobile phone) on vocabulary learning.

The following section details the research instruments used in the study.

4.6   Research Instruments (Phase 1 and Phase 2)

As previously mentioned, this research uses a mixed methods approach in its design in order to be able to compare different perspectives of the research. Mixed methods, according to Onwuegbuzie and Johnson (2012) contain essential key characteristics.

The research incorporated both quantitative and qualitative data collection instruments, which in this case included pre/post-tests, quantitative and qualitative content analysis paired with questionnaires, interviews, focus groups and individual case studies. Data from multiple sources needs to be analysed as a whole, meaning they must be correlated and compared rather than analysed as separate elements, in an attempt to contribute to an overarching philosophical world view of the benefits of technological enhancements on vocabulary learning. The following elaborates on each of the selected research tools separately.

Table 3 gives an overview of the research instruments used and the research questions the data from that instrument seeks to answer.

Table 3: :   Summary of research instrument and corresponded questions

Instruments	Research questions
Questionnaires	Question 2 –Question 3
Tests	Question 1 (parts A and B)
Interviews	Question 2- Question 3 (parts A and B)
Focus groups	Question 2 – Question 3
Content analysis	Question 2 – Question 3
Case studies	Question 2- Question 3

4.6.1   Vocabulary tests

The pre/post-tests model is "common techniques for capturing change" (Gouldthorpe and Israel, 2013). In other words, it is used to measure the extent of progress students have made upon the intervention of an educational program. Gouldthorpe and Israel (2013) explain that a pre/post-test model is carried out by giving the pre-test first, implementation of the program and then upon completion, participants are given a post-test to answer the same set of questions given in the pre-test, or set of questions of comparable difficulty. They contend that, compared to the pre/post model, the after-only test design is a weak method as achievement cannot be entirely attributed to the impact of the program. They add that pre-tests are multipurpose, for example,

knowledge of the current status of a group may provide direction for upcoming activities, or conducting an entry test can determine whether assumed prerequisites are needed. However, like other research methods, the pre/post-test has some drawbacks including the difficulty in determining if the positive change in a pre-post-test is due to the educational intervention or simply natural growth in learners' knowledge (Gouldthorpe and Israel, 2013). For these reasons, the pre-post-test is common in vocabulary research, Gouldthorpe and Israel, 2015) and it was important to use standardised vocabulary research techniques.

4.6.1.1   Pre- test instrumentation

a) Phase 1

The participants were administered the pre-study test after a focus group session in phase 1 of the study, with the objective of seeing whether they were able to show knowledge of 30 words found in their official textbook *Headway, pre-intermediate level* but which had not yet been studied. A total of 30 marks were given to this test which means one mark was allocated to each answer. 20 of the test words were target words (taught during the intervention) and 10 of them were non-target words (not taught during the intervention). Non-target words were added to the test in order to later evaluate students' independence—in utilizing the given vocabulary learning strategies while memorizing non-target words.

Test items: Students were asked to find L1 translations of 8 words in question one (the pre-intervention vocabulary test can be found in Appendix D.1). Then, in question two, they were asked to match 8 words with their equivalents. In question three, they were asked to fill in 8 blanks with the correct word to fit its meaning/ definition. In question four, they were asked to select an appropriate part of speech of 4 words to fit particular contexts. Finally, in question five, the participants were asked to use 2 of the given words in full sentences.

b) Main study (Phase 2)

Following the findings of Phase 1, the opportunity was taken to develop a more robust pre- and post-vocabulary test. The main pre-test consisted of seven sections with a total of 45 multiple choice items. There were 35 target words, 10 non-target words with one mark allocated for each answer. Because participants were at an advanced intermediate level, they are likely to have encountered those words before or were able to employ a number of strategies to make close approximation of correct answers. Therefore, any mistake would be scored as incorrect. Participants were informed that test scores would be used to know whether they have any background knowledge about the target words, to identify a starting point for further learning, and to measure progress, if any, as a result of the intervention after comparison with the post-intervention test. Also, they were assured that their course grades would not be affected in any way in order to provide a sense of security.

Although use of a multiple-choice test might reduce the validity as there is always the possibility that participants' can guess the answers correctly, this format is used because it is the only format the students encounter during their formal assessments at university level. This was verified when participants from phase 1 revealed that they were uncomfortable doing the pre-test due to its new format, which persuaded me to conform to the question format (multiple choice) that students are used to. In addition, research in language testing has identified a number of advantages in multiple-choice assessments (MCQs) (Brown & Hudson, 1998). First, it can provide useful information about students' abilities or knowledge in many language areas especially the receptive skills ((Brown & Hudson, 1998). Test takers responses are relatively valid   since the "guessing factor" is relatively small (e.g., 25% for four options) compared to true-false assessment, 50% (Brown & Hudson, 1998, p. 86). Other advantage of MCQs is the easy, fast, and objective scoring, although the inability to measure students' productive knowledge is considered to be a major disadvantage (ibid).

Test items (see Appendix D.2): Question one measures recognition of form. In this question, the correct spelling of the target word was presented along with three

distractors. The distractors were spelled incorrectly as they are influenced by Arabic phonetically or orthographically such as using /b/ instead of /p/, /f/ instead of /v/, /j/ instead of /g/ (Nation, 2001). Question two is a measure of recognition of meaning; it assesses if the learner can understand a range of uses of the word and its central concept (Nation, 2001). Here the word is presented in isolation along with a set of synonyms. The participants are tested on their knowledge of synonyms by being asked to select the odd word out.

Question three is a meaning recognition question. It aims to measure if learners can produce the appropriate word for the given definition (Nation, 2001). In this question, the participant has to recognize the target word necessary to complete the definition. The distractors are grammatically acceptable. Question four is to test another aspect of word knowledge and aims to test learners' ability to recognize the appropriate collocations (Nation, 2001). It consists of 10 statements with each one being allocated half a mark. Question five asks candidates to demonstrate knowledge of the grammatical functions of a word family and recognize the correct form to fit a given context (Nation 2001).

Question six is about measuring students' abilities to use words in context. Eight statements ask candidates to fill in blanks by selecting the correct word. Choices include both target and non-target words and they are all the same part of speech. Finally, Question 7 comprises 12 sentences in which test takers have to also use context to guess the most appropriate word meaning from given sets of words, which includes distracters. Some of the distracters could be appropriate in isolation from the context, yet there is only one appropriate meaning in the context in which the word is given. For example, the word invasion could mean *attack or offensive*, however in the context of *tourist invasion*, it means *arrival*

To answer the pre-test questions, candidates need to draw on their background knowledge and their cumulative experience with English. Students were given the

whole class period to complete the test (1 hour), yet they only took between 20 to 30 minutes to submit their pre-test papers.

4.6.1.2   Post-test instrumentation

As the phase 1 study was not fully accomplished due to the withdrawal of most of the participants, they did not take the Post-intervention vocabulary test. However, all participants in the main study took their post- intervention test immediately after the completion of the 5 week intervention. The post-study test was identical to the pre-study test as it aimed to measure participant progress/gain of the target words after the five weeks intervention. Participants took between 40 to 50 minutes to complete their papers. It is presumed that they took longer to complete the post-test than the pre-test because they had a more positive attitude and wanted to discover whether they had made progress during the intervention. In completing this test, they could use the diverse vocabulary learning strategies they had practiced during the intervention, use recalling strategies, or at least make use of context to employ a guessing strategy to select the correct word. Participants were not informed about the test date in advance. Post- test papers were graded and analysed and compared with pre-test scores (see Appendix D.2)

4.6.1.3   Retention test

Retention tests are a common feature of vocabulary research as a form of measurement of how many vocabulary items are retained after teaching (Schmitt, 2008). One month later, after taking the post- intervention test, participants in the main study undertook the same vocabulary test to measure their retention/word loss of target words. It is worth noting that regular classes had been suspended since the completion of the intervention due to the mid-term examinations. This means there was no further reinforcement after the intervention (see Appendix D.2).

4.6.1.4   Vocabulary gain/ vocabulary loss

This study uses vocabulary gain (the difference between the pre- and post-study test scores) to measure individual improvement rather than post-study test scores. The rationale of using vocabulary gain as a determinant of students' progress is that, as

participants entered the experiment with varied vocabulary knowledge of target words which was evident in their varied pre-test scores, their post- intervention test scores would possibly be influenced accordingly. That is, it is postulated that some of those who have previous background knowledge about tested words and had higher pre-test scores would, in many cases, score even higher in the post- intervention test, even when they did not necessarily gain more words. A hypothesized example is a participant who scores 10 in her pre-study test, and scores 30 in her post-study test does not gain more words than a participant who gets 0 in the pre-study test and scores 25 in her post-study test. The first participant gains 20 words only, while the latter, though having lower post-test score, gains 25 words. In turn, the latter showed

Table 4 :Average pre-test scores/ average post-test scores/ Average vocabulary gain

	Pre-test out of 45	Post -test out of 45	Vocabulary gain
Mean	5.6970	29.9091	24.2121
N	33	33	33
Std. Deviation	4.26090	10.52189	7.99124

more progress. A list of vocabulary gain scores per participant is found in Appendix E.3.

Similarly, vocabulary loss is calculated by subtracting each participant's post-test scores from her retention test scores. In the analysis phase of this research vocabulary gain was linked with frequency and quality of WhatsApp Messenger contributions to study its impact on vocabulary learning. On the other hand, vocabulary loss was correlated to individual average contributions. A list of vocabulary loss scores per participant is found in Appendix E.3.

4.6.1.5   Grouping participants

Table 4 below), a decision was made to group participants according to their vocabulary gain to identify if patterns could be found.

That is, those who obtained above 24 words are considered as above average while in the same sense, those who obtained less than 24 words are below-average vocabulary gain learners.

However, this division left no room for average learners except for those who obtained 24 words. Therefore, in examining the individual participant's score, participants were found to be easily allocated into three clusters. This offers better categorization as participants were grouped into above average, average, and below -average vocabulary gain groups. Consequently, an estimation that the above average group gained from 29-38 words, the average group gained from 18-27 words, and the below-average one gained from 7-15 words. Appendix E.4 shows the grouping of the participant' according to their vocabulary gain.

4.6.2   Questionnaire

Questionnaires can be a simple and effective way to collect data from a large group of participants. In terms of justification of the questionnaire as a theoretically suitable instrument for this study, Dornyei and Taguchi (2010) suggest that the questionnaire is an instrument that allows the researcher to easily collect data on a specific topic. Brown (2001) defines questionnaires as a group of questions or statements that are presented to participants with the expectation that they will either respond with their own answer or select a choice from a list of possible options. This noted, oftentimes, questionnaires are more statements than questions, and an attempt to elicit opinions from participants about their views on a particular subject on a particular day and in a particular context. Questionnaires, according to Dornyei and Taguchi (2010) can obtain three types of data from participants: attitudinal, behavioural and factual. The questionnaires in this study aimed primarily at the factual elements (i.e. to classify the participants) and attitudinal (i.e. looking at opinions, beliefs, values and interests), and in theory this will provide an overall background picture of the participants' lifestyles in

terms of their everyday use of mobile phones. It will also offer insights into how they view the use of mobile phones for learning and into their expectations of their usability.

One of the first research tools designed for this study were the pre- and post-intervention questionnaires. After determining the main aims of the study, having some tentative research questions in mind, and reviewing relevant literature, I identified the goal of the questionnaires and developed them with the help of colleagues specialised in the areas of vocabulary and technology learning. A couple of focus group discussions were held with learners to help decide items that needed to be included in the pre- and post-questionnaires during the phase 1 study. This was carried out in the light of the research objectives and the related literature and by considering the appropriate English language level for the targeted participants. After which, the first drafts of the pre- and post- questionnaires were ready for the academic supervisor's comments and feedback. Both English and Arabic versions of the questionnaires were given to two expert language instructors in ELI, KAU for checking accurate translation, although participants in the main study preferred to use the English versions of pre-and post-questionnaires only. Following this, the pre-/post-questionnaires were piloted to check for validity, reliability, and clarity. The Pre-study questionnaire used in phase 1 was also used in the main study, yet it underwent further refinement and modifications to meet the requirements of the new participants' ages, backgrounds, and language level. The Post-study questionnaire was applied only in the main study.

4.6.2.1   Development of the pre-study questionnaire

The purpose of the pre-study questionnaire was to elicit information in order to be able to carry out statistical measurements that would complement the qualitative findings collected in the pre-study focus group and to study significant differences in participants' responses when statistically compared later with the post-study questionnaire.

The questionnaire is composed of four parts (see Appendix H.2). Section 1 collects participants' personal information such as a preferred referent name and phone

number. Section 2, Part A, inquiries about currents beliefs and practices in vocabulary learning (Nation, 2001). It comprises 15 statements enquiring about the status of vocabulary in language learning, the students' and teacher's roles in vocabulary learning, preferred vocabulary learning strategies and receptive and productive vocabulary knowledge. Answering this part requires responding to a 5 option Likert scale ranging from, Strongly Agree, Agree, Neutral, Disagree, to Strongly Disagree. Section 2, Part B investigates preferred vocabulary learning strategies such as word groupings, repetition, creating mental images, finding synonyms and antonyms, generating own sentences, using an online dictionary. Responding to this kind of question allows participants to tick more than one appropriate choice (Schmitt, 1997).

Section 3, Part A has one question asking about smartphone ownership and is answered by ticking yes or no boxes. This is followed with a statement clarifying that the main focus of this research is smart phone use as it intends to investigate the possibility of using smart phones in learning. Therefore, participants without smart phones are advised to skip the remaining sections and submit their questionnaire papers, whereas smartphone owners are asked to continue the survey sequentially. Section 3, Part B aims to investigate the current uses of smart phones including the exchanging of information, gaming, messaging, and shopping to know to what extent participants are fascinated/connected with the devices. Section 3, Part C aims to investigate the frequency of use of the most popular smartphone applications to be able verify the adequacy of using WhatsApp as a suitable means to deliver learning materials and to maintain ongoing interactions in the current study, based on its popularity among university students in particular. It asked participants to tick the frequency of use ranging from 0, 1-10 times, 10-20 times, and 20+ times of use of various applications (Apps) including WhatsApp.

Section 4 has four statements which aim to investigate current mobile phone use for learning and university related purposes by responding to 4 points Likert scale, from very often, sometimes, rarely, to never. This is to know whether participants had any previous experience with using mobile phones for learning. Finally, Section 5 explores students' expectations pertaining to potential affordances of smart phones in English learning and whether they see it as possible and practical. It comprises 9 statements

inquiring about its expected usability, ease of use, enjoyment, team work, quick access, distraction, or intrusiveness. Responses to this part requires ticking one box in a 5 point Likert scale, ranging from Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree.

4.6.2.2 Development of the post- intervention questionnaire

Immediately upon completing the 5 weeks intervention, in the main study, the post-intervention questionnaire was applied to participants in the main study. The post-intervention questionnaire aims to elicit students' reactions to the whole experiment throughout the main study. It seeks to know to what extent participants accepted the mobile learning experience, whether their vocabulary learning beliefs, habits, and strategies have been altered/modified due to the intervention, and whether they found it useful, compared to their previous traditional methods of vocabulary learning (Lu, 2008; Kennedy& Levy, 2008). In addition, there are two sections in common in the post-questionnaire and the pre-questionnaire: vocabulary learning beliefs/strategies and expectation /acceptance of MALL. This is because I aimed to explore potential differences in participants' responses due to the impact of the mobile learning experience. A procedure similar to that embraced in the pre- intervention questionnaire is also used in the development of the post- intervention questionnaire (see 4.6.2. above).

 The post-questionnaire is divided into Five Sections (see Appendix H.3 for full questionnaire items). Section 1 collects optional demographic information including referent name and mobile number. Section 2, Part A is on beliefs about vocabulary learning and Section 2, Part B is about preferred vocabulary learning strategies. Section 2, Parts A and B are similar to Section 2, Parts A and B in the pre-study questionnaire. Participants at this point are expected to show improved awareness of vocabulary learning beliefs and vocabulary learning strategy use. Section 3 which explores participants' experiences with mobile learning complements Section 5 of the pre-study questionnaire which was about expectations about mobile learning. For example, statement one in Section 5 in the pre-study questionnaire is "I think learning English by mobile phone would be useful" corresponds to the first statement in Section 3 in the post study questionnaire "Learning English with mobile phone messages is useful". This

allows for a comparison of participants' expectations of mobile learning before the experiment with their attitudes after the experimentation with mobile learning.

Section 4, Part A comprises 10 statements that aim to explore many aspects of the mini vocabulary lessons that form the intervention. They examine ease and usefulness of the content and compare them with elaborated traditional lessons. Section 4, Part B includes 21 statements investigate participants' views about whether/how online interaction enables learning. For example, some statements investigate the ability of virtual environments to facilitate meaning negotiation including modification, comprehension requests, and feedback. Section 5 contains 4 statements inquire about the participants' intention to use MALL in the future, and Section 6 asks participants to rank their overall impression about their MALL experience by selecting one of the 5 descriptions: 1 (very poor), 2 (poor), 3 (fair), 4 (good), and 5 (excellent).

4.6.3　　　Focus groups

A focus group discussion is a common qualitative research technique used among academic researchers in the health and social sciences (Wilkinson 2004). Simply, a focus group is an informal discussion among a group of selected individuals focusing on a particular topic (Wilkinson, 2004). A focus group typically consists of a small number of participants, usually around six to eight who come from similar social and cultural backgrounds or who have similar experiences or concerns. On this ground, participants in this type of research are selected on the criteria that they would have something to say on the topic and would be comfortable talking with the researcher and each other. The primary aim of a focus group is to describe and understand meanings and interpretations of a select group of people to gain an understanding of a specific issue from the perspective of the participants of the group (Liamputtong 2011).

The focus group has some significant merits (Liamputtong 2011). First, focus groups are valuable for obtaining in-depth understandings of the numerous interpretations of a particular issue of the research participants. Focus groups permit researchers to search for the reasons why particular views are held by individuals and groups. The method also provides insight into the similarities and differences of understandings held by people. Second, focus groups allow "multiple lines of communication". For

people who find one on one and face-to-face interaction embarrassing or unnerving the group interview may offer a safe environment where they can share ideas, beliefs, and attitudes. Also, it allows researchers to pay attention to the needs of marginalized people who have little voice.

However, focus groups are not without criticism (Liamputtong 2011). For example, some research topics are not suitable for open discussion, such as personal issues for example. Further, group members may not participate actively in the discussion, or one or two participants may dominate the conversation and in such a situation, group members may simply conform to the prevailing ideas present in the group.

4.6.3.1   Pre/post-study Focus group instrumentation

Upon looking through participants' responses in the pre-study questionnaire, focus group discussion was the second research instrument used to collect qualitative data. In phase 1, a forty minute focus group discussion was conducted with 15 students in the students' class. The discussion was mainly in Arabic according to the participants' preference, and translated later to English after being transcribed. In the main study, two focus group discussions for 28 out of 33 of the students were conducted: focus group 1 and focus group 2 with 13 and 15 students respectively. The pre-study focus group was semi-structured using almost similar questions to the pre-study questionnaire. The aim was to give participants adequate opportunities to freely express themselves without being pressured by time constraints.

In the main study, the fist discussion lasted for 45 minutes in the Student Centre and the second one lasted for about 50 minutes in the one of the students' study rooms in the Central Library. Discussions were conducted mainly in English with some codeswitching when there were knowledge gaps and both focus groups were voice recorded. The focus groups were larger than typical but they worked well and allowed participants to express opinions. In fact, the large size of the group gave them more confidence to engage in a discussion and agree and disagree with each other.

The discussions were primarily structured around the questionnaire questions and aimed mainly to negotiate current vocabulary learning beliefs and mobile phone

expectations, and how they could be combined to enhance the quality of vocabulary learning. I also aimed to detect participants' understanding of questionnaire statements and understand their responses since the concept of mobile learning enquired about in the questionnaire might have been unfamiliar to them both practically and conceptually. That is, the focus group discussions allowed me to shed light on the internal inconsistency in some of the ambiguous responses to the pre-questionnaire items.

 A further purpose of this discussion was to prepare students for the upcoming experiment, to illustrate the procedure of the experiment, and the expected teacher's and students' roles. That is, I explained that for the fulfilment of this study and to accommodate all class members, two WhatsApp groups of about 15 participants in each, would have to be constructed. Via these groups, they would receive around 4 or 5 text messages at intervals during the day containing mini-vocabulary lessons about the target words (See 4.7 below). In turn, their roles were to read these lessons, comprehend them, further search for more knowledge about the target words particularly when some messages involved questions about them, and to take notes if needed. Participants were free to post their research results, to the WhatsApp group, either immediately or during the ongoing virtual chat sessions. These chat sessions, as they were informed, would be held around three times a week in which participants of each WhatsApp group members would have to set some time aside, of around 30 minutes, to talk about new words from their reading textbooks, identify areas of difficulties, practice using various VLS, discuss some relevant topics, and interpret sent images.

One post-study focus group discussion was held immediately upon completion of intervention of the main study with the rest of the participants who were not interviewed due to time constraints. The post-study focus group was semi-structured using almost similar questions to the interview (see interview questions in Appendix H.4). Similar to the interviews, it aimed to collect participants' responses towards their experience with m-learning, their acceptance of the mobile phone as a learning tool, allowing me as a researcher to collect data from multiple resources and triangulate them in order to enhance research validity.

4.6.4 Interviews

It was necessary to use interviews to delve deeper into some of the responses provided by participants. Interviews provide insight and perspectives that allow the researcher to meet the research objectives, while providing critical information which may not be attainable through other quantitative methods (Cohen, Manion & Morrison, 2007) and therefore this further contributes to the mixed method approach chosen for this study. However, this classification of interviews as primarily qualitative is not without flaws, as interviews tend to include researcher bias (Silverman, 2010) and therefore the mixed methods approach of complementing interviews with other forms of quantitative data is intrinsically useful.

In addition to the link between interviews and questionnaires, it is also important to note how the theories behind the nature of the interview become essential for this research study. In previous research, Yin (2006) alludes to the benefits of the face-to-face interview where participants can be more easily observed and non-verbal communication can come into play. While Yin (2006) acknowledges that interviews are typically seen as 'verbal reports' and can have limitations surrounding poor recall or inaccurate articulation, there is a pressing need within this study to gain a better overall perspective of participants' experiences. Pairing this type of interview strategy with the more quantitative type of data obtained in the questionnaires and the tests should provide a clearer perspective on the nature of learning vocabulary through a specific design.

4.6.4.1 Interview instrumentation

In the post-study stage, semi-structured, student-researcher interviews were conducted with a number of research participants in both phase 1 and the main study (See Appendix H.4 for interview questions). That is, in phase 1, 5 participants agreed to be interviewed after their withdrawal from the experiment and this amounted to one hour of interviews in total. Interviewees used Arabic while being interviewed, after which I transcribed and translated their recordings.

In the main study, I interviewed 15 participants representing all patterns identified in research samples including irregular cases who showed discrepancy in their beliefs and

behaviours, like those who showed infrequent online contributions while having high vocabulary gain and vice versa (Lu, 2008). Interviewees used English during discussions and tended to codeswitch when they had a language gap. Voice recordings of the interviews were transcribed after completing the interviews. The average length of each interview was 15 to 20 minutes and the total interview data is 3 hours and 50 minutes. The purpose of these interviews was to gather subjects' spontaneous ideas about their impression of their experience with m-learning, their acceptance of mobile phones as a learning tools, the affordances of mobile phones which could benefit learning, the drawbacks of mobile learning, and the expected challenges of official mobile learning integration with classroom learning. It was also used to determine how participants dealt with the target words, how they learned them, and whether they preferred traditional study modes. Findings from the interviews were triangulated with the corresponding findings from the questionnaire, the focus group, and the tests.

NVivo is used to analyse interviews with the 15 participants. The full script of each participant's interview is used as a separate resource and entered in NVivo. Individual case studies will now be looked at in the following section.

4.6.5   Individual case studies

A number of participants were selected for in-depth individual study following Dornyei (2007, p. 152):

> The case study is not a specific technique but rather a method of collecting and organizing data so as to maximize our understanding of the unitary character of the social being or object studies.

This approach enables me to focus on particular individuals to develop insight into their experience of learning vocabulary using mobile phones. 8 case studies were conducted in order to overcome the problem of generalizability that occurs from having a small number of case studies (Dornyei, 2007; Yin, 2011). This problem can also be reduced by triangulating the research tools (Dornye, 2007). Examining individual achievement, individual mobile phone practices, and beliefs across multiple cases offered the possibility of comparing and contrasting different participants and

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additional insight into the impact of mobile phone learning on vocabulary learning. Although each case would reflect a unique insight, similarities might emerge across different cases, from which it would be possible to draw conclusions about wider issues, and this would be helpful in answering my research question about how learning might be constructed.

As participants were previously classified into three groups according to their vocabulary gains: Above average vocabulary gain, average vocabulary gain, and below average vocabulary gain learners (see 0 and Appendix E.4), I selected 2 cases typically representing each group, as well as two irregular cases that did not follow the group behaviours to have 8 cases in total. Thus, from above the average vocabulary gain group, I selected Afnan and Reem. From the average vocabulary gainers, I have selected Hanan and Maram. From the below-average vocabulary gain learners, Halima and Ghadi fit into this category. Furthermore, Lujain and Ebtihal are two irregular cases that lend themselves for study.

The procedure to study these cases was to conduct a longitudinal study of each case starting from the pre, post, and retention test score analysis and correlate them with their average online contribution and numeric quality of contribution. Then, the behaviours of the cases during WhatsApp sessions over the five weeks were examined. Furthermore, their interview transcripts were individually analysed to examine individual responses pertaining to particular key themes. Findings from studying these cases will be triangulated and integrated with data obtained from the questionnaires and WhatsApp chat analysis. Findings of case studies are discussed in section 7.5.

4.7 Design of the intervention (Main study)

This section describes the intervention which constitutes the main part of this research. The intervention in this study has adopted mobile phone technology, WhatsApp Messenger to deliver vocabulary learning materials (Lu, 2008; Saran and Seferoglu, 2010; Jeapson, 2005; Castrillo, 2014; Bouhnik and Deshen, 2014; Fattah, 2015; Awada, 2017; Sam, 2016; Koegh, 2017). Complying with vocabulary learning theories (see 2.7.2), constructivist theories, mobile phone affordances (see 3.3.1), and

memory theory (see **Error! Reference source not found.**), the intervention comprises wo essential components: vocabulary learning lessons and out of class informal discussions sessions, which are illustrated below.

More specifically, it uses two constructed WhatsApp Messenger groups to learn vocabulary. WhatsApp groups are referred to as Learning On the Move, LOTM1 and LOTM 2, following (Lu, 2008). The intervention was originally designed to take four weeks aligning with the intervention duration of many other online vocabulary learning studies which take around 3 to 6 week intervention period (Lu, 2008; Kennedy and Levey, Saran; 2010). However, phase 1 was quickly terminated (see 4.4), while the main study required a further fifth week of intervention.

4.7.1 Vocabulary lessons

These subsections discuss the design of the vocabulary lessons, their contents, criteria for words selection, and how they are delivered.

4.7.1.1 Design, delivery, and content of the vocabulary lessons

The first strand in the intervention can be described as sending students vocabulary learning messages as a useful technique to complement classroom learning with the objective of enhancing vocabulary acquisition and vocabulary consolidation (Lu, 2008; Kennedy and Levy 2006; Stockwell; 2007; Saran, 2010). The vocabulary lesson was designed to best facilitate vocabulary acquisition/ memorization by conforming to vocabulary learning theories and by making use of the affordances of the mobile phone (see 3.3.1.7).

The intervention of the current study was predominantly designed to deliver 5 vocabulary lessons/ messages per day over four weeks to cover from 80 to 85 target words with embedded strategy training. This frequency is based on the suggestion of studies of mobile vocabulary learning (Lu, 2008; Saran 2010). However, the current study delivered 5 or 6 messages per day throughout the 5 week intervention. Thus, in

each week, students actually received from 11 to 18 words with a total of about 75 words during the course of the five weeks.

Vocabulary lessons were sent over spaced intervals adhering to the spacing effect which suggests a better overall experience for participants and a higher degree of acquisition (see **Error! Reference source not found.**) and following the procedure of ther vocabulary learning studies using mobile phone as a delivery medium (Lu, 2008). This was facilitated by the affordance of accessibility, which enabled learners to access learning anywhere and at any time since their mobile phones are always with them and lessons can be received immediately whenever there is a signals. Thus, vocabulary messages were sent to students between 9:00 a.m. and 7:00 p.m. during weekdays allowing participants a reasonable amount of time (3 to 4 hours) between messages.

Lessons were divided into smaller components or 'chunks' or bite size information in an attempt to have learners absorb as much of the information as possible (Lu, 2008; Kennedy and Levy, 2006; Stockwell, 2007; Saran, 2010). The length of the vocabulary lesson is relatively short as it comprises a sentence, or two at maximum, with not more than 130 characters. Vocabulary lessons could even contain one word, a phrase, or an image at least. This design was devised because it reflects a lower cognitive load for students (see 2.9.1). It also fits the portable nature of mobile phone learning as learners learn on the move (see 3.3.1.1). Vocabulary lessons introduce partially known vocabulary items as they were previously introduced during regular classes. They display each target word along with only one aspect of word knowledge (see 2.4), showing either the form, meaning, or the use of the target word (see Appendix M).

The message content also implicitly reinforces a variety of vocabulary learning strategies (see Table 6). That is, target words are introduced by using a number of strategies from both of the broad categories; discovery and consolidation strategies (see 2.7.1) which fall into the sub categories: determination, social, cognitive and metacognitive strategies. In other words, each message/ vocabulary lesson uses one of these strategies to demonstrate one facet of word knowledge. For example, from determination strategies, analysing part of speech, analysing word parts, giving a

definition, and guessing from context were used. From cognitive strategies, giving exemplary sentences and identifying collocations were used. From metacognitive strategies, I have used English language media by sending imageries. Also, some of these messages include short questions to challenge students and further guide them to search for further word knowledge, such as "What do you think……….means?" , " What part of speech is………?", " What do you infer from the picture?"(see 2.7.1 and see Appendix M for full vocabulary lessons table.

Also, images and pictures were tied to many of the target words depending on their degrees of concreteness to promote memory function by abiding to the dual coding theory (see 2.9.2). This was supported by the WhatsApp Multimodality affordances (readability- watchability- viewability- listenability) (see 3.3.1.6).That is, it is expected by considering the aspects influencing memory and cognition and making use of mobile phone and WhatsApp affordances while designing the message, vocabulary lessons would lead to a better learning outcome. In addition, learners could moderate the level of intrusiveness caused by sending the frequent messages by making use of the affordance of availability.

However, the purpose / aim of the vocabulary lessons underwent a slight amendment during the second week of the intervention in the main study. That is, a quick investigation was conducted via WhatsApp to collect participants' feedback about how they found the intervention so far and whether they have any suggestions to improve it. Some of the participants' feedback revealed that they preferred receiving a message introducing the target words every day/ a daily word list, so as to be able to look for further knowledge when convenient (see Figure 2). Some of them even indicated (Afnan, Reem, Khadijah, Khloud, and Fatima) that they could do the job of searching for vocabulary knowledge themselves and then discussing in evening sessions.

This reflected the level of independence that these students seemed to have, whereas others seem to still need vocabulary lessons to be delivered. To accommodate different students' needs, a message introducing the target words was sent daily and

the number of vocabulary lessons were gradually reduced to encourage students to do more work, and were replaced by review messages about the target words discussed in the previous chat sessions (see Appendix M).

Table 5 below shows a sample of a typical vocabulary messages in a day. It also shows a typical size of a vocabulary lesson, and the frequency of delivery.

Table 5: Sample of a typical day vocabulary messages (Week 2)

Message 1 9: 30 a.m.	Good morning every one, Words of the day: Monotonous Unintelligible Precisely Acceleration
Message 2 11::38 a.m.	I feel trapped in a cycle of monotonous activity and want something to give change to my life. What do you think monotonous means?
Message 3 3:50 p.m.	Unintelligible = incomprehensible
Message 4 5:30 p.m.	Acceleration (n) Accelerate (v)
Message 5 7: 00 p.m.	Precisely (adv) Exactly or accurately Nobody knows precisely how many people are still living in Syria.
Message 6	Simulation (n) Something that is made to look, feel, or behave like something else especially so that it can be studied or used to train people

Figure 1 below shows a snapshot from WhatsApp group chat. It shows two types of vocabulary lessons: pictures and exemplary sentences.

Figure 1: Sample of 2 vocabulary lessons

Figure 2 below is a snapshot from the WhatsApp group chat. It shows three vocabulary lessons: an introductory sentence, an exemplary sentence, and a definition below.

Figure 2: Sample of 3 vocabulary lessons
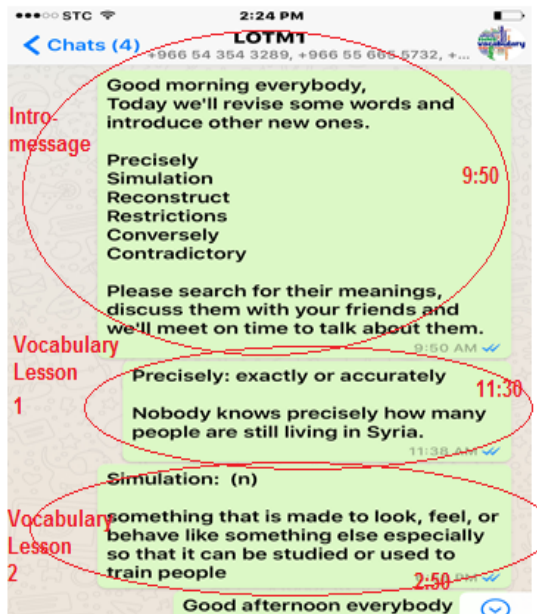
Figure 3 below is a snapshot from WhatsApp group chat. It shows 4 types of vocabulary lessons: exemplary sentences, synonyms, collocations, and pictures.

Figure 3: Sample of 3 vocabulary lessons
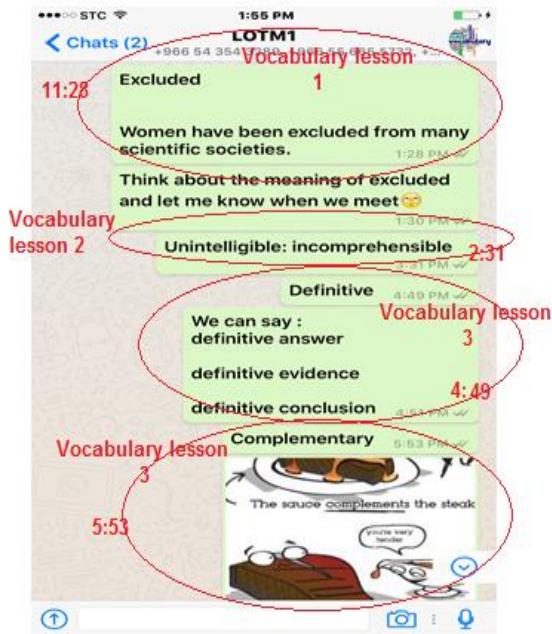
Table 6: Vocabulary learning strategies used in the current study (Adapted from Schmitt 1997).

Vocabulary learning strategies		
Discovery	Determination	a) Analysing part of speech b) Analysing word parts c) Guessing from context
Consolidation	Social strategies	a) Study and practice meaning in a group b) Negotiation of meaning strategies
	Cognitive strategies	a) L1 Translation b) Repetition
	Memory strategies	a) Connect word to image b) Use word in a sentence c) Synonym/Antonyms
	Metacognitive strategies	a) Using English media

The next section discusses factors determining vocabulary choice.

4.7.1.2   Vocabulary choice

As the intervention of this study was a complement to classroom teaching, the choice of target words was predominantly the decision of the classroom teacher (see Appendix L.1). The teacher's decision was informed by the vocabulary building activities of reading topics presented in class to participants during the time of the intervention (Unit 5: Working Together, Unit 6; Language and Culture, Unit 8: Living Longer, Unit 10; Imagine the Future). Many of these words are highlighted / emboldened in the reading passages in their textbook to draw learners' attention to their meaning and use in context. Learning these target words is essential to help learners to comprehend the reading selections and the presented videos, successfully enable learners to engage in topic discussions, and write related essays afterwards.

Word choice conforms to the literature about which words should be taught (see 2.8). That is, target words are frequent academic words found in Coxhead's (2000) academic word list and Kinsella (2003). These words are in the high range since students might encounter them in other courses they were taking such as writing, listening, speaking, and translation. Care was taken to include examples from all word classes (e.g., noun, verb, adjective, and adverb) and all word types (e.g., simple, complex, and compound).

Some target words are expected to be easily taught and learned as they have either short forms (e.g., *breed*), L1 similarity (e.g., *flee*), or might be already known (e.g., *straightforward, figure out*). Other words have a certain level of difficulty, but are teachable and in turn, chances of learnability are possible. For example, some of these words have affixes (e.g., <u>un</u>predict<u>able</u>, collabora<u>tion</u>, <u>dis</u>appear, <u>ir</u>resist<u>ible</u>, <u>ir</u>regular, <u>ir</u>replace<u>able</u>, <u>un</u>intellig<u>ible</u>, <u>un</u>plugged). In addition, target words have varying degrees of concreteness (see 2.9.2 and see Appendix L.2). Few of these words are concrete, others are abstracts, while many of them are in between. Others are difficult to be taught and learned as they have a long form, or are difficult to pronounce and spelling (e.g, decentralization, monotonous, contemporaries, longevity, consensus, and perpetual). Words with different degrees of concreteness and words with pronunciation difficulty are sometimes combined with images and audio files making

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use of the Multimodality of the mobile phone, and conforming to dual coding hypothesis (see 2.9.2 and 3.3.1.6).

Through the description outlined here, this study hypothesizes that the intervention will increase the chances of learnability of these words as participants learn them through interaction, spending time while modifying input, and practicing VLS. Additional aids such as images and audio files will enhance learnability. The next section describes the second constituent of the intervention – synchronous discussion.

4.7.2   Synchronous discussion

Virtual class discussions are another essential component of the intervention facilitated by the affordances of interactivity, portability, immediacy, accessibility, and availability. In the main study, for LOTM 1 and LOTM 2, the primary plan was that three synchronous WhatsApp sessions would be conducted weekly in each of LOTM1 and LOTM2 during the 4 week intervention. Each session would supposedly last about 40 minutes. This would give 12 chat sessions for each group with a total of 24 chat sessions, with about 16 hours in total. However, accommodating students' circumstances and availabilities, 9 sessions were conducted in LOTM1 over the 4 weeks, and 8 sessions in LOTM 2, giving about 5 hours and 20 minutes and 4 hours and 30 minutes, duration respectively, with a total of 9 hours and 50 minutes. However, frequent reading through the data obtained from the WhatsApp discussions over the weeks of the intervention in order to be familiarized with the features characterising this type of data), enabled me to observe that participants increasingly improved in using this new online medium . In other words, they started to become accustomed to the nature of such interactions and showed more interactivity as the intervention proceeded. Consequently, their confidence in using diverse negotiation of meaning strategies and VLS, as well as their online search skills noticeably improved towards the end of the intervention which impacted on the richness of data obtained. Therefore, a decision was made to extend the intervention for an extra week for each group to give a total of 12 hours and 20 minutes.

The current study uses WhatsApp chat groups to allow for language learning via genuine communication. Following Jeapson (2005), Castrillo (2014), Keogh (2017),

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WhatsApp synchronous interaction is perceived as a social community which stimulates genuine communication/peer interaction that takes place to discuss interesting and authentic topics with the aim of supporting language learning, and vocabulary learning in this case. In this virtual environment, knowledge about target words (which participants collected beforehand) were exchanged along with some embedded strategy training. Also, meaningful topics included Food and Health, Obesity, Relationships, Pollution, Collaboration/ Power of Group Work, Design and Furniture, Self-image and the like were discussed, in which target words were used in conversation.

Figure 4 below is a snapshot from WhatsApp group chat. It shows how participants interact to exchange feedback.

Figure4: WhatsApp group interaction

The next section presents how the data is analysed.

4.8 Data Analysis

After designing suitable methodological instruments which best serve the purpose of the study and collecting relevant data, deciding how to analyse this data is essential. The aim of data analysis is to help in the understanding of it to facilitate answering the research questions (Yin, 2011). This section presents the data analysis software used to analyse the quantitative and qualitative data and how analysis proceeded.

4.8.1 Quantitative data

4.8.1.1 SPSS

Quantitative data (questionnaires and pre-and post-study tests) for this project is analysed by SPSS 24 (Statistical Packages for the Social Sciences). SPSS is a popular choice for researchers in the social sciences because the framework and interface are relatively self-explanatory and there are multiple online tutorials if assistance is required ((Yin, 2011).

Firstly, quantitative data was entered and saved in a Microsoft (MS) Excel® 2013 format, and then into an SPSS file format. Both files were kept secured and both files were utilized throughout the data analysis process. All the variables were coded in order to identify them (e.g. by section and then item) and the measure (ordinal or nominal) added. There were 45 Likert (ordinal) scale items and 28 nominal items in the pre-test questionnaire and there were 62 Likert scale (ordinal) items and 26 nominal items in the post-test questionnaire. Data collected through SPSS were kept in a file with a computer password for security, which is ethically and morally important for this research.

The following measures were used to process quantitative data using SPSS.

4.8.1.1.1 Cronbach's Alpha coefficient test

The initial stage of the statistical analysis was performed on the coded responses in the questionnaire using the Cronbach's Alpha coefficient test. The Cronbach Alpha is considered by many researchers as the most commonly used indicator of internal consistency (Coolican, 2014). It provides reliable estimates from the consistency of an

item response from a single assessment. In addition, in statistics, Cronbach's Alpha is used as an estimate of the reliability of a psychometric test (Coolican, 2014). Hair, Anderson, Tatham & Black, 1998 agreed upon the lower limit for Cronbach's alpha to be 0.70 (see Appendix N for the Cronbach alpha's calculated values of the raw data of the Likert scale items in questionnaire instrumentation).

4.8.1.1.2   Paired sample t-test – statistical analysis

Comparing participants' achievements at different phases of the study requires the use of paired sample t-tests to measure the significance of differences among learners' scores and responses to a number of constructs. Acock (2014) explains that the statistical analysis test known as the paired sample t-test , is a repeated-measures test which is used when one group of people is measured at two points. An example given by Acock would be an experiment in which subjects' weights are measured at the start of the experiment and then their weights are measured a second time at the end of the experiment.

Similarly, paired sample t-test statistical analysis is used in the current study to compare the students' achievement in pre- and post-tests to measure the significance of differences among learners' scores. Secondly, the paired sample t-test was also used to examine the changes in participants' responses towards their beliefs about vocabulary learning before and after the intervention. The paired sample t-test also examines the changes in participants' views about usability of MALL before and after the intervention.

4.8.1.1.3   The Pearson Correlation Coefficient

Jackson (2012) states that the "Pearson's correlation coefficient is used when both variables are measured on an interval or ratio scale" (p.162). Thus, it is relatively easy to indicate the relationship (correlation) between two variables based on the calculated coefficient of association. The *Pearson Correlation Coefficient* is used here to correlate vocabulary gain in terms of average contributions scores on the one hand, and to correlate vocabulary loss to average contribution on the other. Accordingly, the strength and the direction of the relationship between vocabulary gain and frequency of contributions is determined. For the same purpose, a scatter chart is created to identify and illustrate the strength and the direction of the relations

4.8.2   Qualitative data analysis

4.8.2.1   Data analysis approach: Thematic approach as a guide for the procedure of qualitative data analysis

For qualitative data analysis, Braun and Clarke (2006) use the thematic analysis method "for identifying, analysing, and reporting patterns (themes) within data" as they found it to be a useful and flexible method for qualitative research in and beyond psychology (p. 6).

 Braun & Clarke, (2006) propose a step-by-step, yet flexible guide which contains six phases that start from preparing data to reporting findings. Phase 1, as they show, is concerned with "data familiarization". This includes data transcription, reading and rereading in order to become immersed in with the data as much as possible. It is, also, possible to take notes on initial ideas. This phase also comprises, as they explain, transcription of verbal data which requires transforming verbal data into rigorous verbatim transcripts. While considered boring and time consuming, they assert that it is an excellent way for a researcher to become familiar with the data. Phase 2, in this guide, is called "generating initial codes" in which an analyst produces codes or a list of interesting ideas in collected data. The process of coding also involves organizing data into meaningful groups. Phase 3 is "searching for themes" which entails sorting the

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previously identified codes into broader themes and putting all the relevant coded data extracts under the identified themes. Also, in this phase unwanted codes might be removed. Phase 4, which is named "reviewing themes" concerns the refinement of devised themes and to do this, the coded extracts should be reviewed to ensure that they fit into their themes. Also, the relationship between the themes and relevant codes need to be re-checked to ensure that they reflect the meaning of the data they hold. In turn, some themes might be merged or other themes might be split into more themes. Phase 5, "defining and naming themes" is concerned with defining and further refining the themes to identify the essence of each theme and to know exactly what it is about, and then to determine what type of data each theme should capture. Finally, phase 6 involves "producing a report" that tells the complicated story of data in an interesting and coherent way.

4.8.2.2   NVivo (interviews)

While analysing data in the current study, I followed Braun & Clarke's (2006) step-by-step guide to analysing qualitative data obtained from interviews and focus group discussions using the NVivo qualitative data analysis computer software package. This piece of software is readily available at the University and provides an equal level of security protection to SPSS. NVivo is useful for the coding procedures used in the analysis of this research as it facilitates storage, coding, retrieval, identifying patterns, comparison, and linking data. That is, after transcribing all the recorded data any Arabic segments were translated into English before developing a list of pre-existing codes derived from the literature (see Appendix I) in order to facilitate the analysis of the data. After that, all data was entered into NVivo, grouped into sets of data extracts from multiple resources and affixed with relevant codes with the help of NVivo. These codes were then categorised under broader themes (see Table 7 below). This was followed up with a re-examination of the same materials to segregate meaningful patterns, before finally reviewing and linking these identified patterns in light of previous research and existing theories.

Following these phases, I asked a colleague to be a second coder and let him code a couple of interviews, one of the focus groups, and one of WhatsApp chat sessions to

ensure the reliability of coding. Then my coding and my colleagues' coding were checked for consistency and I found no major conflicts between the two coders (see examples of coded texts in Appendix I).

Before commencing the experiment, each student was asked to select a referent name (e.g. the name Sara) or a symbol and to use it during the 5 weeks WhatsApp chats and while responding to all research instruments. Therefore, I used these fictitious names when referring to individual participants to maintain anonymity. Thematic data analysis was adopted by using the following table for coding to be consistent in reference to the different research instrument:

Table 7: Coding system of the research instruments

Research Instrument	Instrument Abbreviation
Pre-study Focus Group, Phase 1	Pre-FG, Ph1
Pre-study Focus Group 1, Main study	Pre-FG1, Main
Pre-study Focus Group 2, Main study	Pre-FG2, Main
Post-study Focus Group, Main study	Post-FG, Main
Post-study Interview, Phase 1	Post-Int. , Ph1
Post-study Interview, Main study	Post-Int., Main
Pre-study Questionnaire, Main study	Pre-Ques., Main
Post-study Questionnaire, Main study	Post-Ques., main

4.8.3   WhatsApp Data

Several actions were taken to process the data obtained from the WhatsApp chat sessions. First, immediately after the sessions ended, lurkers were tracked via the "info" button on the teacher's entries for the assigned conversation. It was necessary to capture this data during or immediately after the session had finished otherwise they could not be identified. Lurkers in each session were reported in a separate research diary. Also, by the end of the day, the "info" tab was re-checked to see if additional observers had joined the list. A special table was used to organize this type

of data by writing the date of the WhatsApp session, chat group name, and list of observers name (see Appendix F.1). This data was triangulated with relevant data obtained from the interviews and the post- intervention questionnaire to see how lurking could impact learning.

After each session, screen shots taken by my mobile phone camera were transferred to a computer desktop to be saved. Though screenshots were inherently numbered by the mobile phone camera system, I preferred to give them sequential numbers for better sorting (e.g., IMG_ 49, IMG_50, and IMG_51). Then, each group of screen shots pertaining to a particular chat session were put into a file named with the session's group name and date (e.g., LOTM 1, 24-4 -2016). All files were saved into one file named WhatsApp sessions in multiple places.

After each session, data were transcribed manually and saved in a word document format in multiple places with the same file name (e.g., LOTM 1, 24-4-2016). After transcribing all data, and in an attempt to analyse it, data was entered into NVivo after developing codes in an attempt to thematically sort meaningful extracts under these codes (see data analysis, NVivo, 4.8.2.2). These codes were reviewed with relevant extracts frequently with the help of a colleague to ensure inter-rater reliability, to fit later within the broader themes.

In an attempt to report analysed data from WhatsApp conversations, meaningful extracts from NVivo were selected along with their headings (codes) and interpreted separately and triangulated with other sources of data to fit into the whole picture of findings. In the conversation analysis, each line in a full meaningful extract is given a number to easily refer to it during analysis. The time of an entry and who said it are also written alongside the entry (see 6.2 and Appendix J).

Towards the end of the data analysis phase, a more practical method to easily transfer data from WhatsApp to PC was discovered: going to WhatsApp.com; selecting PC types and simultaneously opening WhatsApp in the mobile phone; select setting and WhatsApp Web, and allow the camera phone to scan the code on the computer desktop. Doing this, I was able to transfer all of the WhatsApp data to my PC at the

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same time. The advantages of this were numerous, particularly in that it saved tremendous amounts of time and effort in terms of transferring data, saving , and transcribing them (i.e. copy and paste instead of manual transcription).

The next section shows the procedure of making a quantitative analysis of WhatsApp contributions.

4.8.3.1 WhatsApp chat analysis

Examination of WhatsApp contributions entails analysing both the quantity and quality of a WhatsApp contribution.

4.8.3.1.1 Frequency of contributions: Quantitative analysis of WhatsApp data

Numbers of contributions entered by individual participants were counted manually per week during the five weeks. These were consequently sorted and organized into a table listing participants' names and their contributions per week, along with each participant's average contributions (see Appendix G.1). For example, if 3 sessions were run in week 1, the number of contributions of each participant in these three sessions are counted and recorded under Week 1 number of contributions, and then the average contribution over the 5 weeks is calculated. Entries with verbal contributions including sentences, phrases, and words as well as nonverbal contributions like emoticons, exclamation and questions marks were all counted.

Consequently, individual average contributions are examined along with their vocabulary gain in order to identify patterns that show common behaviours in order to make a primary interpretation of their vocabulary gain based on the frequency of contribution. Other cases that show irregular behaviour regarding the relationship between vocabulary gain and average online contribution are also identified and basic conclusions are drawn (see 5.4.1). Average contributions are also used later to make statistical correlations with vocabulary gain and vocabulary loss (see 5.4.3).

4.8.3.1.2   Quantifying quality of contributions

To understand how learning can take place in the new online medium, the quality of the WhatsApp contributions over the 5 weeks period was examined for individual participants. Quality of contributions was determined based on learners' use of vocabulary learning strategies and particularly negotiation of meaning strategies.

In order to study whether quality of contribution can influence vocabulary gain, I tried to correlate the quality of contribution to vocabulary gain. To do so, it was decided to quantify the quality of contributions by giving them a numerical value /measurement. In order to establish a valid quality of contribution measurement, and perceiving that vocabulary learning is all about making meaning, a review of the literature was carried out to ascertain how learners learn by using language strategies and negotiation of meaning strategies, followed by a review of the literature about how negotiation of meaning strategies are used in online conversation to understand how they could contribute to meaningful online discussion, and in turn vocabulary learning (see2.7.3).

At this point, the behaviour of individual participants during the 5 week period was holistically examined in terms of their use of vocabulary learning and negotiation of meaning strategies, together with their ability to make meaning. This enabled me to compare and contrast participants' behaviours and constitute a general/ whole picture about individual performances. Each participant was then awarded an overall grade which was based on a 5 point comprehensive graded rubric, based on each participant's ability to use vocabulary learning and negotiation of meaning strategies to make meaning and on their overall ability to run iterative conversation. This 5 point rubric evaluates the quality of participants' entries starting from 5 (above expectation), 4 (meet expectation), 3 (acceptable), 2 (below expectation), 1 (only lurking, ie, observing not contributing), to 0 (no contributions at all) (see G.2).Thus, participants who were ranked 5, 4, and 3 were the most interactive group members, while those who were ranked 2, 1, and 0 were mostly less active ones.

 After giving a value number to the quality of each participant's contributions according to the devised rubric, I asked 2 colleagues to re-evaluate samples of interaction extracts to ensure inter-rater reliability. Then, participants' vocabulary gain

alongside the participants' frequency of contribution as well as participants' quality of contribution were tabulated (see Appendix G.3). This arrangement facilitated the examination of relationships among these variables. Further, statistical correlations were conducted between quality contributions and vocabulary gain and vocabulary loss (see 5.4.4).

Upon devising a tool to measure / quantify the surface quality of contribution, a deep content analysis was a further essential tool to examine the quality of contribution.

4.8.3.1.3 Content analysis (justification for using the negotiation of meaning strategies)

The decision to examine the interactions in WhatsApp sessions was made upon observing the richness of the data obtained from these prolonged conversations during the first week of the intervention. The nature of WhatsApp written conversation mostly resembles ordinary social interaction since it is all about making meaning (Jepson, 2005; Castrillo et al., 2014, Oh, 2001). Therefore, it becomes a source for negotiation of meaning similar to that in genuine social interaction as many researchers have noticed (ibid). In addition, the nature of vocabulary learning requires discussing meaning to a large extent. Accordingly, using negotiation of meaning strategies as a measuring criteria to evaluate the quality of WhatsApp text-chat and to understand the processes learners used to achieve learning seems very reasonable (see 2.7.3).

Complying with other research findings, this study proposes that the use of these negotiation strategies will result in modified interactions which leads to language learning as they enhance comprehensibility (Jepson, 2005; Castrillo et al, 2014; Oh, 2001) (see 2.7.3). This is because when modifying the interactions, speakers can raise other interlocutors' awareness that they produced incorrect output, and in turn push them to modify it, after recognizing various types of negative feedback given by interlocutors. This would avoid communication breakdown and supposedly contribute to second language acquisition (ibid). These strategies comprise modification and clarification request techniques, and in turn responses required from other parties involving different types of feedback like repeating, giving explicit correction or recast,

by elaborating, or simplifying the original message (see 2.7.3).

Accordingly, the analysis of WhatsApp written conversations in the current study aims to track the use of negotiation of meaning strategies that participants employ during interactions. During the planning for WhatsApp conversation analysis, it was interesting to look for a number of essential negotiation of meaning strategies selected from the relevant literature, including modification, comprehension checks, and feedback. However, while analysing participants' entries, further emergent negotiation sub-strategies are employed by participants who nicely fitted under the broad pre-existing strategies. These include using emoticons for modification, confirmation, clarification, for exchanging feedback, for expressing emotions, and for softening critical feedback (see 6.2).

Table 8: Negotiation of meaning strategies used in the current study

WhatsApp conversation analysis	
Negotiation of meaning strategies	
Modification	a) Simplification (simpler vocabulary and syntax- shorter utterances- deletion of morphological inflection- using L1- b) Elaboration (explanation- paraphrase- example) c) using emoticons
Comprehension difficulty	a) Confirmation checks (own understanding/ others' understanding) b) Clarification request (imperative –questioning) c) comprehension checks d) emoticons use
Feedback	a) Asking for feedback b) Giving feedback c) Recognizing feedback d) Recast e) Self correction f) Incorporation g) Soften critical feedback h) Using emoticons

 NVivo software is used to sort and organize the thematic analysis process. To organize data in Nvivo, negotiation of meaning strategies that participants use in interaction are

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used as codes in Nvivo, which is further grouped under broader themes. Codes and themes are synthesized following Table 8, and the data is presented according to this organisation in the data chapter (see 6.2).

The choice of extracts presented in the data chapter is according to theme as it is intended to highlight meaningful extracts rather than simply identifying an assigned single strategy use in a decontextualized entry. This is to provide sufficient context to understand how the interaction works. Also, it is worth noting that interactions in a full meaningful extract could be fairly complex, similar to any natural conversation, as it exhibits use of multiple negotiation of meaning strategies. For example:

Extract 1

A number of interlocutors exchange interactions about the word *meticulously* in which they use a number of negotiation of meaning strategies like elaboration, clarification request, expressing difficulty, and confirming understanding:

7:36 p.m. …T: Does It (meticulously) have positive or negative connotation?
7:38 p.m. …Afnan: Positive
7: 38 p.m. …Sara: I don't know   (Express difficulty)
7:39 p.m. …Wallo: I think it depends
7:39 p.m. …Afnan: I don't understand   (Clarification request)
7:40 p.m. …Wallo: We can use it in both of them   (Elaboration)
7:40 p.m. …Afnan: I think its good to be careful and pay attention to details   (Elaboration)
7:42 p.m. …Wallo: No I meant we can use it in positive n negative   (Elaboration)
7:42 p.m. …Dew: I see   (Confirm understanding)
7:44 p.m. …Dew: when a teacher corrects the exam meticulously
            students lose a lot of marks 😂   *(Incorporation)*

Despite the complexity of interaction, the use of NVivo enables a focus on a particular negotiation of meaning strategy representing the relevant code. For ease of presentation, I provide an explanatory heading before the extract and locate the entry in which the strategy was used by numbering the entries and giving a side heading beside it while ignoring the other strategies (see 6.2.3.3).

The next section describes the different roles the researcher of this study adopts.

4.9   Researcher / teacher roles

In this research study, I was both the researcher, course designer and the teacher working with the learners online. Carrying out the three roles has both its advantages and disadvantages.

Studies show that educational research run by teachers can provide valuable understanding of the teaching experience as well as the nature of students' learning (Mills, 2003). However, being a teacher and a researcher is challenging due to the different and even conflicting purposes and natures of teaching and research (ibid). Creswell (2012) explains that the main purpose of a research is to understand through an investigation process which involves observation, analysis, and inflection, whereas teaching is concerned with making others understand, maintain continuity of ideas, and set the learning environment in the classroom. Moreover, David (1993) describes ethical and logistical conflicts between teaching and research. For example, he explains that the essence of teaching involves being responsible for developing students' knowledge and skills, treating them with compassion, and providing them with experiences that are of value. However, the core role of a researcher is to gain conclusions with evidence after following a rigorous procedure of design and control to ensure the validity of the evidence (Creswell, 2012).

Because the practice of teaching is mainly dependent on human behaviours and intentions as well as the specific classroom situation, researchers find typical theoretical research principles and goals unsuitable for measuring the nature of this practice (Mills, 2003). The dynamic of classroom practice is best captured and analysed by a practitioner rather than an observer (ibid). Therefore, despite the tension associated with combining these roles, I decided to adopt the researcher / teacher role because it allowed me to adapt my research questions, the design of my study and the level of interaction, to be sensitive to the learning context or any unexpected factors affecting the procedure, and to be responsive to students' levels and needs.

Being a teacher enabled me to be more familiar with the data as I would be personally involved and this would help me to establish a rapport with the participants which would encourage them to open up and talk freely about their opinions.

However, incorporating the role of a teacher along with a researcher would adversely affect the validity of the research as teacher-participant interaction might influence the research findings and the interpretation of the observation (Brew, 2006). In other words, my actions as teacher could alter the students' learning experience (what I tried to understand). For example, when I found students struggling to work something out, my sense as a teacher would urge me to help them to understand, instead of standing passively observing how they created their learning, which put me in a dilemma between my role as a researcher and my responsibilities as a teacher.

To resolve this conflict between the teacher and the researcher roles, David (1993) suggests an alternative questioning strategy. That is, the research questions should be modified and rather than being interested in observing / capturing students' conceptions and understanding, a shift should be made to investigate changes in understanding due to the teacher's intervention. Another way to concurrently pursue the roles of the researcher and a teacher is to modify the classroom culture (ibid). David (1993) gives an example of changing what constitutes the idea of "fair" and "unfair" in the classroom.

Accordingly, the current study, first adapts the research question to capture changes in participants' practices, attitudes, and beliefs about vocabulary learning, and particularly vocabulary learning using mobile phone technology. In addition, from the outset of the intervention, I established the norms of the virtual classroom environment. That is, I explained the participants' role and how they are expected to behave in online environment. For example, they were informed of the need to interact with each other using negotiation of meaning strategies to make meaning and they should work collaboratively to construct knowledge. They were also informed that online chat is a good opportunity for new forms of learning and they are responsible for their own learning and their peers' without causing harm to anyone. This would supposedly encourage participation without fear of losing grades or being

criticized by others. Students knew that the teacher would not call on their names to answer, but they would post entries when they had something useful to post, in order to help themselves and others to understand.

Students were informed that the teacher would not have an authoritative role. She would send bite size lessons to facilitate memorization and participate in the virtual discussions as a mentor when help is needed. In addition, the teacher's questions are not for assessing students, but to facilitate understanding and to indicate that the student's idea is interesting and needs further elaboration.

Altering students' background knowledge about the perceived role of a teacher is not simple, as students' beliefs about the dictatorial role of the teacher who imparts knowledge and dictates rules is deeply rooted. However, discussing the new teacher's role and students' roles was a prerequisite for research conducted by a researcher/ teacher.

The next section discusses research ethics.

4.10 Ethical considerations

The Economic and Social Research Council (2010, 2017) suggests that there are six main principles of ethical research need to be implemented. These include:

1) Participants should be fully informed about the purpose and methods of the research study and the ways in which the data might be used in the future. Participants should also be aware of any risks associated with becoming involved in the research.

2) Participants should be assured of the anonymity of the research process and that confidentiality can be assured.

3) Participants in the research must be willing to participate voluntarily and without coercion.

4) It is essential that harm is avoided for all participants.

5) Research should be designed, reviewed and piloted to ensure quality and transparency and to meet standards of honesty.

6) Researcher neutrality must remain clear and there should be no undeclared conflict of interest arising.

In terms of this research, the first four points relate to participant involvement, much of which is dealt with in the consent form given to students. Participants in this research were clear on the main focus of this research pertaining the examination of how learning is constructed via the use of WhatsApp Messenger on mobile phones. Moreover, not only were participants aware of these elements of the study, but it was also made clear to the administration that the purpose and research questions surrounding this study were clear and able to be openly discussed. Participants, in the two research phases in this research were permitted to withdraw at any time, as per typical ethical requirements, however the students' gradual withdrawal was noticeable in the first phase of this study which rendered the first phase to be less successful. To assure anonymity, a consistent coding system was used by which each participant selected a referent name/ nickname to be used during the intervention weeks and across all research instruments. Further, while students were advised that no harm would come to them, it should be noted that students who participated in this research could actually benefit from their participation, as they had access to several key resources which could assist them in their vocabulary acquisition and overall language learning.

The last point made by the ESRC pertains to the researcher. While this point is slightly more difficult to 'prove', as researcher bias exists in virtually all aspects of research, it can be assured by the methods employed in this research that no conflict of interests exists and that impartiality has been maintained. This link between my own methodology design and the theory behind the ethical considerations is essential to the design and implementation of my research.

Prior to commencing the intervention of the current study, two ERGO permissions were issued. The first permission reference number: ID 6585 was issued on 1st of April 2014 and ended on 1st of July 2014 in which phase one was conducted, while the second one pertaining to the main study, ID 12667 was issued on 1st of January until 1st April 2015. In terms of the procedure, in the Phases 1, I asked for a permission of the Head of the English Language Institute to have access to the research sample in order to conduct the intervention. In turn, the coordinator of the regular students' English courses facilitated ~~my~~ access to the intended research sample. Subsequently, in the

main study, I asked for the permission of the Dean of the English department in the European Language College to gain access to another group of research sample. After permission had been granted, authorization was given to enter an assigned class and to meet the students. I then met the director of student academic affairs, who offered full assistance to make this academic research successful.

In the two research phases a brief meeting was held with each class to explain that this research is a requirement for obtaining my PhD degree and they have been randomly selected to participate in this research. Students were asked to read through the student information sheet which gives an overview of the research, why they are selected to be research subjects, and any risks posed by participating in this research. They were also encouraged to ask questions when they had any doubts. Following this, a brief discussion about research objectives and any risk that might be associated of being involved in this research, such as whether participating in the experiment would affect their final course scores, was conducted. After which, the signed consent forms were collected. . There were no cultural restrictions on gaining ethics permission in the research site since the Use of WhatsApp was acceptable although other tools such as Snap Chat, Instagram, or Skype would have been more problematic because of the use of photos.

The following three chapters present the results of the analysed data obtained from three different resources: vocabulary tests, WhatsApp conversations, and interviews and focus groups.

Chapter 5:   Vocabulary gain/loss in relation to online contribution

5.1   Introduction

The following three chapters present the results of analysing data obtained from the different research tools used in this study. Chapter 5 looks at vocabulary gain and loss, correlating this to frequency and quality of contribution. Chapter 6 looks in depth at WhatsApp interactions to understand their contributions to learning. Chapter 7 explores participants' beliefs and attitudes to MALL.

This chapter presents the results of vocabulary gain and vocabulary loss determined by analysis of the pre-, post-, and retention tests conducted in 3 distinct periods during the study, and then relates this with the quantity and quality of WhatsApp contributions in order to establish whether participants actually gained more vocabulary as a result.

5.2   Vocabulary gain

The differences between the scores in the pre-, post- achievement and retention tests should reveal individual vocabulary gain and loss due to the intervention. Figure 6 below shows the scores of all three tests for all of the 33 participants in the main study.

All students' scores in the pre- intervention test were relatively low with a mean vocabulary score of 5.69 words (out of the 45 words tested) with a low standard deviation (SD= 4.2). This indicates that the participants had encountered very few of the vocabulary items included in the test prior to the intervention which is not surprising since the new words would be included in future units in their textbook and they have limited exposure to target language outside the classroom (see Table 9).

 Afnan and Reem are good examples of students with average vocabulary scores in the pre-test (5 out of 45), Khadijah and Wejdan are examples of students who started with

the highest vocabulary scores in the pre-study tests, (12 and 10 respectively), whereas Ajwad and Waad are examples of students who entered with under-average knowledge of target words (1 and 0 respectively).

Post- intervention test scores (five weeks after the pre-test), show that many of the students have improved dramatically. Table 9 indicates that the mean score was 29.9 words out of 45, yet with a relatively high standard deviation (SD= 10.5). The highest score was 45 which was obtained by Khadijah, while the lowest post-test score was 11 which was achieved by Ghadi.

In terms of individual vocabulary gain over the intervention period, the mean vocabulary gain was 24 words (24.2) and the standard deviation was relatively high (SD=7.9).This gain may be said to be due to the intervention itself but no doubt other factors such as the normal classroom input or merely passive observation (lurking) of peer interactions in the WhatsApp group may be at play. Of course we cannot know whether any direct intervention / teaching would have resulted in similar vocabulary gain.

Reem gained the highest number of words (38 words) receiving 5 out of 45 in her pre-study test and 42 out of 45 in her post-study test. Similarly, Afnan got 5 out of 45 in her pre-study test followed by 43 out of 45 in her post-study test with a gain of 37 words gain, whereas Ghadi has the lowest word gain receiving 4 out of 45 in her pre-intervention test and 11 out of 45 in her post- intervention test (word gain =7). Interview data and content analysis data reveal that the intervention has contributed significantly to the high word gain achieved by Reem and Afnan, whereas Ghadi rarely participated in WhatsApp discussions and is not interested in using technology for learning (see 6.2.1.1 and 6.2.1.3 as examples of their frequent participation)

Table 9: Average pre- and post- study tests scores and average vocabulary gain

Mean	5.6970	29.9091	24.2121
N	33	33	33
Std. Deviation	4.26090	10.52189	7.99124

Figure 5 below shows the differences between pre- and post- study test of the main study. It is evident that participants gained a considerable number of words after the intervention.

Figure 5: Vocabulary gain
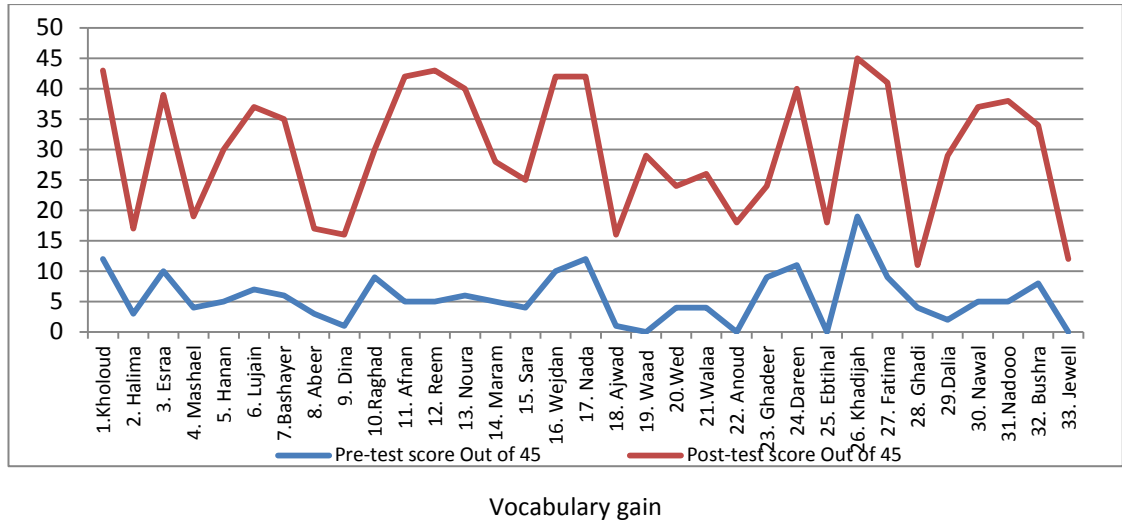
Vocabulary gain

Figure 6 below shows the variations of vocabulary gain and loss during the three vocabulary tests. It seems evident that after gaining a considerable number of words after the intervention, all of the participants lose some these words in different ranges.

Figure 6: Pre-, post-, and retention vocabulary tests

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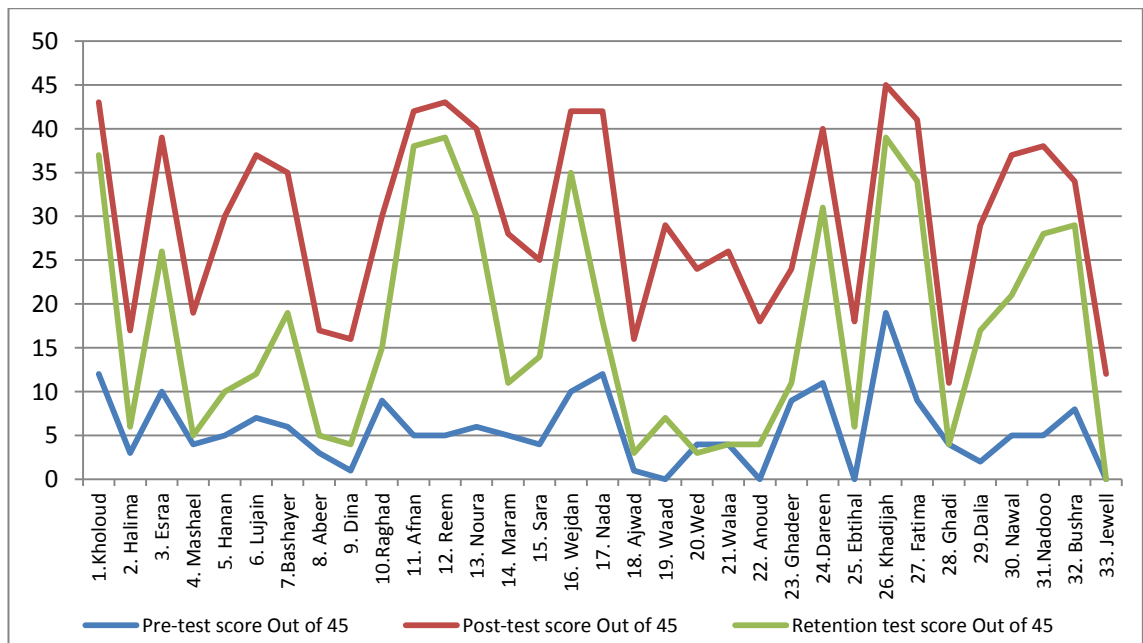
In order to determine whether this gain was statistically significant, paired sample t-test statistical analysis was carried out. The results are reported below.

5.2.1 Paired sample t-test (Statistical analysis of test scores in pre- and post-achievement tests)

In Table 11 below, the two-tailed paired-sample t-test indicates a statistically significant difference in the scores of the students between the pre-intervention test scores (M = 5.697, SD = 4.26090 and df =32) and post-test scores (M=29.9091, SD = 10.52189 and df =32) of p value ≈ 0 at an α level of 0.05. This indicates that there was a marked improvement in the students' scores in the post-test since the calculated difference between the two means indicate a statistically significant difference, p value =.000 which is less than .05.

Table 10: mean scores of the pre- and post- tests

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test out of 45	5.6970	33	4.26090	.74173
	Post Test out of 45	29.9091	33	10.52189	1.83163

Table 11: Paired Samples Test: Two tailed paired sample t-test at α = 0.05

		Paired Differences							
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	Pre-test out of 45 - Post Test out of 45	-24.21212	7.99124	1.39110	-27.04569	-21.37855	-17.405	32	.000

The next section identified participants' vocabulary loss in the retention test.

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5.3   Vocabulary loss

It was important to consider how many vocabulary items were retained by the group of students who participated in the intervention. It is standard practice in vocabulary research to measure retention a number of weeks after the research period. This is calculated here as a measure of vocabulary loss (see Appendix E.3). In the retention test carried out 4 weeks after the post-intervention test, the mean test score was 17 words (17.1) out of 45 with a higher standard deviation than the post-intervention test (SD=12.8). Calculating vocabulary loss over the 4 week period between the tests yields a mean vocabulary loss of 12.7 (see Table 12 below) for the whole group with relatively low standard deviation (SD=5.7). All participants seem to have lost words in the retention tests .The highest number of words lost was 25 (Lujain), the lowest number of words lost was 4 words (Afnan and Reem), This difference in vocabulary loss between participants is interesting and is likely to stem from differences in reinforcement of vocabulary due to differentiated levels of involvement in the WhatsApp sessions including the number of WhatsApp contributions, degrees of mental effort exerted by participants plus differences among individuals pertaining to memory functions. Afnan, for example, was categorised as a high level contributor (see Appendix G.1).

Table 12: Vocabulary loss, post-test, and retention tests mean scores

	Vocabulary loss	Post Test out of 45	Retention test out of 45
Mean	-12.7879	29.9091	17.1212
N	33	33	33
Std. Deviation	5.74868	10.52189	12.86895

Figure 7 below shows the words lost one month after the intervention. Student lost words at different ranges.

Figure 7: Post-test scores and retention test scores
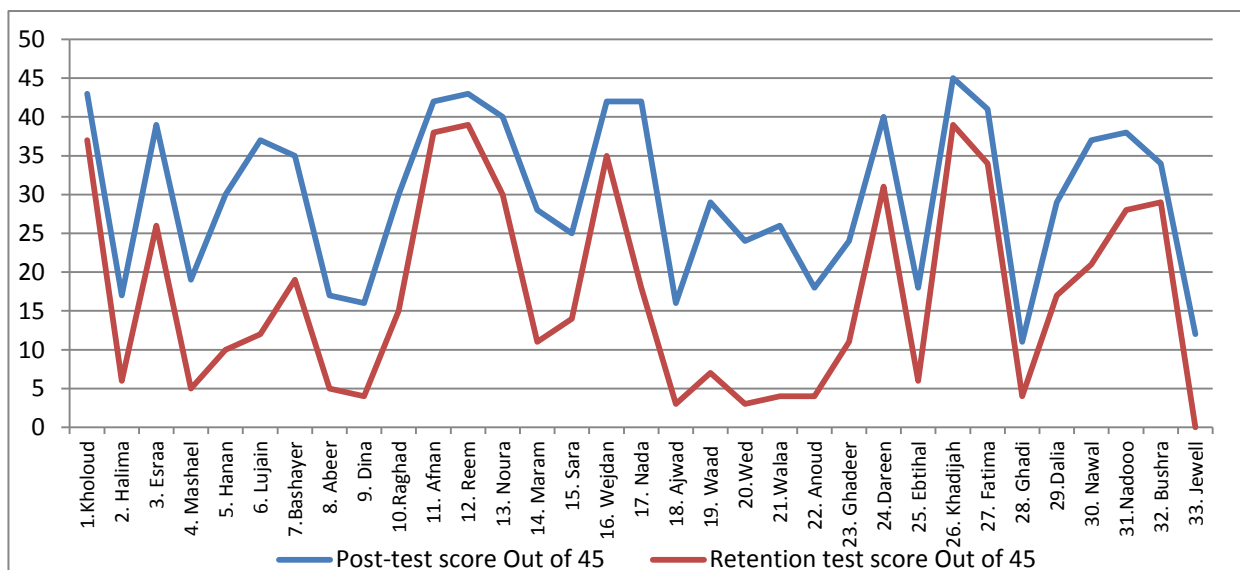
The following section looks at the volume and the quality of participants' contributions to the WhatsApp sessions. This is to establish whether there is any relationship between these measures and vocabulary gain and loss.

5.4 WhatsApp contributions

5.4.1 Frequency of contributions

The number of contributions from individual participants in each of the five weeks of the intervention as well as individual weekly average contributions over the five weeks are shown in Appendix G.1. The mean score of all participants average contributions over the intervention is 11 with a relatively high standard deviation (SD=11.09) (see Table 13 below). The highest average contributors were Afnan (39) and the lowest average contributors were those who never joined any WhatsApp sessions such as Ghadi, Ajwad, and Jewell.

Figure 8 below shows participants according to their average frequency of contributions over the five week intervention period. 14 participants fell in the above average contribution group including Afnan, Bushra, Ebtihal, and Reem who made an average of 39, 36, 30.6, and 28 contributions respectively. Seven participants fell in

the average contribution group such as Nawal, Maram, and Sara who made 10.2, 9.4, and 8.6 contributions respectively. The below average contribution group comprises 12 participants who had a very weak contribution average such as Halima, Waad, Lujain, and Abeer who respectively made 1.4, 0, 0 contributions. In relating the impact of frequency of contributions to vocabulary gain, Afnan is a good example who has high vocabulary gain, 37 words, and made a very high level of contributions, 39. Similarly, we can presume that because Halima made a low level of contributions (average 1.6), she obtained a below average vocabulary gain of 14 words. However, Ebtihal and Bushra were exceptional cases who have high contribution averages, 30.6 and 36, with an average vocabulary gain of 18 and 26 words respectively. This could be attributed to other factors such as the quality of contribution and individual differences. Similarly, Lujain is an exception since she made 0 contributions, while she made an above average vocabulary gain, 30 words. This was because Lujain was not interested in learning using mobile phones as a learning medium and preferred traditional learning methods as she indicated in her interview (see 7.5.4.1).

Table 13: Average WhatsApp contributions by participants over 5 weeks

Mean	N	Std. Deviation
11.0727	33	11.09840

Figure 8 below organizes participants according to their frequency of contributions. Participants with the highest frequency of contributions are located at the left-hand side, while frequencies of contributions decrease gradually towards the right-hand side.

Figure 8: Average quantity of contributions per participants over 5 weeks intervention period
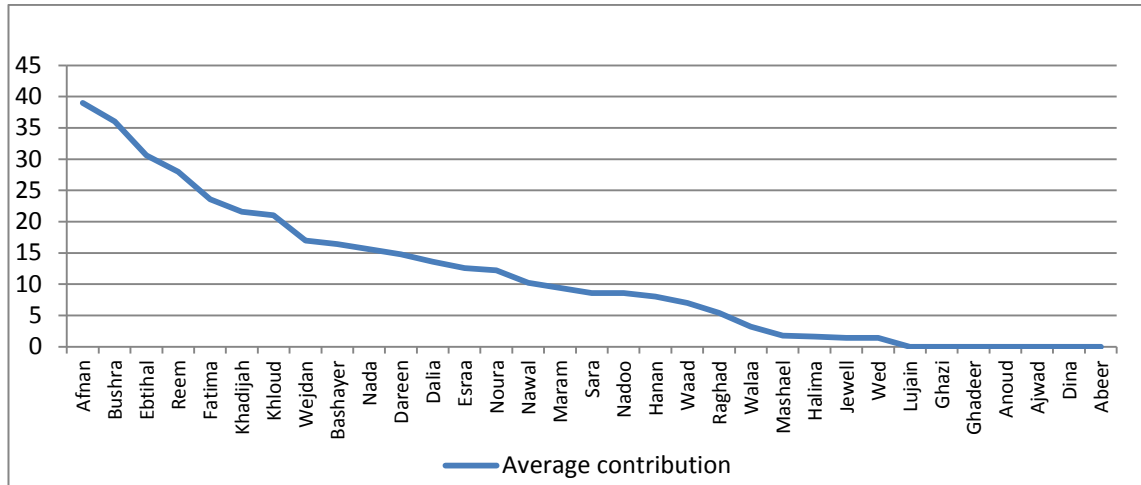
5.4.2 Quality of contributions

Having calculated frequencies of contributions, it was decided to make a surface analysis of the quality of contributions and then measure them qualitatively. Therefore, a 5 points rubric was devised to evaluate the quality of participants' entries by giving a value number to each student's overall contributions over the five weeks. This was done to see whether vocabulary gain and vocabulary loss could be attributed to quality of contributions (see G.2 G.3).

Out of the class of 33 participants, the quality of contributions of 12 participants was 4 or 5. For example, Reem and Afnan who had a vocabulary gain of 38 and 37 words respectively were given a score of 5 for the quality of their contributions. This means that they were successful in using a number of negotiation of meaning strategies to modify output or to request clarifications in elaborated contributions, with relatively few syntactic errors (see 6.2.1, 1, 6.2.3, and 6.2.3.4, for examples of the diverse range of contribution to modify their output efficiently). Out of the other 10 highly ranked participants, the majority were found in the above-average vocabulary gain group. However, two of them were in the average vocabulary gain group. Khadijah was ranked 5 in the quality of contribution measure but was placed in the average vocabulary gain group (see G.2 G.3). Khadijah was the only participant who received 45 /45 in her post intervention test, with only 26 words gained since she entered the

intervention with 19 already known words. Dalia is another student in the average vocabulary gain group who showed qualified contributions (4).

 Dalia obtained the highest vocabulary gain score (27 words) of this group, with only one vocabulary gain score less than her peer Esraa (lowest vocabulary gain in the above average vocabulary gain group). The reason for only obtaining an average vocabulary gain score may be linked to a lower frequency of contributions (13.6 average contributions over the 5 week period) or individual differences.

Seven participants were ranked 3 against the quality rubric which means that they showed a satisfactory/ expected level of interaction in which they used a number of negotiation of meaning strategies to modify output or to request clarifications, however they used shorter contributions with some syntactic errors. These students were mostly found in the average vocabulary gain group, yet a few of them were in the above average vocabulary gain group. This is no doubt due to individual variation and alternative learning methods. Six participants were ranked 2 which mean they showed lower than expected level of interactions with limited use of negotiation of meaning strategies as well as overuse of one word form responses, such as "yes" and "right". These participants were equally distributed between the average and the below average vocabulary gain groups, e.g., Walaa is in the average vocabulary gain group and Ghadeer is in the below average vocabulary gain group. Four participants were ranked 1 which means they were lurking throughout the WhatsApp interactions without making any attempt to participate (see Appendix G.3 and F.1).Two of these participants, Ajwad and Ghadi, were in the below average group , while one was in the average vocabulary gain (Raghad) and another one was in the above average vocabulary gain group (Lujain). Finally, four participants were given 0 against the quality of contribution rubric as they neither never participated nor lurked and they were in the below average vocabulary gain group, the same as Abeer, and Anoud in the average group, (see Appendix G.2 for quality of contribution rubric and Appendix G.3 participants quality of contribution table).

Figure 9: : Quality of contributions scores per participant over: 5 weeks intervention
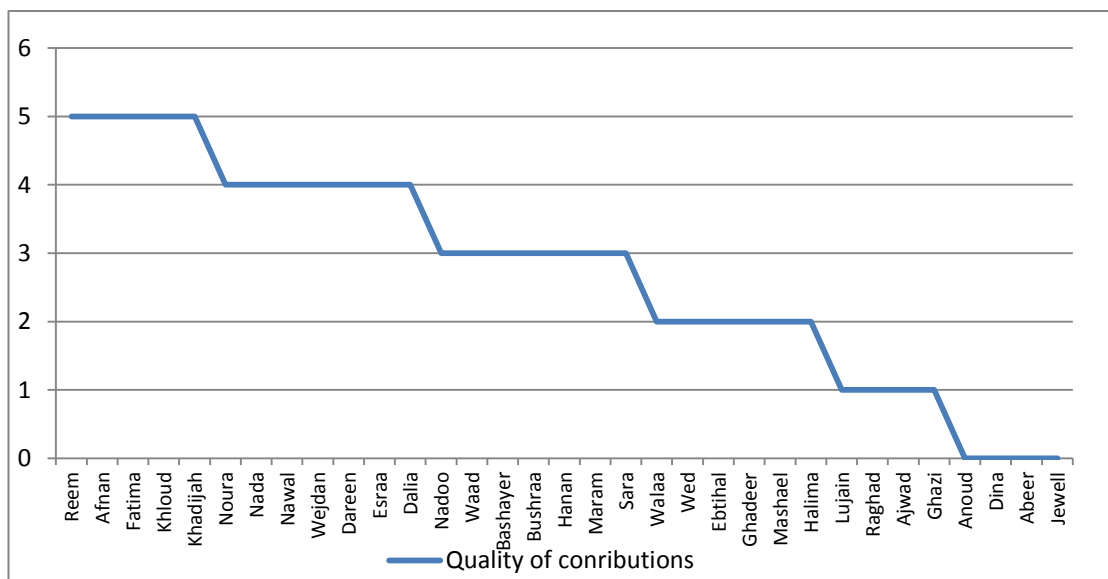
The following section looks at whether there seems to be a relationship between the volume and the quality of the activity within the WhatsApp sessions and vocabulary gain and loss. It shows the statistical correlation of frequency and quality of WhatsApp contributions to this.

5.4.3 Relating participants' frequency of contribution to vocabulary gain and vocabulary loss

This section looks at the correlations between frequency of contribution and vocabulary gain on one hand, and the frequency of contribution and vocabulary loss on the other hand.

5.4.3.1 The Pearson Correlation Coefficient. Correlating the frequency of contribution scores to vocabulary gain

The Pearson Correlation Coefficient shows that the absolute correlation between average contribution and vocabulary gain, or the *r* value, is =.640 which suggests a moderate to strong uphill positive linear correlation between vocabulary gain and average contribution, as shown in Table 14 below . This means that there is a moderate

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to strong correlation between these variables. That is, the more participants made high levels of contributions, the more likely they were to achieve vocabulary gain during the intervention.

Table 14: Correlation between vocabulary gain and average contribution

		Average contributions over 5 weeks	Vocabulary gain
Average contributions over 5 weeks	Pearson Correlation	1	.640[**]
	Sig. (2-tailed)		.000
	N	33	33
Vocabulary gain	Pearson Correlation	.640[**]	1
	Sig. (2-tailed)	.000	
	N	33	33

**. Correlation is significant at the 0.01 level (2-tailed).

In the scatter plot chart below (Figure 10), the *x* axis represents the independent variable, the average contributions over the five weeks, ranging from zero contribution to the highest contribution average, 39, while the *y* axis represents the dependent variable which is the number of words participants gained, ranging from the lowest number of words gained which is 7 words to the highest number of words gained which is 38 words.

The scatter plot chart shows that there is some correlation between vocabulary gain and average contribution. Though the relationship is somewhat complicated and open to interpretation it does demonstrate a relationship between an increase in contribution and vocabulary gain. That is, at the top right-hand side of the scatter plot chart cases who have the highest level of contributions with the highest numbers of words gained are located, whereas at the bottom left –hand side of the scatter plot chart cases with the lowest contribution averages and the lowest number of words gained can be found. The middle area of the scatter plot chart, however, includes cases with various averages of contribution and diverse numbers of words gained.

For example, Reem and Afnan at the top right-hand side of the scatter plot are typical of this positive uphill relationship between frequency of contributions and vocabulary gain. They show relatively high levels of contributions, and in turn they have high vocabulary gain. That is, they made average contributions, 28 and 39, and in turn, they gained 38 and 37 words respectively. Also, from the average vocabulary gain group, Hanan, Maram, and Sara best describe this relationship as we can presume that because they made average contributions, 8, 9.4, 8.6, they gained average vocabulary size, 25, 23, and 21, respectively. Similarly, all of the participants in the below average vocabulary gain group illustrate this relationship as we can relate their low vocabulary achievement to their low number of contributions. For example, Abeer, Jwell, and Ghadi, are located at the bottom left-hand side of the scatter plot, and these participants made zero contributions, thus gaining few words as a result at 14, 12, and 7 respectively. Of course lack of interest may be responsible for these results.

However, the relationship between frequency of contribution and increased vocabulary gain was not always the norm. Some other learners showed exceptions to this. For example, Lujain behaved in an entirely opposite fashion showing zero contributions whilst and still gaining 30 words. Also Ebtihal was a further exception with a high contribution average, of 30.6, but only gaining an average number of words of 18 words ~~only.~~ This may be due to the fact that this participant offered contributions of low quality~~.~~

Figure 10: Correlation between vocabulary gain and average contribution
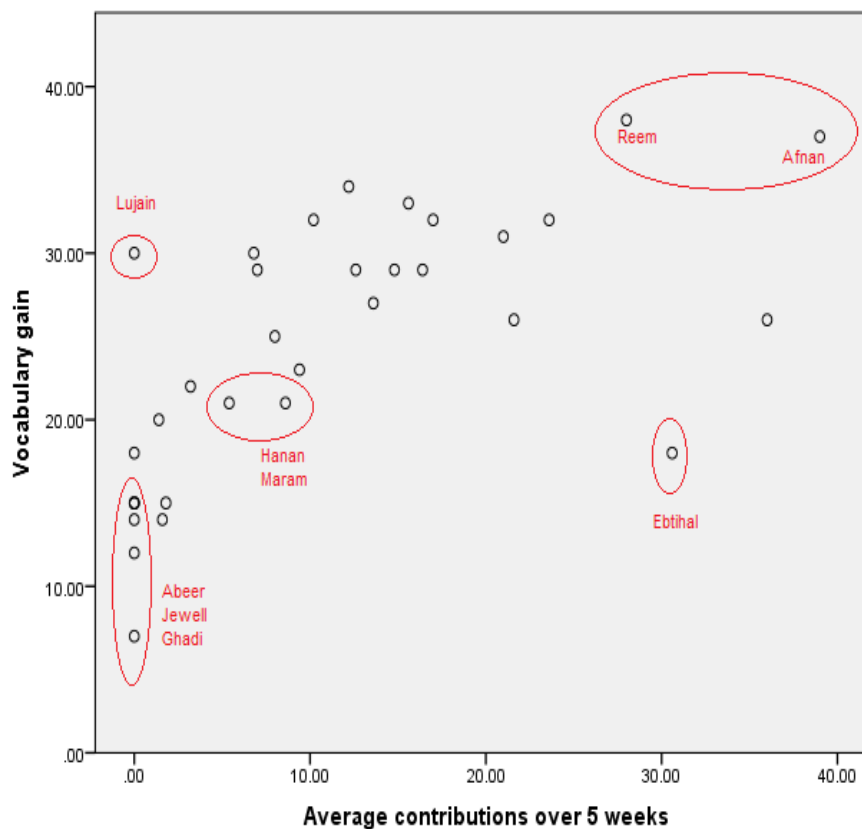
In the same vein, the statistical correlation between the frequency of contribution and vocabulary loss was carried out.

5.4.3.2   The Pearson Correlation Coefficient. Correlating the frequency of contribution scores to vocabulary loss

The Pearson correlation coefficient between vocabulary loss and average contribution is, or the absolute value, r =-.586, which suggests a moderate to strong negative/reverse downhill linear correlation between vocabulary loss and average contribution (see Table 15 below). This reflects the fact that students who have above average frequency of contribution rates show relatively lower vocabulary loss in their retention test. In other words, this means that the more the average contribution increases, the less vocabulary loss is likely to occur, though this relationship is complex.

Table 15: Correlation between average contribution and vocabulary loss

		Average contributions over 5 weeks	Vocabulary loss
Average contributions over 5 weeks	Pearson Correlation	1	-.586[**]
	Sig. (2-tailed)		.000
	N	33	33
Vocabulary loss	Pearson Correlation	-.586[**]	1
	Sig. (2-tailed)	.000	
	N	33	33

**. Correlation is significant at the 0.01 level (2-tailed).

In the scatter plot chart below (Figure 11) the *x* axis represents the independent variable, average contributions over the five weeks, ranging from zero contribution to the highest contribution, average of 39, while the *y* axis represents the dependent variable which is the number of words participants lost, ranging from 4 words to 25 words. The scatter plot chart shows that there is a reverse correlation between vocabulary loss and average contribution. Therefore, the cases that show high contribution levels and lower vocabulary loss are located at the bottom right-hand side of the scatter plot chart, while cases that have low contribution levels and highest words loss are located at the top left-hand side, while others with various degrees of contribution and different numbers of lost words are located in between.

There are some ideal cases that best describe this moderate negative downhill relationship between frequency of contribution and vocabulary loss. For example, from the above average vocabulary gain group, Reem, Afnan, Fatima, and Kholoud, located at the right-hand bottom side of the scatter plot chart, show the highest levels of contributions, 28, 39, 23.6, and 21, with the lowest vocabulary loss, 4/38 ,4/37, 7/32, and 6/31 words respectively. Similarly, but at the other end of the continuum, other participants lost a considerable number of the words gained due to low levels of contributions. For example, with zero WhatsApp contribution, Lujain, situated at the top left-hand side of the scatter plot chart, lost 25 words out of the 30 words she had gained.

Bushra and Khadijah were another two cases from the average vocabulary gain group who showed that with high levels of contributions, 36 and 21.6, a lower number of words were lost, 5/26 and 6/26 words respectively. On the other hand, but also another facet to provide evidence to this correlation, some participants in this group behaved similar to Lujain in the above average vocabulary gain group, in that with low levels of contributions, they lost a considerable numbers of words. For example, Waad and Raghad made very few contributions, 1.4 and 0, and lost 21/20 and 19/21 words respectively. However, this correlation between frequency of contribution and vocabulary loss was not always the norm and there were some exceptional cases. The extreme case was Ebtihal who showed above average contribution, 30.6 yet she lost a considerable number of words 12/18 words. This may be because her quality of contribution was low, as previously mentioned.

 Furthermore, all participants in the below average vocabulary gain group, located at the top left-hand side of the scatter plot chart, show low levels of contributions, and in turn demonstrate varied ranges of vocabulary loss. For example, Dina, Mashael, and Halima, showed low average contributions, 0, 1.8, and 1.6 with larger numbers of words lost 12/15, 14/15, and 11/14 respectively.

Figure 11: Correlation between vocabulary gain and average contribution
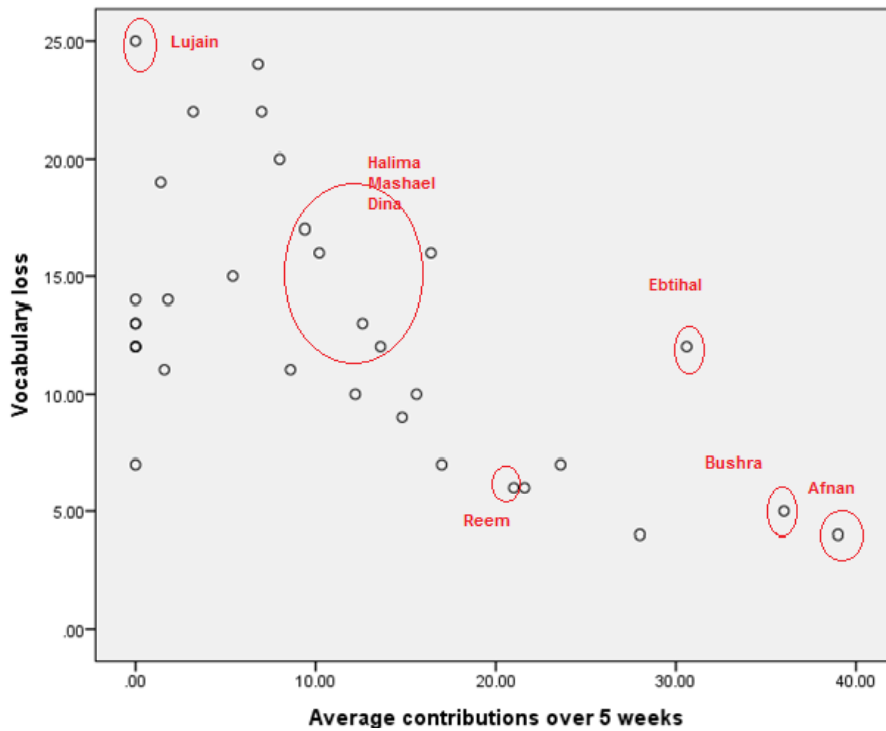
The correlation between retention and frequency of contribution was not calculated because vocabulary retention already includes the measure of vocabulary gain. Instead of measuring retention, individual cases can best exemplify the relationship between the frequency of contributions, the retention, and the quality of contributions. A number of these cases illustrate a strong positive relationship between the frequency of contribution and vocabulary retention. For example, from the above average vocabulary gain group, Afnan, located at the top right-hand side of the scatter plot chart shows high levels of contribution, 39, starting with 5 known words in her pre-test and after 5 weeks of intervention she received 42 in her post-test (see Figure 12 below). This remarkable improvement is no doubt attributed to the quantity of WhatsApp contributions among other factors. In her retention test Afnan retained a considerable number of words (33 words) which could be directly attributed to her high number of contributions. Also, Bushra is an example from the average vocabulary gain group who shows that even though her vocabulary gain is average, with high levels of contributions (36), she managed to retain 21 words out of 26 words previously gained, with a loss of only 6 words.

Moving towards the left-hand bottom side of the scatter plot chart, we can identify cases when frequency of contribution decreases with a corresponding decrease in the level of vocabulary retention. In the middle area, Dareen, and Bashayer, and Esraa are good examples of those who show average contributions, 14.8, 16.4, and 13.6 respectively with lower vocabulary retention compared to Reem and Afnan (20 out of 29, 13 out of 29, 15 out of 27 gained words respectively).

 In the left-hand bottom of the scatter plot chart as the average contribution decreases as well as the number of words retained, it is possible to identify all cases in the below-vocabulary gain group, such as Mashael and Abeer, who have very low contribution averages of 1.8 and 0, and retained only 1 out 15 words, and 2 out of 14 words previously gained in the post-study test respectively. Despite the fact that Lujain is an above average vocabulary gain participant, who gains 30 words in her post-intervention test, she retained only 5 words in her retention test. This links well to the frequency of contribution-vocabulary retention correlation, as no matter how many words a learner gains, with low frequency of contributions, less vocabulary is retained. Lujain's considerable word loss could be due to reliance on rote memorization without expending sufficient effort in vocabulary training.

Figure 12: Correlation between average frequency of contribution and vocabulary retention
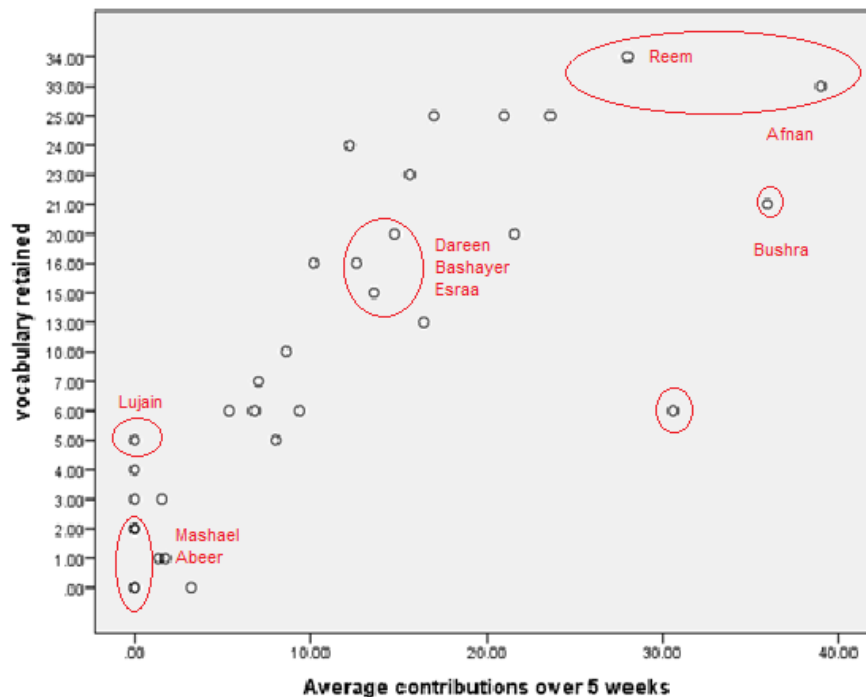
In the following sections, the correlations between the quality of contributions, vocabulary gain and vocabulary loss are identified.

5.4.4   Relating participants' quality of contribution to vocabulary gain and vocabulary loss

These subsections look at the correlation between the quality of contributions and vocabulary gain on the one hand, and the correlation between the quality of contribution and vocabulary loss on the other hand.

5.4.4.1   The Pearson Correlation Coefficient. Correlating quality of contributions scores to vocabulary gain

The Pearson Correlation Coefficient shows that the absolute correlation between quality of contributions and vocabulary gain, or the absolute *r* value, is =.816, which suggests a strong uphill positive linear correlation between vocabulary gain and quality

of contributions as shown (see Table 16 and Figure 13 below). This means that there is a strong positive link, so that the more participants provide quality contributions, the more they are likely to gain vocabulary.

Table 16: Correlation between vocabulary gain and quality of contribution

		Vocabulary gain	Quality of contribution
Vocabulary gain	Pearson Correlation	1	.816[**]
	Sig. (2-tailed)		.000
	N	33	33
Quality of contribution	Pearson Correlation	.816[**]	1
	Sig. (2-tailed)	.000	
	N	33	33

**. Correlation is significant at the 0.01 level (2-tailed).

In the scatter plot chart below (Figure 13), the *x* axis represents the independent variable, quality of contributions over the five weeks, ranging from zero contribution to 5 according to the quality of contribution rubric (see Appendix G.2), while the *y* axis represents the dependent variable which is the number of words participants gained, ranging from the lowest number of words gained (7 words) to the highest number of words gained (38 words). There is a strong positive correlation between vocabulary gain and the quality of contribution. The higher the quality of the contribution of the participant, the more vocabulary is likely to be gained. Participants who are located at the top right-hand side of the scatter plot chat are those who have the highest quality of contribution, rank 5, and at the same times gain the most number of words. Whereas, moving towards the bottom left-hand side of the scatter plot chart, the quality of contribution decreases and the vocabulary gain consequently decreases. Therefore, those who gain the least number of words with the lowest average contributions are located here.

A number of cases could typically describe this strong uphill correlation between quality of contributions and vocabulary gain. That is, all of the participants, who have been ranked 4 or 5 on the quality of contribution rubric, gain the highest number of

words. These learners are mostly found in the above average vocabulary gain group, with a few of them being placed in the average vocabulary gain group. For example, regardless of frequency of contribution, Reem, Afnan, and Fatima, located at the top right-hand side of the scatter plot chart, were the most successful vocabulary learners who gained 38, 37, and 32 words and were ranked 5 on the quality of contribution rubric. Also, from the average vocabulary gain group learners, Dareen gained 27 words while being ranked 4 on the quality of contribution rubric.

Participants who are ranked 3 on the quality of contribution rubric have also obtained a reasonable yet varied vocabulary gain. For example, Nada, Waad, and Bashayer were ranked 3 on their quality contributions and gained an above average number of words (30, 29, and 29 words respectively). Similarly, Bushra, Maram, and Sara were ranked 3 on their quality of contributions, and gained an average number of words (26, 23, and 21 respectively). The variation in vocabulary gain could be due to different levels of frequency in their contributions or individual differences.

Moving towards the left-hand side of the scatter plot chart, participants who were ranked 2 on the quality of contribution rubric have gained even fewer words than those on the right side of the scatter plot chart. These participants are found in the average and below average vocabulary gain groups only. For example, each of Walaa, Ebtihal, Ghadeer, and Mashael gained a below average number of words, 22, 18, 15, and 15 respectively, which could be directly correlated to their lower quality contributions (2). Further, participants who were ranked 1 and 0 on the quality of contribution rubric gained the least number of vocabulary items. These participants, who are located at the bottom left-hand side of the scatter plot chart, were either passive observers in the WhatsApp environment or were not interested in joining WhatsApp sessions, preferring to adopt other traditional learning methods. These participants are mainly found in the below-average vocabulary gain group, and include Ajwad, Dina, and Abeer who obtained below average vocabulary gain 15, 15, and 14 words respectively.

  However, the positive correlation between vocabulary gain and the quality of contribution is not always without exceptions. Although making no WhatsApp

contributions but lurking in some sessions, Lujain as indicated previously, gained an above average number of words (30).

Figure 13: Correlating quality of contribution to vocabulary gain over five week intervention
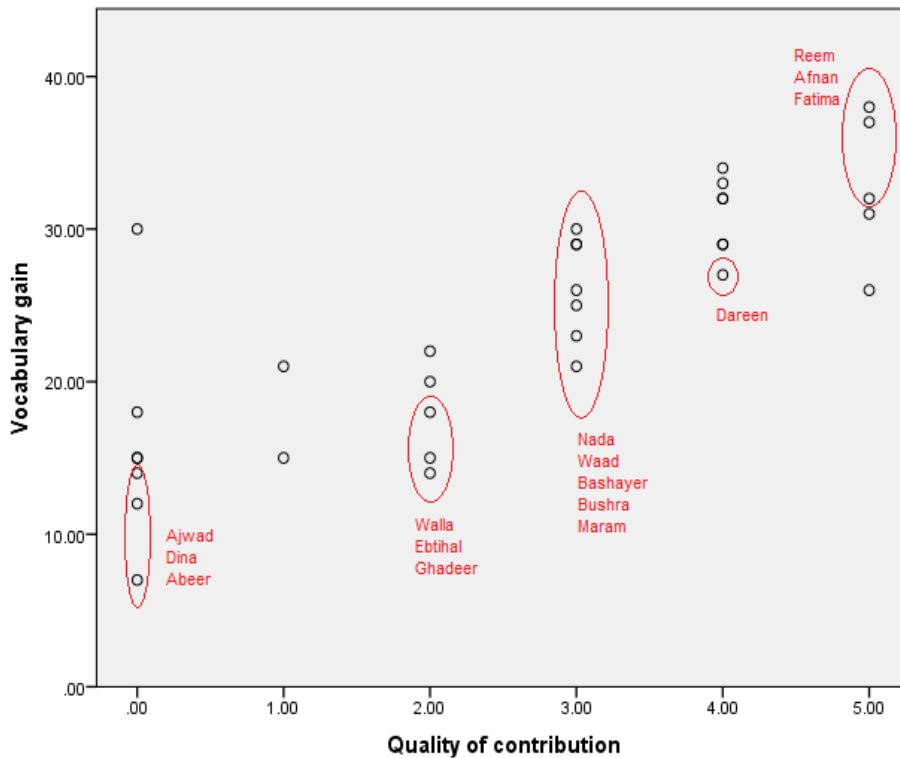
The next section correlates participants' vocabulary loss four weeks after the post-intervention test with their quality of contribution.

5.4.4.2   The Pearson Correlation Coefficient. Correlating the quality of contributions scores to vocabulary loss

The Pearson Correlation Coefficient between vocabulary loss and quality of contributions, or the absolute value r, is =-. 386, which suggests a weak downhill rather linear negative correlation between vocabulary loss and quality of contribution (see Table 17). This indicates that there is a weak correlation between the number of higher quality contributions and reduced vocabulary loss. In another words, students who made more quality contributions do not necessarily always show lower vocabulary loss in their retention test.

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Table 17: Correlation between the quality of contribution and vocabulary loss

Correlations

		Quality of contribution	Vocabulary loss
Quality of contribution	Pearson Correlation	1	-.386[*]
	Sig. (2-tailed)		.026
	N	33	33
Vocabulary loss	Pearson Correlation	-.386[*]	1
	Sig. (2-tailed)	.026	
	N	33	33

*. Correlation is significant at the 0.05 level (2-tailed).

In the scatter plot chart below (Figure 14) *the* x axis represents the independent variable, quality of contributions over the five weeks, ranging from zero to 5 according to the quality of contribution rubric, while the *y* axis represents the dependent variable which represents the number of words participants lost, starting from 4 (the lowest number of words lost by a participants) to 25 (the highest). Aligning with the above statistical findings, the scatter plot chart also demonstrates the weak/not strong downhill correlation between vocabulary loss and quality of contributions. It shows that when the quality of contribution increases, vocabulary loss might not necessarily decrease or vice versa. Accordingly, this scatter plot shows that whereas at the bottom right-hand side participants who show quality contributions and have the lowest vocabulary loss are located, moving to the left-hand side of the scatter plot, we see lower quality contribution, but that an expected corresponding vocabulary loss is not always evident.

All participants (ranked 5 or 4 on the quality of contribution) recalled most of the target words in their retention tests and lost a limited number of words. This is presumably because of both their quality and frequency of contributions. For example, Afnan, Reem, Fatima, Wejdan, and Khloud were assessed as 5, 5, 5, 4, and 5 on their quality of contribution rubric, while in their retention tests, a loss of only, 4, 4, 7, 7, and 6 words was recorded respectively. On the other hand, describing the opposite side of the same typical correlation, most of the participants who were ranked 0 or 1 on quality of contribution rubric could not recall most of the previously learned target

words and lost a considerable number of words, to the extent that in some cases there was a loss of all of the previously learned words. For example, though Lujain, a unique case, gained an above-average number of 30 words, she demonstrated a loss of 25 words in the retention test. This could be due to this participant's reliance on more traditional memorization techniques for vocabulary learning, together with evidence of occasional but limited lurking and lack of sufficient effort in vocabulary training. Similarly, most of the below average vocabulary gain participants such as Abeer, Halima, Jewell, and Ghadi, could not recall most, if any, of the words they had previously recognised in their post- intervention tests, probably for the same reason (see Appendix E.3).

However, since there seems to be no strong linear correlation between the quality of the contributions and vocabulary loss, I found that the majority of participants, particularly those who are ranked 4, 3 and 2, lose a varied number of words regardless of their rank on the quality of contribution rubric. For example, Nada, Waad, Bashayer, Dareen, Bushra, Hanan, Maram, and many others have an inconsistent vocabulary loss pattern (see Appendix E.3 for more detail about vocabulary loss per participant).

Another reason why this correlation is likely to be weak is that the relationship between vocabulary loss and vocabulary gain is mostly proportional. In other words, we cannot simply consider participants who show lower vocabulary loss are better vocabulary learners than those who have greater vocabulary loss because participants who originally had low vocabulary gain in the post- intervention test might have lost fewer words in the retention test. For example, we cannot say Ghadi is a good learner because she lost only 7 words in the retention test, but rather we should take into account that Ghadi formerly gained only 7 words in her post- intervention test before losing all of them in the retention test (-7).

Figure 14: Correlation between quality of contribution and vocabulary loss
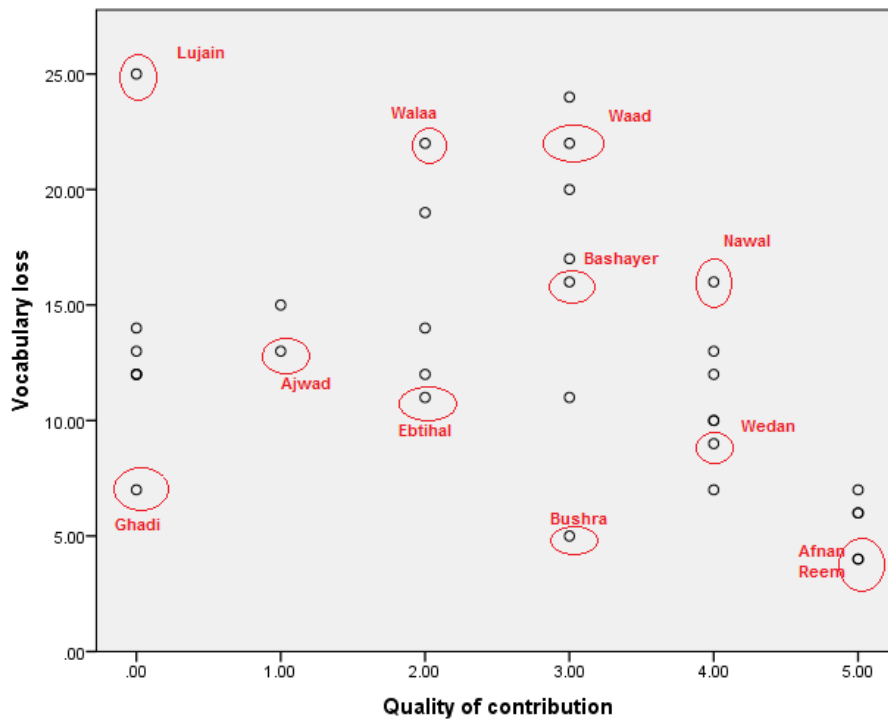
5.4.4.3   Summary of the four correlations and interpretations

The above section describes the findings of the four statistical correlations pertaining to frequency of contribution and vocabulary gain, plus frequency of contribution and vocabulary loss on the one hand, and quality of contribution and vocabulary gain together with quality of contributions and vocabulary loss on the other hand. It emerges that there is moderate to strong positive linear correlation between frequency of contribution and vocabulary gain. That is, the more the participants contribute, the more words are probably gained. However, the relationship between quality of contribution and vocabulary gain is even more evident. That is, a stronger positive liner correlation between quality of contribution and vocabulary gain was identified. This could be interpreted as making good use of negotiation of meaning strategies, which quality of contribution is identified with. This allows for modifying meaning, and in turn enhances second language acquisition (see 8.5.1). Thus, for learning words, quantity, and more importantly, quality of contributions seems to lead to learning.

The correlation between frequency of contribution and vocabulary loss demonstrates ~~is~~ a moderate downhill relationship, which suggests that there is a reasonable relationship between the quantity of contribution and level of vocabulary loss. However, in correlating the quality of contributions to vocabulary loss, a weak negative relationship in that varied degrees of vocabulary loss happened regardless of the quality of contributions is identified. This could be interpreted as learners relying on frequency more than quality where memory is concerned. That is, based on previous studies, memory is strengthened and recall increases when learners encounter new words a number of times before it is transferred to long term memory, thus repetition is the key for memory (see 2.7.2). In this WhatsApp environment, there are more chances of encountering words repeatedly when participants are more frequently engaging with online postings (frequency of contribution) regardless of how skilful the use of the negotiation of meaning strategies (quality of contribution). Thus, for memory and recall, frequency is key, whereas for vocabulary learning, both frequency and quality of contributions are equally regarded as important.

The next chapter presents the results of WhatsApp conversation analysis of selected extracts of participants' contributions.

Chapter 6: WhatsApp chat analysis

6.1   Introduction

This chapter presents the analysis of content of selected excerpts from WhatsApp chats sessions based on the identification of negotiation of meaning strategies as social vocabulary learning strategies, which are believed to lead to vocabulary learning and second language acquisition

In order to try to establish how learning was taking place during the participation in the WhatsApp sessions, analysis of a number of WhatsApp conversations extracts was carried out (see 4.8.3.1.3 for justification of using these strategies). Participants were informed in the pre-study focus group discussions about their roles and how they are expected to behave in the chat sessions (see 4.6.3.1). The results of this analysis is organized according to the negotiation of meaning categories and subcategories identified in 2.7.3 and in Table 18 below, which presents some predetermined negotiation of meaning strategies found in the literature and integrates further emergent strategies participants used while engaged in online chat.

Table 18: Negotiation of meaning strategies used in the current study

WhatsApp conversation analysis	
Negotiation of meaning strategies	
Modification	a) Simplification (simpler vocabulary and syntax- shorter utterances- deletion of morphological inflection- using L1- b) Elaboration (explanation- paraphrase- example) c) using emoticons
Comprehension difficulty	a) Confirmation checks (own understanding/ others' understanding) b) Clarification request (imperative –questioning) c) comprehension checks d) emoticons use
Feedback	a) Asking for feedback b) Giving feedback c) Recognizing feedback

	d) Recast e) Self correction f) Incorporation g) Soften critical feedback h) Using emoticons

The sections below give examples of these strategies and sub-strategies.

6.2 Conversation analysis

The below sections categorize participants extracts according to the type of negotiation of meaning strategies used during the interactions.

6.2.1 Modification

The following extracts exemplify the techniques that participants used to modify their contributions. The two main strategies used are simplification and elaboration strategies, as seen in Table 18 above, and these are associated with a number of sub strategies. The extract has been marked up with the relevant strategies / sub-strategies. See Appendix J.1 for further exemplification of this strategy.

6.2.1.1 Extract 1 (LOTM1)

This extract is a good example of a number of high quality contributions.

1. *7:58 p.m. …Reem: You will lose underpayment unless the property remains intact*
2. *7:58 p.m. … Noura: Can you explain this sentence?* (Clarification request)
3. *7:58 p.m. … Noura: What is underpayment?* (Clarification request)
4. *7: 59 p.m. … Khloud: like deposit?* (Simpler vocabulary/simplification)
5. *7: 59 p.m. … Reem: Money you pay to hold something* (Paraphrase/elaboration)
6. *7:59 p.m. … Reem: If the property was damaged you'll lose the underpayment.*
   (Giving example/elaboration)
7. *7: 59 p.m. … Noura: What do you mean by property ?* (Clarification request)
8. *8:00 p.m. … Khloud: Things you have* (Simpler vocabulary/simplification)
9. *8:00 p.m. … Afnan: Thing you own* (Simpler vocabulary/simplification)
10. *8:00 p.m. … T: Property means عقار* (Translation/ simplification)
11. *8:00 p.m. …Afnan: Flat or villa,* (Giving example/elaboration)
12. *8:01 p.m….T: Yea, a unit you want to buy or rent.*

13. *8:01p.m. …Reem: So if there is a damage in the flat you will lose the deposit you paid at the*
    beginning   (Paraphrase/elaboration)
14. *8: 01 p.m. … T: So are you familiar with intact then?*
15. *8:01 p.m. … Afnan: yeah*
16. *8:02 p.m. … Noura: Undamaged*   (Simpler vocabulary/simplification)

In week 3, Reem, Noura, Khloud, Afnan were sufficiently confident of the intervention, that when the teacher asked students to use the target word *intact* in sentences (line1), they were able to construct sentences and discuss meaning. As can be seen (line 4 onwards), they use modification strategies in order to facilitate their own understanding 4, 15 and understanding of others 5, 6, 8, 9.

In this extract, Reem who is a high vocabulary gain participant, high level contributor, with noticeable quality output has posted a sentence (line 1) with several vocabulary items which are unfamiliar to the other learners (*property* and *underpayment*). Noura made a clarification request about the meaning of the whole sentence and then made clarification requests about the word *underpaymen*t. Khloud then uses simplification by providing the word *deposit* that might be more familiar to the others (line 4). Reem follows this simplification and uses elaboration to define the unknown word (line 5) and goes on to paraphrase her original sentence (line 6).

In line 7 to 16, the participants continue to discuss the meaning of the second new word and the meaning of the whole sentence using similar sub-strategies. In line 10, the teacher gives a translation of the word *property* in order to facilitate and speed up comprehension. Afnan follows this with exemplification suggesting *villa and flat* and then once all the unfamiliar words are understood, Reem paraphrases her original sentence in order to reinforce her meaning (line 13). In line 14 to 16, teacher checks understanding of the word *intact* and Noura confirms her understanding by offering an alternative vocabulary item (simplification).
This short sequence (lines 1 to 16) shows how the learners have used modification strategies to collaborate and co-construct meaning.

6.2.1.2   Extract 2 (LOTM2)

1. *8:21 p.m. …T: Do we need complementary pills in our diet?*

2. *8:21 p.m. …Fatima: yes*

3. *8:21 p.m. …Bushra: I think yeah*

4. *8:22 p.m. …T: why?*

5. *8:22 p.m. …Bushra: Because we don't eat enough food*   (Explanation/elaboration)

6. *8:22 p.m. …Fatima: You don't eat enough?!* ☹   (Clarification request)

7. *8:22 p.m. …Bushra: No I mean vitamins*   (Simpler vocabulary/simplification)

8. *8:23 p.m. …Fatima: We eat lots of junk food, high in fat, low in vitamins*

   .   (Explanation/ elaboration)

9. *8:23 p.m.… Bushra: I see* ☺   (Confirm understanding)

In week 4 when discussing the topic of living longer, the teacher invited students to participate in a real topic discussion by asking a question about whether people should use complementary medicine. The teacher used the word *complementary* which was introduced earlier in week 1 as a review before introducing the new word *longevity*. Fatima and Dareen who have above average vocabulary gain and high level of frequency and quality of contribution worked with each of Ebtihal and Bushra who have average vocabulary gain and high level of contributions with lower contribution quality (2 and3) respectively. All participants worked together to share opinions, and to help in meaning construction by using explanation and simplification strategies.

In line 1, the teacher opened the topic of whether people need to take complementary medicine for discussion through which she prompted participants to produce meaningful output, reviewing some of the words that had been used already, and introducing new ones for further discussion in a new context. Fatime and Bushra, high average contributors with reasonable quality (4 and 3 respectively), responded with "*yes*" (in lines 2 and 3) affirming that they have the opinion that people should take complementary pills, yet without offering any justifications. To expand the discussion and invite more parties, the teacher asked *"Why"* after which Bushra supported her opinion in line 5 by saying that *"we don't eat enough food."* Fatima in turn in line 6 used Bushra's sentence (recast) to alert Bushra that her output needed to be fixed as she may mean something different from what she wrote. Fatima's post was also

accompanied with a question mark and exclamation mark to give a stress to her output and show that she needs a further reply from Bushra, and an accompanied by an emoticon of a disappointed face, to show that this could not be the case as they already ate more than enough food. Alternatively, it may be to imply that they struggle with issues such as being overweight and of body fitness.

Bushra, in response to Fatima, quickly realized that her output was not clear and followed it with an example of the food consumed that lack sufficient nutrients in line 7.Bushra used the word *"vitamin"* as a way of simplification as everybody in the group presumably knows it. At this point, after Fatima understood Bushra's opinion, she agreed with her and even added to it by giving further explanation as to why we do not have sufficient vitamin intake in line 8. In line 9, Bushra confirmed understanding of Fatima's explanation and also confirmed that Fatima managed to provide a better explanation of her original contribution "we don't eat enough food" by a winking face.

10. *8:23 p.m. ...Dareen: No we don't*
11. *8:23 p.m. ...Dareen: We eat enough healthy food and we don't complementary pills*
    .   (Explanation/elaboration)

12. *8:23 p.m. ...Ebtihal:* 🤚
13. *8:23 p.m. ... Ebtihal: Eat fruit vegi*   (Explanation/elaboration)
14. *8:23 p.m. ... Ebtihal: from sun*   (Explanation/elaboration)
15. *8:23 p.m. Ebtiha:* 🍃 🫐 🍇 🥝 🥥 🍒 🍎 🌾   (Explanation/elaboration)
16. *8:23 p.m. ...Ebtihal: Like vitamin D*   (Gving example/simplification)

In the same extract, in continuing to talk about the topic of whether people should take complementary pills, Dareen, a high vocabulary gain participant, with less than average contributions (average 7) and contribution quality (3), contradicted Fatima's and Bushra's views in line 10 by posting *"No, we don't."* She followed this by posting a further entry to explain her position in line 11. Though Dareen produced a sentence with incorrect grammatical structure, her friends managed to understand her and no one asked for clarification. Then, although the WhatsApp virtual environment allowed all participants to contribute equally without needing the teacher's permission, Ebtihal, average vocabulary gain, with above average contributions (30.6) in line 12 sent an emoticon to show that she wanted to contribute 🤚. This could be either because Ebtihal was still influenced by the

actual classroom setting or she wanted to add a sense of humor to the discussion. After that, in line 13, 14, 15 and 16, she supported Dareen's opinion by adding some phrases and emoticons to show examples of natural vitamin resources.

17. *8:24 p.m. ...Bushra: I think some people need to take it*   (Explanation/elaboration)
18. *8:25 p.m....T: I agree with you all. If you have a balanced diet you may not need complementary*
    pills, yet if you eat less healthy food you may need them.
19. *8:25 p.m. ...Ebtihal: TOO MUCH vitamins make you problem*   (Explanation/ elaboration)
20. *8:25p.m. ...Bushra: Ebtihal you can ask the doctor first.*   (Elaboration)
21. *8:25 p.m. ...Ebtihal:* 👍
22. *8:25 p.m. ...Ebtihal:* ✄
23. *8:25p.m. ...Bushra:* ❤
24. *8:25 p.m. ...Ebtihal:*

After that, in line 17, Bushra contradicted Ebtihal and Dareen and further supported her previous position (about taking complementary pills) by giving a further explanation that they are necessary for some people. At this point, in line 18, the teacher intervened to show that there are no wrong and right answers and the key is having a balanced diet. Then, Ebtihal continued defending her position in line 19. Though her production was grammatically incorrect with also a word choice problem, she managed to convey that   taking *"TOO MUCH"* vitamins could cause health problems. Ebtihal also used capitalization as a way to stress this. In response, Bushra, in line 20 contradicted Ebtihal and suggested consulting a physician after which Ebtihal agreed with Bushra by using confirmation emoticons in line 20, 21. To close this debate both Bushra and Ebtihal exchanged good feeling emoticons to soften the debate.

6.2.1.3   Extract 3 (LOTM 1)

The teacher introduced the target word *imply* by asking students a question to contextualize it and help them infer its meaning. Reem and Afnan,and Wejdan, high vocabulary gain and high level of frequency and quality contributors, collaborated with Raghad and Mashael who made average vocabulary gain and contributed less frequently, and Mashael, by using elaboration to construct the meaning of the word *imply* in lines 2,3,4,5, 7, 9,10,11,12, and 13.

1. *7:50 p.m. ...T: What does being a positive person imply?*
2. *7:50 p.m. ...Raghad: Living with a positive thinking all the time*   (Explanation/elaboration)
3. *7:51 p.m. ...Reem: Look for the good things in the bad*   (Simpler vocabulary/simplification)

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4. *7:51 p.m. …Raghad: And don't give up*   (Simpler vocabulary/simplification)

5. *7:51 p.m. …Wejdan: You will be always optimistic and never be defeated in worst circumstances*
   .   (Explanation/elaboration)

6. *7:51 p.m. … T: So what does imply mean?*

7. *7:52 p.m. … Reem: maybe*   (Simpler vocabulary/simplification)

8. *7:52 p.m. … T: On the contrary, how does negative person look like?*

9. *7:52 p.m. … Reem: always sad*   (Elaboration)

10. *7:52 p.m. … Afnan: Thinking negatively*   (Elaboration)

11. *7:52 p.m. … Raghad: Depressed*   (Elaboration)

12. *7:52 p.m. … Wejdn: Disappointed*   (Elaboration)

13. *7:53 p.m. … Mashael: Complain a lot*   (Elaboration)

14. *7:53 p.m. … T: I gree, good analysis*

6.2.1.4   Extract 4 (LOTM 1)

1. *8:03 p.m. … T: Do you know the word "undermine"?*

2. *8:03 p.m. … Khloud: to weaken, may be*   (Simplify input)

3. *8:03 p.m.… Khloud: or damage*   (Simplify input)

4. *8:05 p.m. … T: Well, What happens when someone keeps undermining your effort?*

5. *8:07 p.m.… Reem: Feel sad*   (Elaboration)

6. *8:038p.m.…Khloud: feel anger*   (Elaboration)

7. *8:08 p.m.… Reem: Yeah and maybe stop doing what I was doing* (Elaboration)

8. *8:09 p.m.… Khloud: or make more effort*   (Elaboration)

9. *8:09 p.m. …Noura: Depression*   (Elaboration)

10. *8:09 p.m. …T: I like what khloud has just said. You may play it smart and work even harder to show*
    that you can do it.

11. *8:10 p.m. … Khloud: yeah be positive and never give up* 👊   (Elaboration)

12. *8:10 p.m. … Afnan: Sure*

In week 4, Khloud, Reem, Noura, and Afnan use simplification and elaboration strategies while constructing the meaning of the word *undermine*. When the teacher asks about the meaning of the word *undermine* in line 1*,* Khloud gives a one word response, in each of lines 2 and 3, *weaken* and *damage,* but gives the impression that she is not certain about what the word means by adding *may be* . In order to help Khloud to figure out the correct meaning of the word *undermine*, the teacher contextualizes it by using it in a question, which asks about their reactions when

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someone undermines their efforts, in line 4, to elicit more responses. From line 5 to 9, Reem, Khloud, and Noura give short responses in response to the teacher's question. In line 10, the teacher confirms the students' answers and provides further elaboration.

6.2.2 Comprehension check

The following extracts are examples to show the techniques participants used to check their comprehension. The three main strategies used are clarification request, confirming understanding, and expressing difficulty (see Table 18 above) and these are associated with a number of sub strategies (see Appendix J.2 for further exemplification of this strategy.

6.2.2.1 Extract 1 (LOTM 2).

1. *8:06 p.m. …T: What do you think irresistible mean?*
2. *8:06 p.m. …Bushra: I think its mean strong or powerful to be topped.*
3. *8: 06 p.m. …Fatimah: can't get you Bushra*   (Express difficulty)
4. *8:06 p.m. … Fatima: Would you explain?*   (Clarification request /questioning)
5. *8:06 p.m. …Dalia:: May be can't stop to love it?*
6. *8:07 p.m. …Bushra: yes. Can't stop it.*
7. *8:07 p.m…. Bushra: Or prevented*
8. *8:07 p.m. …Dalia: prevented?*   (Clarification request / questioning)
9. *8:07 p.m. …Bushra: Yes. Can't prevent myself of it*
10. *8: 06 p.m. …Fatima: Can't stop myself from it*   (Confirm own understanding /paraphrase)

In week 2, Bushra, Fatima, and Dalia used a number of clarification of meaning strategies while constructing the meaning of the word *irresistible.* That is, when the teacher asked about the meaning of the word *irresistible.* Bushra in line 2 gave an output that seemed to be unclear. In turn, Fatimah in line 2 expressed difficulty in understanding by saying that she cannot understand Bushra's output. She followed this by asking Bushra to give an explanation in line 4. Dalia, an average vocabulary gain, average contributor, and with a high quality of contribution score (4), joined the discussion by making a guess of what the word means. This was accompanied with a

question mark to elicit others' feedback. Bushra then added feedback to Dalia and confirmed Dalia's understanding by saying *yes* and repeating Dalia's contribution in line 6. Bushra then provided an incorrect synonym *prevented* for the word *irresistible* which led to Dalia using a further clarification request strategy by simply repeating the ambiguous word with a question mark next to it in line 8. In turn Bushra, in line 9, provided the meaning of the word *irresistible* by providing context to the word *prevent.* Following this, Fatimah in line 10 confirmed Bushra' s understanding by paraphrasing what she had said and used the correct preposition *from.*

6.2.2.2   Extract 2 (LOTM 2)

1. *8 p.m. ….T would you put collaboration in a sentence?*
2. *8:18 p.m. ….Khadijah: This piece of art exhibits features reflects collaboration of many artists.*
3. *8:18 p.m. … Khadijah: *reflect*
4. *8: 19 p.m.….Bushra: Can't get it khadijah*   (Express difficulty)
5. *8:19 p.m. … Bushra: Say it again* 🖤.   (Clarification request/imperative)
6. *8:20 p.m.... Khadijah: Ok give me a sec*
7. *8:22 p.m. … Khadijah: Each portrait displayed in the exhibition were a collaboration of two talented artists.*
8. *8:22 p.m. . . .… Khadijah: Have you got it Bushra?*   (Check others' understanding / questioning)
    .   .
9. *8:22 p.m. …Bushra:* 👆   (Emoticon/ confirm own understanding)
    .   ..   .
10. *8: 23 p.m.….Bushra: Or, Each piece of art you see in the show room was a collaboration of two artists*.   (Paraphrase/confirm own understanding)
11. *8:23 p.m. …Khadijah: yes*   (Confirm others' understanding)
    Extract

In week 5, in reviewing the word *collaboration,* which had been previously introduced in week 1, the teacher asked students to use the word *collaboration* in sentences of their own in line 1. Khadijah in turn (the only student who received 45 out of 45 in her post-study test with 6 words loss in retention test and average WhatsApp contribution (21.6) posted, in line 2, a sentence with what could be considered a complex grammatical structure for some students. Khadijah, in line 3, followed it up with an entry to correct subject / verb agreement of her previous sentence. In line 4, Bushra

posted an entry stating that Khadijah' sentences is incomprehensible. After that, in line 5, she asked Khadijah to paraphrase it, with an emoticon showing a good feeling to her friend or to show it is a gentle request rather than an order. Consequently, Khadijah, in line 6, required little time to think about how to paraphrase her sentence in an easier way. After two seconds, in line 7, Khadijah reworded her sentence almost using the same words with further little elaboration to convey her meaning. Then, in line 8, Khadijah posted a question to check Bushra's understanding. In lines 9 and 10, Bushra used two techniques to confirm her understanding, first, she used an emoticon with a thumb up to ensure understanding, and then she paraphrased Khadijah's by simplifying it. Finally, in line 11, Khadijah provided confirmation feedback to Bushra.

6.2.2.3   Extract 3 (LOTM1)

1.   *7: 40 p.m. …T: What are some of your qualities that make you a distinctive person?*
2.   *7: 40 p.m. … Sara: WHAT!!!*   (Express difficulty)
3.   *7:40 p.m. … Sara: Two difficult words*   (Express difficulty)
4.   *7:41 p.m. … Reem: I think distinctive is close to distinction?*   (Clarification request)
5.   *7:41 p.m. … Wejdan: Yes, distinctive adj, distinction n?*   (Giving feedback/ feedback request)
6.   *7:41 p.m. … T: You are right Wejdan*
7.   *7:41pm …. Sara: So you are asking about …*   (Express difficulty)
8.   *7:43 p.m. …T: Hellooooo*
9.   *7:44 pm. … T: Can anyone explain my question?*

In week 3, while discussing the word *distinction*, the teacher asked a question in line 1 about individual *distinctive qualities* to start the discussion and to allow students to identify the word derivatives. In line 2, Sara, an average vocabulary gain participants (21 words) and an average frequency of contributor (8.6) an average quality contributor (3), *expressed* difficulty in understanding the teacher's question by capitalizing the question word *WHAT* followed by exclamation marks. Sara further explained the reason for difficulty as she encountered two unknown words *qualities* and *distinctive.* Reem in line 4 tried to help Sara in understanding the meaning of the word *distinctive* by relating it to a word that they already know *distinction*, however Reem herself was not certain whether linking these two words was correct as she followed her sentence with a question mark. Then, in line 5, Wejdan stated that the

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two words *distinctive* and *distinction* are derivatives, yet she sent a question mark to check her output. The teacher then, in line 6, provided enforcement to Wejdan and verified Wejdan's contribution. Sara in line 7 still expressed difficulty in understanding the overall meaning of the question and waited for assistance. Then, the teacher, in lines 8 and 9, elicited more contributions to help Sara.

10. *7:45 p.m. …Reem: May be what characteristic makes me different from others* (Simpler . . vocabulary/simplification)
11. *7:45 p.m. … Wejdan; What is special about me* (Simpler vocabulary/simplification)
12. *7:45 p.m. … Sara: Fine got it* (Confirm understanding)
13. *7:45 p.m. …Reem: Being who you are* (Elaboration)
14. *7:46 p.m. … Khloud: See the positive side of unpleasant situation* (Elaboration)
15. *7:46 p.m. … Afnan: My voice*😄 (Elaboration)
16. *7:47 p.m. … Sara: Eating a lot* 😊(elaboration)
17. *7:47p.m. … Afnan:* 😄
18. *7:47p.m. …Khloud:* 😊

In lines 10 and 11, Reem and Wejdan paraphrased the teacher's question in line 1 using simpler words after which Sara in line 12 confirmed her understanding. From lines 13 onwards, participants provided examples of their special qualities and sometimes in a sarcastic way.

6.2.3 Feedback

The third negotiation of meaning strategy participants used while engaging in WhatsApp conversations is feedback (see Table 8). The following extracts show the techniques the participants used to exchange feedback including requesting feedback, giving feedback, recognizing feedback, self-correction, recast, and the softening of critical feedback. The extracts have been marked up with the relevant strategies / sub-strategies (see Appendix J.3 for further exemplification of this strategy).

6.2.3.1 Give / ask / recognize for feed back

6.2.3.1.1 Extract 1 (LOTM 1) here

1. *8:34 p.m. …T: What part of speech is emergent?*
2. *8:35 p.m. …Halima: adj?* (Feedback request)

In week 1, Khloud, Halima, and Afnan used a number of feedback strategies to encourage others, including the teacher, to comment on their answers.

In line 1, the teacher asked about the part of speech of the word *emergent*. Then, Halima (average vocabulary gain with low contributions), in line 2, posted an abbreviation of the word adjective and followed it up with a question mark to request feedback from others, which means that she was not sure about the right answer. Consequently, Khloud, in line 3, gave feedback to Halima by confirming that she was right. Simultaneously, Afnan also provided feedback to Halima and confirmed that Halima's answer was ~~is~~ correct.

5. *8:37 p.m. …T: Well, would you put it in a sentence?*
6. *8:40 p.m. …Kholoud: the emergent of diseases is the result of unhealthy life style.*
7. *8:40 p.m. …Kholoud: ??*   (Feedback request)
8. *8:43 p.m. …Afnan: May be …The emergence of diseases…..*   (Giving feedback)
9. *8:42 p.m. …Kholoud: Or Emergent diseases is due to unhealthy life style*
10. *8:42…Khloud: What do you think teacher*?   (Feedback request)
11. *8:42…T: good trials Afnan and Khloud*

The teacher then, in line 5 (above) asked students to put the word *emergent* into a sentence. In response, Khloud, made a sentence in line 6 , however she posted question marks afterwards in 7 to request feedback. Afnan, next, took 3 seconds to think about Khloud's sentence and tried to fix the structure of Khloud's sentence. In line 8, however she was still unsure about whether her feedback is correct. In line 9, Khloud recognized her structural error due to Afnan's feedback and tried to correct her sentence in another way. In line 10, Khloud asked the teacher to provide her with some feedback. In line 11, the teacher approved both of Khloud's and Afnan's answers.

6.2.3.1.2   Extract 2 (LOTM1)

1. *7: 26 p.m. …T: The sauce complements the steak.*
2. *7: 26 p.m. …T: What do you think complement mean?*
3. *7: 26 p.m. …Noura: To complete something else*
4. *7: 26 p.m. …Maram: Say something nice*

5. *7: 27 p.m. …Reem: No Maram, I think this is another word.*   (Give feedback)

6. *7: 27 p.m. …Maram: ☺*   (Express difficulty)

7. *7: 29 p.m. …Maram: Yes, I see Reem. Compliment is to say something nice* (Recognize feedback)

8. *7: 29 p.m. …Reem: Different meaning, same pronunciation*

9. *7: 29 p.m. …Maram: different spelling too*

10. *7: 30 p.m. …Maram: Thank you Reem*

11. *7: 30 p.m. …Reem: Its ok, I also make mistakes*   (Soften critical feedback)

In week 4, while reviewing the meaning of the word *complementary,* previously introduced in week 1, Maram (an average vocabulary gain participant, average online contributor with average quality) was confused as she gave the meaning of the word *complimentary* instead. Noura, Maram, and Reem used a number of feedback strategies to help Maram to notice the differences between the two words.

In line 1, the teacher posted a sentence to help students to infer the meaning of the word *complement,* after which she asked about its meaning in line 2. In response, Noura (an above average vocabulary gain, above average contributor, and above average quality) offered an acceptable meaning. At the same time, Maram, in line 4, suggested an incorrect meaning to the word *complement* as she probably has had some confusion with the word *compliment.* In line 5, Reem intervened by raising Maram's awareness that she gave a meaning of another word. Then Maram in line 6, posted an emoticon to show confusion which means that she recognized that she had made a mistake. After 3 seconds (which means that Maram probably took time searching for the correct relevant piece of knowledge), Maram, in line 7, corrected it by first acknowledging Reem's remark and then by linking the correct word *complimentary* to the definition she previously gave. In lines 8 and 9, Reem and Afnan continued illustrating similarities and differences of the two words (spelling and meaning). Then, in line 10, Maram thanked Reem for her useful feedback. In line 11, Reem tried to soften her critical feedback to maintain the friendly environment.

6.2.3.2 Critical feedback

6.2.3.2.1 Extract (LOTM 1)

1. *7:48 p.m. … T: So can you put it [meticulous] in a sentence?*
2. *7:48 p.m. … Dareen: The artist drew the picture meticulously.*
3. *7:48 p.m. … Walla: I think it is good to work with Walaa. She is extremely meticulous.*
4. *7:49 p.m. … Walla: I think without to*   (Request feedback)
5. *7:49 p.m. … Dareen : No it is right with to* 👄   (Soften critical feedback)
6. *7:49 p.m. … Walla:* 👄 👄 👄

In week 5, while discussing the word *meticulous,* Dareen used an emoji to soften her critical feedback.

That is, in line 1, the teacher asked participants to put the word *meticulous* into a sentence. Dareen, in response, posted a correct sentence. Simultaneously, Walla, made another correct sentence, yet she was slightly sceptical about the structure. Therefore, she posted a follow up message to fix her previous sentence accompanied with a question mark to elicit feedback in line 4. Accordingly, Dareen, in line 5, corrected Walla's output and tried to soften her criticism by posting an emoticon of lips (to symbolise kisses) reflecting good feelings. Wallaa, in response, exchanged the same feeling by posting the same emoticon in line 6.

6.2.3.3 Self-correction

6.2.3.3.1 Extract (LOTM 1)

1. *7: 09 p.m. … T: Would you put collaborate in a sentence?*
2. *7: 10 p.m. … Wejdan: My miss ask us to collaborate to do the research*
3. *7: 10 p.m. … Wejdan: * Our miss*   (Self -correction)
4. *7: 10 p.m. … Wejdan: *Our teacher*   (Self -correction)
5. *7:11 p.m. … Wejdan: *Our teacher asked us to …….*😊   (Self -correction)

This is a good example of using self-correction strategies. In week 1, Wejdan corrected herself while constructing a sentence with the word *collaborates.*

In line 1, the teacher asked participants to put the word *collaborate* into a sentence. In line 2, Wejdan (an above average vocabulary gain participant, above average

contributor with a good quality of contribution), made a meaningful sentence using the word *collaborate,* but with a structural error. Consequently, in lines 3, 4, and 5, Wejdan made numerous attempts to fix her sentence. In line 5, in her final contribution on the subject, Wejdan posted an emoticon showing the effort she has expended during working out the sentence. She used an emoticon to show that she worked hard in line 5.

6.2.3.4   Incorporation

6.2.3.4.1   Extract 1 (LOTM 1)

1. *8:10 p.m. …T: Would you put it (perpetual) in a sentence?*
2. *8:11 p.m. ...Maram: I wish you perpetual happy*
3. *8:11 p.m. …Maram?*   (Feedback request)
4. *8: 12 p.m. … Afnan: perpetual happy 👀*   (Recast)
5. *8: 12 p.m. … Maram???*
6. *8: 15 p.m...Afnan: You mean... perpetual happiness*   (Giving feedback)
7. *8: 16 p.m. …Maram: I wish you perpetual happiness ☺*   (Incorporation)
8. *8:16 p.m. …T:* 👍

This is a good example of using the incorporation strategies. In week 2, after Maram committed an error, she incorporated her friend's correction to the error to fix her production.

 In line 1, the teacher asked students to put the word *perpetual* in a sentence. Maram, in line 2 made an acceptable sentence, however she used an inappropriate word derivative (part of speech). In line 3, Maram posted a question mark to elicit feedback from others to check the hypothesis she made (about using the target word *perpetual)*. Then, Afnan, in line 4, repeated Maram's error with an emoticon to express that she had noticed an error. Maram in line 5, posted three question marks which probably means that she could not identify her mistake. Accordingly, Afnan, in line 5, repeated Maram's production in the correct way. After that, in line 6, Maram recognized her error and incorporated the correction into her final product. The teacher, in line 6, used an emoticon to give reinforcement to both of Maram and Afnan.

6.2.3.4.2   Extract 2 (LOTM1)

1. *8:40 p.m. …T: Now, can you make a sentence using the word emergent?*
2. *8:40 p.m. …khloud: The emergent of diseases is the result of unhealthy life style.*
3. *8: 40 p.m. …Khloud: ?*   (Request feedback)
4. *8:41 p.m. … Afnan: The emergence of diseases*   (Giving feedback)
5. *8:41 p.m. … Khloud:* ✌   (Recognizing feedback)
6. *8:42 p.m. … Afnan: or emergent diseases*   (Giving feedback)
7. *8:42 p.m. …Khloud: The emergence of diseases is the result of unhealthy life style.*   .
         .   (incorporation)

This is another example demonstrating the use of the incorporation strategies. In week 1, Kholoud incorporated Afnan's feedback to fix her output.

In line 1, the teacher asked participants to make a sentence using the word *emergent*. In line 2, Khloud worked out a sentence and posted it. She followed it with a question mark (in line 3) to see whether her production is correct. After that, Afnan, in line 4, fixed Khloud's production by amending the part of speech of the word *emergent* (adj) to *emergence* (n). Khloud, then, in line 5, acknowledged Afnan's feedback when she used an emoticon showing that Afnan's correction is correct. In line 6, Afnan suggested another way to fix Khloud's sentence by eliminating the preposition, *of.* Khloud, as a result, in line 7, selected an appealing option to correct her sentence and incorporated it to her final output.

6.2.3.4.3   Extract 3 (LOTM 2)

1. *3:44 p.m … T: How do you pronounce the word longevity?*
2. *3:45 p.m … Halima: Recording / lɒnˈgevəti/*
3. *3:45 p.m … Walaa: Recording /lɒnˈdʒevəti/*   (Give feedback)
4. *3:45 p.m …T: Yes Walla. Would you resay it Halima*
5. *3:46 p.m …Halima: Recording /lɒnˈdʒevəti/*   (Incorporation)
6. *3:46 p.m … T:* 👍

This is a further example where the use of incorporation strategies is tracked. In week 4, Halima incorporated Wala's feedback about the pronunciation of the word *longevity.*

That is, the teacher asked students to pronounce the word longevity. In line 2, Halima recorded her voice while saying the word, however she pronounced it incorrectly. Walla pronounced the word correctly in line 3. Consequently, the teacher approved Walaa's pronunciation and asked Halima to re-say the word in line 4. Halima, then, in line 5, incorporated Wala's production. In line 6, the teacher reinforced Halima too.

6.2.4   Other features in WhatsApp conversations:

6.2.4.1   Giving short responses

Due to the nature of the synchronous WhatsApp conversation, most of the participants used short responses frequently during their interactions.

6.2.4.1.1   Extract (LOTM 1) Timing

A number of interlocutors gave one word response to answer teacher's question in lines 2, 3,, 4, 5, 6, 7, 8, 9, and 10.

1. *7:32 p.m....T: Which food should be excluded from your diet if you want to lose weight?*
2. *7:32 p.m ...Reem: fast food*
3. *7:32 p.m ...Dina: Chocolate*
4. *7:32 p.m ...Esraa: fast food*
5. *7:32 p.m ...Noura: Burger*
6. *7:32 p.m ...Esraa: Ice cream*
7. *7:32 p.m ...Afnan: Chips*
8. *7:32 p.m ...Maram: Cake*
9. *7:32p.m ...Reem: Cola*
10. *7:32 p.m ...Noura: Pepsi*
11. *7:32 p.m ...T: Actually, all delicious food*

6.2.4.2   Using emoticons

The participants used emoticons to express their feelings as a replacement of facial expressions in face-to-face communications. Extracts demonstrating participants' use of various types of emoticons are available in most of the above extracts.

The mobile phone medium lacks properties found in face-to-face communication, such as the tone of articulation (stress), body language, and facial expressions which are important in determining a speaker's intent and feelings (anger, happiness, wondering, or sarcasm). In compensating for this drawback, participants used emoticons to express their emotions during the communication via WhatsApp. Data from WhatsApp conversation analysis showed that participants were using emoticons abundantly to express feelings like happiness, anger, disappointment, and embarrassment, or even sometimes used contractions to convey meaning in the shortest way to cope with the pace of the conversation, for example, by using a question mark to express difficulty.

Diverse emoticons were used to show different facial expressions in order to convey various positive and negative feelings. For example, they used a set of emoticons to reflect happiness and joy including, a smiling face ☺, a face with tears of joy 😂, a smiling face with heart eyes 😍, a face blowing a kiss 😘, a face with stuck out tongue and winking eyes 😜 . To express negative feelings, they used another set of emoticons, for example they used a frowning face, a face with sunglasses 😎, a disappointed face 😞, a worried face 😟, confused face 😕, a tired face 😫, an expressionless face 😑, a crying face 😢, a loudly crying face 😭, a face with a hallo 😇 , an angry face with horns 😈. These negative impressions were mostly used to express feelings about the difficulty of learning, confusion and misunderstandings.

Participants also used hand emoticons to replace body language which is missing in this environment. For example, they used clapping hands 👏 or a hand with a thumb up 👍 for reinforcement, folded hands 🙏 for expressing gratitude, a hand pointing up ☝ to refer to something, raised hand ✋ to show availability or to express a desire to answer, a flexed biceps 💪 to show ability.

Other groups of emoticons such as a kiss, hearts ❤ 🖤, and flowers 🌾 🌷 🌸 🌼 🌺 are used to show love or care, while a broken heart 💔 is used to show grief. Also, eyes 👀 are used to express presence, wondering, or thinking. Lastly, foods and drink

emoticons are used to answer food related topics 🍎 🌶️ 🍉 🍇 🌽 🍠 🍟 🍜 🍲 🍣 🍥 🍚 🍦 🍧 🍨 🍰 🍮 🍩 🐕.

6.2.4.2.1 Extract (LOTM 2)

6.2.4.3 Initiating

It was very rare that participants initiated the conversation rather than the teacher but there are some exceptions.

6.2.4.3.1 Extract 1 (LOTM1)

Dareen initiated the following interaction by asking a question about two confusing words *complement* and *complete.*

1. *7:02 p.m. ….Dareen: Does "complement" and "complete" the same? (Initiating)*
2. *7:04 p.m. …Waad: Yes*
3. *7:05 p.m. ... Reem: No. I think they are different*
4. *7:05 p.m. …Waad???*

6.2.4.3.2 Extract 2 (LOTM1)

Sara initiated a side conversation with her friends discussing some important dates:

1. *9: 39 a.m. … Sara: Hello friends*
2. *9:39 a.m. … Sara: very bad to miss yesterday's class. I was caught up in a heavy traffic and my 4G connexion was real bad. I could not tell you that I won't be able to catch up with you. Here are some important updates I got from Mrs. Marwa*
   1. As agreed, the vocabulary quiz is on Sunday.
   2. Chapter 10 is only vocabulary included and we would better review it together online via WhatsApp.
   3. On Tuesday grades and presentation tips revision
   4. Thursday presentation (not Sunday)
3. *9: 55 a.m. … Esraa: Ohhhh. But I have final exam on Thursday.*
4. *9.57 a.m. …Raghad: Me too. We have to fix this as soon as we can*

6.3 WhatsApp virtual environment versus traditional classroom learning

The WhatsApp chat environment in the current intervention is similar to classroom context in terms of the interactions are nearly always initiated by the teacher and was mostly teacher driven (teacher-student questioning and answering style), with few opportunities for students to initiate interactions towards the end of the intervention. However, the mobile phone medium imparts additional features for group conversation that distinguishes it from actual classroom conversation.

Although the teacher aimed to cover a set of target words when planning for the intervention, learners were seen to learn at their own pace, in which they never proceeded to the a next piece of learning until they had fully internalized the one at hand. In other words, the WhatsApp chat sessions provided learners with the space to extend classroom time without the pressure of trying to catch up with the syllabus. Further, unlike the classroom, students have equal opportunities to participate as everyone can post entries at any time.

Unlike natural conversations, which require interlocutors to exchange interactions promptly, learners in the WhatsApp medium can take the necessary time to work out what to say and how to say it, to search for information needed, and to therefore respond at their convenience. This is evident in the time gaps participants have (sometimes) between entries (see 6.2.3.1.2 as an example)

Similarly to a classroom setting, there are some participants who join chat sessions regularly and participate frequently such as Afnan, Reem, Bushra, and Ebtihal. Others preferred lurking and learning passively. Some of these participants started to participate after observing earlier sessions such as Waad, Walaa, and Dina, with others preferring to observe the conversations without attempting to participate, such as Lujain.

The next chapter explores participants' opinions about beliefs and practices of vocabulary learning before and after the intervention.

Chapter 7:   Vocabulary learning beliefs and attitudes to mobile phone learning

7.1   Introduction

Building on Chapters 5 and 6 which set out to examine patterns of vocabulary gain and loss, and to look in depth at WhatsApp interactions, this chapter explores the beliefs and attitudes of participants towards the two essential themes underpinning this study: vocabulary learning and mobile phone learning.

The vocabulary section firstly unfolds participants' beliefs about vocabulary learning before and after the intervention. It then statistically measures whether there are significant differences between pre and post-study vocabulary learning beliefs. After that, it examines participants' vocabulary learning practices, including their use of vocabulary learning strategies before and after the investigation. More specifically, following this, it investigates their use of negotiation of meaning strategies.

The mobile phone section is concerned with attitudes towards mobile learning. That is, it explores participants' attitudes to mobile phone learning before and after the intervention, and then statistically examines whether there are differences between pre and post-study attitudes towards mobile learning. Next, the chapter moves on to explore participants' views about mobile phone affordances that they find most useful and contribute to their learning. The chapter continues by showing participants' views on the challenges which impede formal learning using mobile phones. The chapter ends by reporting the findings of eight cases in terms of their overall experience with learning vocabulary via mobile phones.

7.2 Changes in vocabulary learning beliefs

7.2.1 Vocabulary learning beliefs before the mobile phone learning experience

Before the intervention, many of the participants reflected on some of their beliefs about vocabulary learning via the pre-study questionnaire. These involved their perceptions about the importance of vocabulary learning, vocabulary/grammar status in language classroom and the roles of teacher and students in vocabulary learning tasks. Participants' beliefs about what vocabulary learning should involve, different approaches and views on vocabulary learning, including whether they find it tiresome or boring, were also explored. Table 19 below shows the responses of the participants to the pre-study questionnaire section on vocabulary learning beliefs.

Table 19 Pre-study Vocabulary learning beliefs

Vocabulary learning beliefs	Agree	Neutral	Disagree
1. I believe that learning vocabulary is important when learning the English language.	86.2%	3.4%	10.3%
2. I think that learning grammar is more important than learning vocabulary.	61.3%	22.6%	12.9%
3. I do not always have enough words to freely express my thoughts in English in real life.	67.7%	22.6%	9.7%
4. I think that knowing a word is all about knowing its meaning.	61.3%	16.1%	22.6%
5. I do not think new vocabulary could be picked up and learned easily while reading.	41.9%	35.5%	22.6%
6. I think teachers should teach new vocabulary in class.	80.6%	19.4%	---
7. I think that it is the role of students to always notice new words and learn them.	19.4%	29%	51.1%
8. I find vocabulary memorization difficult and boring.	51.6%	35.5%	12.9%
9. Occasionally, I recognize the form and the meaning of newly learned words without being able to reuse them in other situations.	67.7%	25.8%	6.5%
10. In my writing or speaking, I prefer to use words that I have already mastered rather than newly learned words.	87.1%	3.2%	9.7%

11. The task of vocabulary memorization is mostly left for us to do at home.	80.6%	12.9%	6.4%
12. I think it is possible to delay the task of vocabulary memorization until immediately before an exam.	45.2%	12.9%	42%
13. I find that words with difficult pronunciation can easily be forgotten.	90.3%	3.2%	6.4%
14. I find that long words are more difficult remember than short ones.	74.2%	19.4%	6.5%
15. I find that words with irregular forms are more difficult to remember than words with regular forms.	60%	13.3%	26.6%

Findings from the pre-study questionnaire reveal that most participants have realized the importance of vocabulary while learning any language (86.2%), and the considered learning grammar to be more important than learning vocabulary (61.3%). However, only a few of them (22.6%) believed that knowing a word comprises more than simply understanding its meaning and it involves other aspects of word knowledge. Responses to statement number 5, which investigates participants' views about preferred vocabulary learning approaches, show that participants were divergent about their best way to learn vocabulary. That is, 41% of participants did not prefer an incidental vocabulary learning approach as they found acquiring new words, while doing other tasks difficult, as they similarly reported during interviews. 22.6% of participants adopted the incidental approach to vocabulary learning, while 35% of them were neutral. Participants justified their positions during interviews (see below in this section).

However, participants' preferences for deliberate vocabulary teaching were evident when the majority (80.6%) supported statement 6, which stated that a teacher should teach new vocabulary in class. This means that they prefer a deliberate approach to vocabulary learning, by which the teacher draws attention to word features and gives an explanation. In the same way, responses to statement 7, which investigated whether learners should notice and learn new words by themselves, revealed that 51.1% of participant disagreed, 19.4 % agreed, while 19.4% were neutral. Overall, responses to statements 5, 6, and 7 showed that even though some of the research

subjects opted for an incidental vocabulary learning approach, the majority of them believed that the task of vocabulary learning could not be accomplished independently. However, 80.6% of them in statement 11 stated that vocabulary memorization is left for them to be carried out at home.

Statement 8 showed that just over half the research sample (51.6%) found vocabulary learning boring and difficult, 35.5% of them were neutral, and 12.9% disagreed with the statement. Statements 9, 10, 13, 14, and 15 investigated aspects of difficulties with vocabulary learning. That is, participants' ranking of aspects of word difficulties from most to least difficult were as follows: remembering words with pronunciation difficulty (90.3%), memorizing long words (74.2%), using words in sentences (67.7%), and then memorizing words with irregular forms (60%). Finally, statement 12 which investigated participants' views regarding the act of studying vocabulary only before an exam showed that 45.2% found it acceptable, 42% did not, and 12.9% were neutral.

Aligning with the above findings, data from the pre-study focus group gave further insight into participants' vocabulary learning beliefs. For example, some of the participants reported that they adopted a deliberate vocabulary learning approach.

 Nawal, (Pre-FG 1_Main), an above average vocabulary gain learner, adopted a deliberate learning of vocabulary approach, yet she found it boring and tiresome. She said:

> I spend long time studying vocabulary….I think this will improve someone's language, but I don't like it….. It is a boring task and it requires me to spend lots of time and effort while memorizing.

In the same sense, (Pre-FG 2,_ Main), Dareen, an above average vocabulary gain participant added that she only studied vocabulary before exams and forgot itimmediately afterwards. She said:

> I know learning vocabulary is important but it is tiresome …….. I usually spend time memorizing words especially before exams, but I forget them quickly afterwards …. no matter how much time I study.

Sara, (Pre-FG 2_Main), echoed that expending effort on vocabulary memorization consumes time. She said:

I think learning vocabulary is important but I don't like it because what you memorize quickly forget.

On the other hand, a number of students adopted an incidental learning approach to vocabulary learning, which does not require effort. For example:

Halima, an under average vocabulary gain participant, (Pre-FG 2_ Main), preferred incidental vocabulary learning while engaging in other tasks. She said:

> I usually don't pay attention to learn new words intentionally….I finds it boring and hectic ….. As it involves lots of memorization……I think it is better to see words in context and pick them when possible while reading or through working on other skills like listening, or writing.

Similarly, Abeer, (Pre-FG 2_Main), believed that encountering words in many contexts is the key to learning vocabulary. She said:

> I don't memorize vocabulary….It is boring and consumes time and effort… I just pick them while doing other tasks … reading or listening …it is not about memorization

Ajwad, (Pre-FG 1_Main), also did not devote much effort into memorizing words, as exams allocate few marks for vocabulary. She said:

> In periodic tests, for example, only five marks are given to vocabulary out of thirty …. I did no pay much effort in memorizing vocab.

The following section shows participants' beliefs about vocabulary learning after the intervention.

7.2.2 After intervention vocabulary learning beliefs (data from post- study questionnaire)

Students' vocabulary learning beliefs have been influenced by their mobile phone learning experience. That is, some of these beliefs, previously explored in the pre-study phase, have been refined after using the mobile phone medium to learn vocabulary. Following the intervention, vocabulary learning beliefs were re-explored in the corresponding section in the post-study questionnaire (see Table 20 below).

Table 20: Post-study vocabulary learning beliefs

Vocabulary learning beliefs	Agree	Neutral	Disagree

1. I believe that learning vocabulary is important when learning English language.	97.0%	---	3.0%
2. I think that learning grammar is more important than learning vocabulary.	21.2%	15.2%	63.6%
3. I do not always have enough words to freely express my thoughts in English in real life.	60.6%	24.2%	15.2%
4. I think that knowing a word is all about knowing its meaning.	33.3%	--	%48.5
5. I think new vocabulary could not be easily picked and learned while reading.	39.4%	39.4%	21.2%
6. I think teachers should teach new vocabulary in class.	57.6%	33.3%	9.1%
7. I think that it is the role of students to always notice new words and learn them.	21.2%	42.4%	36.4%
8. I find vocabulary memorization difficult and boring.	36.4%	39.4%	24.4%
9. Several times, I recognize the form and the meaning of newly learned words without being able to reuse them in other situations.	60.6%	9.1%	30.3%
10. In my writing or speaking, I prefer to use words that I have already mastered rather than newly learned words.	84.8%	6.1%	9.1%
11. The task of vocabulary memorization is mostly left for us to be done at home.	80.6%	6.5%	12.9%
12. I think it is possible to delay the task of vocabulary memorization to be done immediately before exam.	31.3%	12.5%	56.3%
13. I find that words with pronunciation difficulties can easily be forgotten.	54.6%	39.4%	15.2%
14. I find that long words are more difficult to be remembered than short ones.	60.6%	27.3%	12.1%
15. I find that words with irregular forms are more difficult to be remembered than words with regular forms.	56.3%	21.9%	21.9%

Findings from the post-study questionnaire reveal that the majority of participants believe in the importance of vocabulary while learning any language (86.2%), and have come to believe that leaning vocabulary is more important than learning grammar (61.3%). Also, nearly half of the research sample (48.5%) has realized that knowing a word comprises more than simply knowing its meaning and it involves other aspects of word knowledge. In investigating participants' views about the effectiveness of incidental vocabulary learning, their responses were still divergent about their capability to pick up words while engaging in other language tasks. The participants' views about the role of the teacher and learner are investigated in statement 6 and 7, which revealed that 57.6% believe that the teacher should teach vocabulary deliberately. Although this percentage has fallen when compared to the findings from the pre-study questionnaire (80.6%), it revealed that more than half of the participants

still believe they need a teacher when learning vocabulary. Responses to statement 7 have undergone some changes too when compared to the pre-study questionnaire answers (see 7.2.1). It shows a divergence in students' responses as 21.2% of them agreed that students should be responsible for their learning, 36% disagreed with it, and 42.6% of them could not identify a clear position. This may mean that they either perceived the new interdependence roles of both teacher and learner (no absolute independency), or they do not have a clear idea about their roles in this new learning environment, or maybe they did not understand this statement. Data from post-study Interviews shows that participants have perceived a transformation in both the role of the teacher and student in this mobile phone learning environment.

In statement 8, the percentage of participants who view vocabulary learning as boring has dropped, (from 51.6% to 36.4%). There were no major changes in participants' responses in statements 9, 10, 11, 12, 14, 15, and 16 which investigated aspects of difficulty of vocabulary learning (see Table 20 above).

Statistical difference in students' beliefs is discussed in the section below.

7.2.3   Statistical differences in pre- and post-intervention vocabulary learning beliefs

There were no significant statistical differences in students' responses in the pre and post- intervention phases as the p value was greater than .05 in all pairs except for paired statements 2, 4, 6, and 13 (see Table 21 below and Appendix O.1).

 There were substantial differences between the responses before and after the intervention in statement 2 as the p value was .03 which is less than .05. Statement 2 investigated the status of both vocabulary and grammar in language learning. Frequency data in the pre-study questionnaire revealed that 61.3% of participants believed that grammar is more important than vocabulary, 22.6% of participants did not agree. Whereas 16.1% of them could not identify their position or they may have thought they were equally important. However, after the intervention, and probably as a result of the WhatsApp conversations, the percentage of those who prioritized grammar has reduced dramatically to 21.2%. Similarly, the percentage of those who

previously could not identify their position has fallen to 15.2%, while the percentage of participants who realized that vocabulary is important to avoid communication breakdown, has risen to 51.5%. This could be because they themselves might have observe how their threaded communication in the online chat sessions were maintained, without necessarily producing the correct syntax, but rather choosing correct words. This shift in the participants' responses might mean that participants have become more aware that having a wider range of vocabulary is important in a communicative situation.

The paired sample test also indicated a significant shift in responses regarding the perception of word knowledge (p value= .02). That is, statement 4 stated that knowing a word is all about word meaning. Frequency data indicated that 61.3% of participants agreed with this statement in the pre-study questionnaire, only 22.6 % of them rejected it, while 16.1% of them were neutral. Participants' responses have shifted noticeably in their post-study questionnaire. That is, 66.7% of them disagreed with the statement, while 33.3% accepted it. This means that the majority of participants have become aware that, probably due to the current mobile learning experience, word knowledge comprises further dimensions than simply word meaning. Yet, a minority still restricted knowing a word to knowing its meaning.

There were changes in response to statement 6, which stated that a teacher should teach vocabulary in class. That is, before the intervention, 80.6% of participants agreed with this statement, whereas 19.4% of them were neutral. However, after the intervention, the percentage of those who advocate strong teacher presence fell to 57.6%, with 9.1% disagreeing with it and 33.3% of them being neutral, which means they are probably unsure as to what extent a teacher should control/ direct their learning. The change in student' opinion could be because participants have understood the transformed roles of the teacher and student. In other words, they perceived the more interactive roles of both parties in the WhatsApp mobile phone sessions, constructing learning together. This is rather than the over reliance on either a teacher or student on learning (see qualitative data in 7.3.1.1, 7.3.2, 7.4.2.1 and in 7.3.1.1), which showed how mobile phone users could handle the task of vocabulary learning by doing some independent actions.

Responses to paired statement 13, which examined the participants' potential to forget difficult to pronounce words, have undergone significant changes too. Before the intervention up to 90.3% of respondents believed that words which were hard to pronounce can be easily forgotten, however after the intervention, this percentage has dropped significantly to 45.5%, which means that they may have discovered an area in WhatsApp chat for practice and repetition which inevitably strengthens memory function.

Overall, in comparing pre and post study beliefs about vocabulary learning, it can be assumed that the mobile phone learning intervention has probably refined some of the participants' vocabulary learning beliefs. For example, it managed to adjust their beliefs about the status of grammar in language learning, a myth traced back to the influence of the Grammar Translation Method. In addition, it managed to raise their awareness that vocabulary knowledge comprises more than word meaning. Besides, it helped them to realize that vocabulary learning is not boring per se, instead other innovative methods could be utilized to make vocabulary learning more interesting. In addition, beliefs about the role of the student and teacher have also changed.

Table 21: Paired Sample Test/ Pre- and Post- study vocabulary learning beliefs

	Mean	Std. Deviation	Sig. (2-tailed)
Pair 1	.276	1.461	.318
Pair 2	-1.097	1.921	.003
Pair 3	-.226	1.117	.269
Pair 4	-1.032	1.683	.002
Pair 5	-.129	1.088	.514
Pair 6	-.548	1.091	.009
Pair 7	.258	1.125	.211
Pair 8	-.226	1.203	.304
Pair 9	-.161	1.369	.517
Pair 10	.065	1.153	.758
Pair 11	-.103	1.319	.676
Pair 12	.000	1.509	1.000
Pair 13	-.742	1.264	.003
Pair 14	-.290	1.160	.174
Pair 15	.033	1.520	.905

Key: shaded elements = significant differences between pre- and post- intervention attitudes

After understanding the thoughts of students regarding vocabulary learning and how their beliefs have been modified after the 5 week intervention, the strategies that participants say they used to learn vocabulary before and after the intervention are explored in the following section in an attempt to see whether mobile phone learning has encouraged students to use more vocabulary learning strategies.

7.3   Vocabulary learning practices: Strategies used for learning

In this section, participants' attitudes towards vocabulary learning practices employed in the current study including the use of vocabulary learning strategies and negotiation of meaning strategies are examined.

7.3.1   Vocabulary learning strategies

This sub-section looks at vocabulary learning strategy use and negotiation of meaning strategy use. These two strategies are highlighted here as separate strategy types (unlike e.g. Schmidt, 1997 in his strategy taxonomy) in order to explore the impact of WhatsApp on their use.

7.3.1.1   Changes in vocabulary learning strategy use

Findings from the pre-study questionnaire reveal that participants used a range of vocabulary strategies, which fall under the broad categories of discovery and consolidation strategies of Schmitt's 1997 (see 2.7.1). Therefore, many of the participants before the study, used a number of determination strategies including analysing parts (57.5 %%), analysing word types (e.g., verb, noun) (58%), and guessing words from context (69.6%). With social strategies, a few participants used discussing meaning in a group (24.2%), asking a friend for word meaning (12.1%), and discussing for meaning (9.0 %). However, with cognitive strategies, many participants used word

repetition (84.8%), translating words to L1 (90.9%), and writing words in lists (66.6%). For memory strategies, 42.4% of participants used connecting words to images, 33.3% used new words in sentences, while 42.4 % connected words to synonyms and antonyms. Finally, in metacognitive strategies, they used English language media (24%) and mobile phones while learning vocabulary (18%).

During the intervention, participants' use of these vocabulary learning strategies (VLS) has generally improved. That is, all participants maintained using L1 translation strategies and repetition strategies (100%). Using words in sentences has also improved dramatically (90.9%). Furthermore, there was also a remarkable increase in using determination, social, and memory strategies , such as dividing words into parts (90.9%), identifying word type (90.9), guessing meaning from context (87.9%), working in a group (84.8%), asking a friend for a meaning (81.8%), negotiating for meaning (84.7%), and connecting words to synonyms and antonyms (87.8%). Moreover, many participants used connecting word to image (66.6%), whereas using word lists has reduced noticeably (from 66.6% to 27.2%). Also, the strategies of using multimedia and the mobile phone for learning, have improved noticeably, (81.8%) and (87.8%) respectively (see Appendix P.1).

Figure 15: Changes in vocabulary learning strategy use
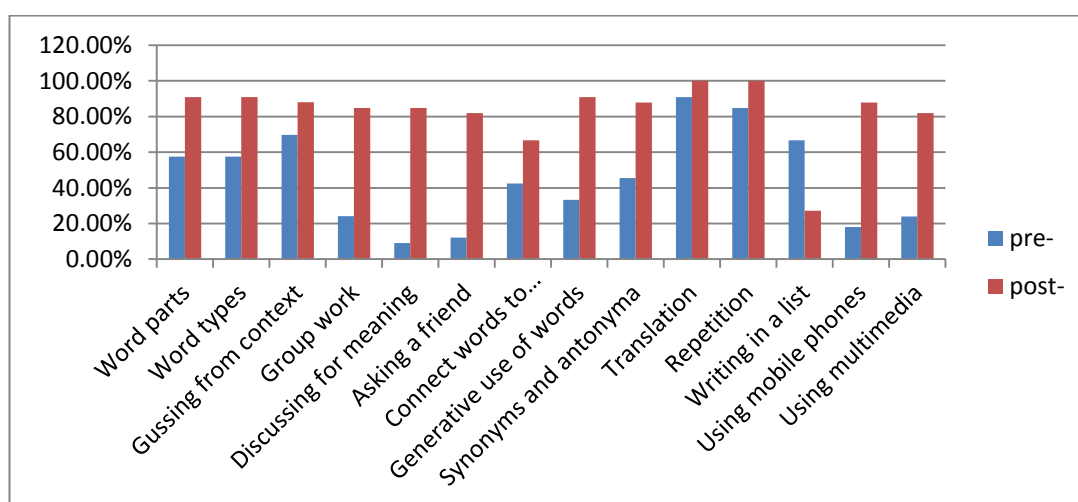
In addition, data from the post-study questionnaire, (see Table 22) shows that the majority of participants considered that mobile phone learning offered a rich environment that better allowed for the use of VLS. That is, it helped them to learn about the various aspects of word knowledge including word meaning, synonyms and

antonyms, word affixes, part of speech, pronunciation, spelling. The majority of them also found this type of learning is reinforced by consistent repetition and any time anywhere learning.

Table 22: Attitudes, beliefs and vocabulary learning strategies following the intervention

VLS in LOTM	Agree	Neutral	Disagree
1. Online vocabulary messages enable me to study words whenever and wherever I want.	75.7%	9.1%	15.2%
2. I found studying vocabulary lessons by messages easier to memorize than paper based vocabulary lessons.	66.7%	18.2%	15.2%
3. Vocabulary lessons in LOTM improved my pronunciation of new words.	63.6%	21.2%	15.2%
4. Vocabulary lessons improved my spelling of new words.	56.7%	18.2%	15.2%
5. Vocabulary lessons helped me to understand different meaning of a word.	74.10%	9.4%	15.6%
6. Vocabulary lessons helped me to know about words parts of speech.	81.8%	6.1%	12.1%
7. Vocabulary lessons helped me to learn about word affixes.	81.3%	6.3%	12.5%
8. Vocabulary lessons helped me to know about words synonyms and antonyms.	80.13%	6.3%	12.5%
9. Continual repetitions of words in LOTM enabled me to remember words better.	78.8%	9.1%	12.1%

Different sources of data, from the chat analysis (see 6.2) and the interviews show that participants maintained the use of vocabulary learning strategies they used before the intervention and incorporated additional ones such as using interaction and negotiation of meaning strategies as well as regular word practice (inherent to the nature of WhatsApp communication and the vocabulary lesson design). This remarkable improvement in using these strategies could give evidence that this new learning experience using mobile phone WhatsApp chat has encouraged learners to better utilize diverse vocabulary learning strategies to remember target words. Besides, genuine interaction in English between the student and teacher become more plausible, in which they can practice using diverse vocabulary learning strategies effectively.

Participants discussed their use of their preferred vocabulary learning strategies in the interviews. For example, Afnan, (Post-Int._ Main), a high vocabulary gain learner and an above average contributor, asserted that word translation is the first technique she uses when confronting new words:

> When I take a new word, the first thing comes to my mind is to translate the word into Arabic…It's the easiest way to know its meaning….We translate words since we were in school.

She also, in (Post-Int._Main), compared between online chat sessions and the classroom setting in terms of allowing strategy practice. She stated:

> I think chat sessions gave us a better chance and more time to practice vocabulary learning strategies…..I also tried to apply these strategies with new words and make guesses…. We did not have this in regular classes….vocabulary learning was mostly left to be done alone at home.

Hanan, (Post-Int._Main), an average vocabulary gain participant with average contribution quantity, added that word translation is useful when long definitions are difficult to comprehend and memorize. She said:

> I wonder why I should bother with long definition when I want to know about word meaning…Arabic translation quickly stick to mind especially with difficult concepts.

Similarly, Nawal, (Post-Int._Main), an above average vocabulary gain and above average contributor, commented that translating words is the easiest strategy. She said:

> I automatically translate the word into Arabic and write the Arabic meaning in pencil besides it…when I translate words they become relevant in a way….it is usually the easiest and the most efficient start in the process of knowing a word.

She also, (Post-Int._Main) claimed that the time spent practicing VLS, enhanced learning:

> Spending long time with words…..using various VLS to learn different aspects of knowledge about the words really matters…..I mean in online chat, we were mainly practicing using VLS, seeing how our friends apply VLS to even new words…….I learned a lot from this.

Also, Fatima, (Post-Int._Main), an above average vocabulary gain and above average contributor, commented that word repetition is a useful memorization technique

which she had adopted before and was even further reinforced during the intervention.

> I think repeating words while memorization is a useful strategy…. I used it since school time…Though it sounds boring, but it is effective especially before exam……….The good thing ….target words in WhatsApp group show up again and again….and this is a kind of repetition…I don't need to repeat words myself…The task of is done for me FANTASTIC

Ebtihal, (Post- Int._Main), an average vocabulary gain and above average contributor, reported that WhatsApp chat enabled her to use vocabulary learning strategies more intensively through genuine interaction. She said:

> The best thing is that we all talk together in WhatsApp group…. We used lots of techniques to learn vocabulary together … we fix sentences together….we divide words into parts together….we ask each other and we learn from each other.

Maram, (Post-Int._Main), an average vocabulary gain and average contributor, explained, that unlike previous learning habits, she learned better via mobile phone, by practicing vocabulary learning strategies through interaction. She said:

> Group work is what makes Mobile learning different….when I studied alone at home, my only technique to memorize words was to list them along with their Arabic meaning…. In WhatsApp group we work together to discover different information about words and how to use them in place…this way I learn more about the word

Corroborating the frequency data, interviews revealed that there was a dramatic drop in using the word lists strategy. Khadijah, (Post-Int._Main), a special case who only received 45 /45 in her post- intervention-test and who made average contributions, commented that the WhatsApp medium allows for learning through interaction, which is more authentic than the outdated listing strategy. She said:

> It is funny when I remembered those days in school when the teacher gave us a long list of words to memorize for the exam …I used to jot down all what I learned in the exam and wondered how quickly I forgot everything immediately afterwards….. I realized now that it is not a matter of memorization… it seems that it is more about practicing with others.

Noura, (Post-Int._Main), an above average vocabulary gain and an above average contribution participant, indicated that unlike individual home study, mobile phone learning allows for more VLS practicing:

> The most important thing in online classes is that we practice vocabulary learning strategies ….. Though we knew most of them before, I have not used them while studying vocabulary alone…….I mainly relied on memorization….. This time we

practiced using lots of VLS with friends ….I also make guesses about new words and try using them.

Wejdan, (Post-FG_Main), an above average vocabulary gain and an above average contribution participant, commented that vocabulary messages allowed for vocabulary learning strategy practice, unlike in a classroom setting. She said:

> Unlike the case in the classroom … (In WhatsApp chat sessions) we spent considerable time learning words by practicing various vocabulary learning strategies………. Before mobile learning, vocabulary learning was mostly memorization and left for us to be done at home ….teacher always says classroom time is short.

Reem, (Post-Int._main), an above average vocabulary gain and contribution participant, reported that online learning encouraged her to test a hypothesis and experiment with language and get feedback from teacher and friends. Reem said:

> [During interaction]…I mostly apply vocabulary learning strategies I took before to new words and get feedback from friends and teacher….I mean, for example, many times I change nouns to verbs or adjectives, and the like, based on my experience of how words work in English…..sometime my guesses were correct….other times were not…. I knew this when other group members gave me their feedback….We did not have this chance in real classroom.

To sum up, the students' views in the post intervention interviews showed that mobile phone learning environment allows for more strategy use compared to traditional learning environment, by providing a space for social interaction. In addition, the mobile phone learning environment provided by the mobile phone raises learners' awareness that the quality of vocabulary learning is tremendously enhanced by strategy training.

7.3.2   Negotiation of meaning strategies

Schmitt's (1997) taxonomy considers the use of negotiation of meaning strategies as a sub-strategy under social strategies used for vocabulary learning (see 2.7.1), special attention is given to them here as they are one of the main pillars of this study. Many participants indicated that one of the qualities of the online chat sessions is their ability to spend time in negotiating meaning (see above 7.3.1). Though they did not mention the term "Meaning Negotiation" in their utterances, they showed awareness in describing what it comprises and how it contributes to their learning. Responses to statements 4, 6, 7, 11, 13, 14, 15, 16, 17, 18, 19, and 20 in the post-study questionnaire

(Table 23 below), reflected their use of these negotiation of meaning strategies to modify meaning and achieve learning.

Data from the post-study questionnaire showed that the majority of students have used a wide array of meaning negotiation strategies during online interactions. Yet, it appears that the majority of participants, including those who responded negatively or neutrally to statements examining the use of meaning making strategies (4, 6, 7,11, 13, 14, 15, 16, 17, 18, 19), responded positively to the last statement, which stated that lurking in WhatsApp interactions is sufficient for them to learn, rather than being involved. This probably means that even without active participation, some learning might take place due to mere observation. Besides, there is a chance that those who prefer to be passive observers will become more active over time.

Table 23: Negotiation of meaning strategy use based on the post-study questionnaire

	Agree	Neutral	Disagree
4. Online chat enabled me to paraphrase information in my own words.	45.5%	39.4%	15.2%
6. Online chat helped me to share my ideas with class.	71.9%	15.6%	12.5%
7. Online chat enabled me to comment on our friends' opinions.	57.6%	12.1%	12.1%
11. Friendly environment of online chat made leaning less formal.	78.8%	15.2	6.1%
13. Online chat helped me to correct my understanding of some misunderstood information	78.8%	12.1%	9.1%
14. Online chat enabled me to know about different point of views of my class mates.	81.8%	9.1%	9.1%
15. Over time, I gained more confidence in making new sentences and posting them to LOTM.	60.6%	27.3%	12.1%
16. Our errors were gently corrected while chatting online.	81.8%	12.1%	6.1%
17. the teacher gave us useful comments during online classes.	84.4%	9.4%	6.3%
18. I got more feedback from classmates in online chat than regular classes	51.5%	27.3%	21.2%
19. I feel free to post questions to the group discussion whenever I need.	53.1%	31.3%	15.6%
20. For me, I was happy to just learn from observing teacher-students interactions in online chat.	61.3%	16.1%	%22.6

Extracts from students' views in post- intervention interviews and post- intervention focus group relevant to their use of meaning negotiation strategies are shown below.

For example, Khadijah, (Post-Int._Main), compared the difference between online chats sessions and regular classes. She said:

> I have a chance to ask questions if I don't understand…… I can ask for repetition if I missed something or joined the group late……If I don't understand what my friend has said, I asked her to resay it in simpler words…. This is not the case in regular classes….. I usually feel embarrassed to ask questions.

Bashayer, (Post-Int._Main), explained that negotiation of meaning is one of the online chat merits. She said:

> ………………It's definitely better……I got the courage to ask for repetition or even more clearing up …..more explanation …..and then check my understanding…..

Esraa, (Post-FG_Main), an average vocabulary gain and an average contribution participant, has a similar opinion. Esraa said:

> We are kept busy asking questions, giving comments, giving opinions, expressing difficulties, asking for explanation…. And this I think increased our chances to learn words………….Its unlike classroom in which we listen to the teacher and take notes.

Afnan , (Post-Int._Main), compared between online chat sessions and studying at home. Afnan said:

> …I no longer spend long time at home memorizing words by writing them down many times. Ohh! … Now, I have friends to share my learning with…..I mean I can ask questions if I don't understand what teacher or friends say………I ask to explain if something is not clear……..I ask for advice if I wasn't sure about my answer…… or for repetition if I missed what they said….My learning is more meaningful this way….I think.

Fatima, (Post-Int._Main), indicated that they learned in a safe environment. Fatima said:

> …….I can ask questions and get immediate feedback……..if I don't understand something, I ask for clarification or repetition……when anyone gives incomprehensible contribution, I can ask her to resay it in simpler words………I do this without embarrassment or fearing to waste class time….

Dareen, (Post-FG_Main), linked the benefit of meaning negotiation to the exam:

> I did not feel I need to study hard before exam, I just scrolled down the chat group quickly……I remembered all of the words………….I think it is just because of the time we spent asking questions and got feedback, asking for repetition, or clarification…. All count.

However, Halima, (Post-Int._Main), a below average vocabulary gain and under average contribution participant, did not favour the interactive nature of learning. She said:

> Interaction with the teacher and friends is somehow annoying as my digital writing is somehow slow, particularly in English…………. I knew the answers to [the teacher's] questions, or I might need to ask questions but my friends who write faster than me always preceded me. This gave me a feeling of competition.

In the same vein, Lujain, (Post-Int._ Main), an above average vocabulary gain and under average contribution participant, also did not like this type of negotiation. She said:

> My digital writing in English is poor……. I preferred to observe their interactions and I learned from my friend's comments and questions……most of the time they asked question which I wanted to ask myself.

Waad, (Post-FG_Main), an above average vocabulary gain and under average contribution participant, indicated that she learned only from lurking,

> I learned a lot from my friends' entries……….Though I did not always participate, I was following their interactions and I learned new things.

Walaa, (Post-FG_Main), an average vocabulary gain and under average contribution participant, also added that she benefited from lurking. She said:

> I did not have time to join the chat sessions regularly, yet I always observed how my friends experimented with language……Many times I built on their knowledge and make new production.

Sara, (Post-FG_Main), a below average vocabulary gain and a below average contribution participant, also said that she learned only from observing interactions:

> I didn't join the chat sessions but I noticed how my friends experiment with language…….how they used words in new places, and I learned from their interactions…….I sometimes didn't know how to say something in English, While my friends could say it right.

  Dareen, (Post-Int._Main), an above average vocabulary gain and average contribution participant, compared learning in chat session to learning at home. She indicated:

Online chat is of great help actually……we spend more time learning new words easily by real interaction…..I mean I can ask question……I can ask to make it simple or more explanation….I even sometimes asked to check whether I understand … This does not happen when I study alone at home.

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7.4 Mobile phone learning

This section concerns the changes in mobile phone learning attitudes and their understanding of mobile phone affordances and challenges.

7.4.1 Changes in mobile phone learning's attitudes

This sub-section comprises pre and post-study attitudes to learning and changes to these attitudes.

7.4.1.1 Pre-study mobile phone learning attitudes (pre- study questionnaire, pre-focus group)

Before actual experimentation with MALL, participants' expectations of the potential of web-enabled phones concerning vocabulary learning were explored. Data sources were collected from the pre-study questionnaire and the pre-study focus group. Data obtained in this pre-study phase was compared to relevant data in the post-study phase, to measure differences in participants' perceptions of mobile phones' usability in vocabulary learning.

The responses of participants regarding the potentialities of MALL, which are found in Table 24 are divergent. That is, even though in some statements a greater percentage of students had high expectations of mobile phone learning, a considerable percentage of them gave neutral responses to other statements, which means that they were, at that point, probably quite sceptical of the benefits that could be reaped from the combination of mobile phone and learning. However, there were a low percentage of participants who disagreed with the potential of mobile phones for learning. This may be because the concept of MALL was quite new for them and they avoided trying new modes of learning, or because they were simply not interested.

Table 24: Pre-study mobile phone learning expectation

Expectation of Mobile phone learning	Positive (Pre)	Neutral (Pre)	Negative (Pre)
1. I think learning English by mobile phone messages would be useful.	61.3%	29%	9.7%
2. I think using smartphone technology to learn English would make learning easier.	61.3%	35.5%	3.2%

3. I think that using smartphone technology would help us to access learning quickly.	58.1%	32.3%	9.7%
4. I would prefer face to face learning than learning online with my mobile phone	58.1%	22.6%	19.4%
5. I think that mobile learning would enable learners to work in a team.	50%	30%	20%
6. I think that learning how to use mobile learning systems will not need effort.	29%	48.4%	22.6%
7. I think using smart phones in learning is rather a distraction.	33.3%	53.3%	13.3%
8. I think mobile phones are best used for social communication and fun.	61.3%	12.9%	25.8%
9. I think mobile learning would intrude/interfere with my personal life.	35.5%	41.9%	22.6%

More than half of the sample in statements 1, 2, 3, 5 believed mobile phone learning would be useful, easier, allow for quick access to learning, and enable team work. Yet, statement 4 which prioritized face to face learning over mobile phone learning, still gained a high agreement percentage of 58.1%. This may mean that a greater percentage of students might prefer the known traditional learning over the unknown mobile phone medium for study. Besides, 48% of the responses to statement 6 which stated that mobile phone learning requires effort, were neutral which showed that many participants did not have a clear picture, at this point, of how a mobile phone would be implemented in learning, and whether it would need effort. Statement 8, which emphasized prototypical use of the mobile phone, communication and fun, received the agreement of 61.3% of the participants, which perhaps means that many participants, at that stage, felt reluctant to get out of their comfort zone and accept further uses of mobile phones. In addition, a high percentage of participants responded neutrally to statements 7, and 9, 53.3% and 41.9% respectively, which investigated negative dimensions of MALL like distractions and intrusiveness, which probably was due to a mixed cultural background concerning mobile phone beliefs, as it is banned in some social settings, while allowed in others.

In this regard, in the pre-study focus groups, participants were prompted to talk freely about their expectations of mobile learning and concerns they might have. Extracts from the participants' responses are shown below:

Nada, (Pre-FG1_Main), believed that the concept of mobile learning is novice. She said:

> I like being busy with my mobile phone ….specially social networking apps… but, I am not sure if I like it when it is linked to learning.

Noura (Pre-_FG1_Main), also expressed interest in the possibility of learning through a combination of mobile phone andstudy. Noura Said:

> Yes, for me, mobile phone is for fun, while learning is boring ……so may be if they are put together, learning would be fun too.

Khadijah (Pre-FG 2_Main), illustrated that technology could impart benefit to learning. She said:

> I like using technology, and I believe if it is linked to business…. or learning….. it would make it easier, more useful, and more interesting…………..I have high expectations of technology.

Besides, Nadoo, (Pre-FG1_Main), indicated that this might be intrusive. She said:

> You said that we will receive messages while at home!!!….. I think this will be getting into my personal life.

Ghadi, (Pre-FG1_Main), expected that using WhatsApp in learning might need effort. She Said:

> I am familiar with how WhatsApp works, but I am still worry about how to think and write quickly in English………..I don't know….May be, I would be under pressure."

After collecting participants' expectations of the potential of mobile phones prior to experimentation, participants' attitudes about mobile phone were examined again 5 weeks later.

7.4.1.2 Post – study mobile phone learning attitude/acceptance of Mobile phone, WhatsApp Messenger

Responses to the post–study questionnaire items regarding attitudes after experimentation with mobile phones in learning, revealed generally positive attitudes towards mobile phone learning. That is, the majority of participants agreed with statements that reflected the mobile phone's capability to allow for easier (72.7%), quicker (65.6%), useful (78.8), and more collaborative (78.8%) learning. However, when asked about face-to-face learning, the majority of them

still prefer the physical presence of the teacher. Moreover, nearly half of the sample (46. 9%) views the mobile phone as being best used for communication, rather than learning and found it can interfere with their personal life.

Table 25: Post-study mobile phone learning attitudes

	Agree	Neutral	Disagree
1. Learning English by mobile phone messages is useful.	78.8%	12.1%	9.1%
2. Using smartphone technology to learn English makes learning easier.	72.7%	18.2%	9.1%
3. Using smartphone technology helps me access learning quickly.	65.6%	25%	9.4%
4. I prefer face to face learning than learning online with my mobile phone.	65.6%	21.9%	12.5%
5. Mobile learning enables learners to work in a team	78.8%	12.1%	9.1%
6. Learning how to use mobile learning systems does not need effort.	68.8%	15.6%	15.6%
7. Using smart phones in learning is rather a distraction.	40.6%	25%	34.4%%
8. Mobile phones should be only used for social communication and fun.	53.1%	15.6%	31.3%
9. Mobile learning intrudes/interferes with my personal life.	46.9%	18.8%	34.4%

Complementing the data obtained from the questionnaires (see Table 25), many participants with varied attitudes toward innovation gave justification to support their positions -- sometimes by comparing the current innovation of mobile learning with previous traditional learning methods - in the post intervention interviews and post-intervention focus group. They agreed that simplicity and usefulness of the innovation are the most unique benefits (see 3.3.3). Below are excerpts from students' opinions that justify their positions.

a) Simplicity

Post-study interviews and post-focus group data indicated that many participants believe that learning targeted vocabulary by using mobile phones and WhatsApp Messenger is simple. For example, Bashayer, (Post-Int._Main), compared it with the computer programs she was used to. Bashayer said:

> …..It (WhatsApp) is easy….I mean if we compare it with computer programs, you will feel that it is simple, handy, and enjoyable…. You don't need to turn on your computer and log in every time you want to join WhatsApp group…

Nawal, (Post- Int._Main), indicated that using WhatsApp Messenger does not require training. Nawal said:

> WhatsApp is simple…….You don't need to learn how to work on it……You don't need training on how it works. …..We already know how to use it before the trial.

Nada, (Post-FG._Main), preferred WhatsApp to Twitter and Facebook due to its simplicity. Nada said:

> WhatsApp is simple ….unlike Twitter or Facebook…. I tried them but found them difficult….In WhatsApp I know all of its features and know how exchange messages freely.

Noura, (Post –Int._Main), explained that learning using the platform is easy as she accesses the application in simple steps. Noura said:

> I don't need to log in every time I want to access learning….It doesn't even have a username and a password…I am also alarmed when there is a new message….the App as well as the learning messages are very user friendly.

Waad, (Post-FG_Main), indicated that the platform lends itself to simple learning, as WhatsApp messages are conventionally short unlike printed materials. Waad said:

> Learning by WhatsApp is simple …WhatsApp messages are usually short….with less texts and more images… Leaning this way is simple and sticks to mind….unlike textbooks with long print texts…..

Ebtihal, (Post-Int._Main), said that the mobile phone helped her before an exam, due to its simplicity:

> I remembered one time…..15 minutes before the exam, my friend and I enquired about a word we forgot ……the simplest reaction was to quickly pick up my mobile phone and read through the group chat…. And I quickly found an answer to our query…. You see…..There would be no time to look for that word in my notes.

b) Usefulness

Data obtained from the questionnaires at different phases revealed that many of the participants saw the potential usefulness of mobile phone learning in the pre-study phase, and showed even more awareness after the intervention (see 7.4.1.1 and 7.4.1.2). Congruently, the theme of 'usefulness' frequently emerged from the data collected from both the post-study interviews and the post-focus groups

discussion, which apparently influenced participants attitudes/ acceptance of using mobile phones and WhatsApp Messenger in learning.

As a result, participants in the post-study phase identified (in the interviews and the post- study focus group discussion) a number of useful outcomes obtained from mobile phone learning. Some of these benefits are already found in the literature (see 3.3.3), while others could be incorporated well under the theme of usefulness. These comprise of enjoyment, promoting authentic learning, and teamwork as being essential determinants of the usefulness of mobile phone learning. These features are introduced and discussed along with extracts from students' views.

Initially, it was common amongst participants that learning using mobile phone, WhatsApp Messenger is enjoyable. Thus words, like interesting, enjoyable, fun, and entertaining appeared frequently in students' responses.

For example, Wejdan, (Post-Int._Main), declared that this method makes learning enjoyable. She said:

> I like it mostly because I am learning with my mobile phones which I really enjoy….I mean we are not dealing with boring textbooks or papers any more…. But it mixes learning with fun.

Bushraa, while being interviewed (Post-Int._Main), indicated that mobile learning is motivating and used the word interesting to describe it. She said:

> I liked it very much….I like it because I am learning by using something I really like….MOBILE PHONE….It's really interesting and encourages me to learn

Khloud, (Post-FG_Main), also indicated that learning with entertainment is one of the unique qualities of this intervention. She said:

We learned with fun….no books, no papers, no memorization….learning becomes interesting by interesting [device]….

Afnan, (Post-Int._Main), commented that the mobile phone imparts joy in learning. She said:

> It's a smart idea…..I mean putting learning which is boring and serious with the smart phone, makes learning interesting…..I think this new method makes learning more enjoyable.

Khadijah, (Post-Int._Main), explained that learning using mobile phones made use of her free time and it was fun. She said:

> It changes the way we look at learning…..it is no longer boring …BUT it is fun….I did it in my free time ….I did it without thinking I am learning ….I enjoyed it.

Participants also explained that this method is useful because it promotes interaction and collaborative work.

Sara, (Post-Int._Main), an average vocabulary gain and below average contribution participant, indicated that this method is useful because it managed to change her introverted manner. Sara said:

> I did not use to participate in class…. I was usually shy ….but, when I try sending the messages, I found myself interacting …. It looks safe ….it is amazing…

Afnan, in her post-study interview (Post-Int._Main), explained that in this social environment, learners have equal chances to participate and no one dominates the conversation. Afnan said:

> In chat sessions, we all have equal chances to talk….No one is the leader of the conversation and this makes me feel safe and feel that I have something to share without worries.

Bashayer, (Post-Int._Main), explained that in this collaborative environment they are not passive learners, but rather they learned through collaborative work. Bashayer said:

> We all together share knowledge…. We did not stay silent ….each one of us post what she knows about the topic and the teacher is there for help

A further reason mentioned by participants to justify the usefulness of mobile phone learning is authenticity. That is, they found the mobile phone allows for authentic learning.

For example, Reem, (Post-Int._Main), liked the innovation and this linked to updated /authentic learning. Reem said:

> I like it ….I feel my learning is up to date. …I am using the latest technology…. I am using mobile phone to new kind of learning……learning from reality….I mean I no longer take knowledge from a teacher or a textbook….Instead, I learn Online and talk with real people. … I think this is the way a language should be learned.

Khadijah, (Post-Int._Main), used the term "real" to describe the new mode of learning. Khadijah said:

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> I loved it…… Our learning looked real…..we learn from real conversation …..we learn from real websites…and from real conversation…I mean for example if the word I am looking for is a food related vocabulary, I search online for real ready-made menus ….There, I don't only find the food items, but also find some food related vocabulary to introduce the food and how it is made….I remember when we took the word "complement" and I found the sentence "The pepper sauce complements the steak" in a real menu.

In the same sense, Fatimah, (Post-Int._Main), was fascinated with the platform and linked it to authentic learning:

> I like it ….mostly because we are using our mobile phones which I really enjoy….. I mean we are not learning with boring textbooks or papers any more…. we learn English by using something real or we already use every day ….I mean WhatsApp…. to talk with friends which is also real ……We also use online resources to search for information…..This way learning is becoming up to date and real.

However, mobile phone learning is not without drawbacks. Aligning with data obtained through the questionnaires, some participants in the post- intervention interviews and post-study focus group, despite admitting its usefulness, reported some disadvantages inherited with mobile phone learning. These include difficulty, distraction, and interference. For example,

Dina, (Post-Int._Main), indicated that she finds mobile learning frustrating. Dina said:

> …….It turned me mad when the net is down or when it takes forever to download something…..Sometimes I feel technology complicates thing……..thus it is more convenient for me to do things manually.

Ebtihal(Post-Int._Main), also commented that she found difficulty in selecting proper information from numerous online resources. Ebtihal said:

> I find problem in searching for information online……..I find many web-links and hardly select the right information to post to WhatsApp group…. Sometimes I copy and paste things… I don't understand …and put myself in trouble when friends ask me for explanation

In addition, Raghad, (Post-FG_Main), lost interest in the new medium quickly. Raghad said:

> At the beginning, I posted some messages, but I lost interest quickly. …..Maybe because am always busy with family and university work.

Ghadi, in, (Post-FG_Main), reported that she rejected this method because it is intrusive and she needed to have her own space. Ghadi said:

> It is boring......learning should be in class only ....why should we bother the rest of the day.....I need to feel free at home.

Similarly, Anoud, in, (Post-FG_Main), indicated that she could not adhere to the WhatsApp meeting schedule due to personal and family commitment. Anoud said:

> Once I get home, I am busy with my family...I prepare food ...I look after my toddler...I barely find time for acadeic assignment ...I could not add further load and chat on regular basis for about 40 minutes

Furthermore, Jewell commented in, (Post-FG_Main), that the mobile phone and learning could not be combined due to their different nature. Jewell said:

> Mobile phone is for communication and fun......and learning is serious and systematic, and ...I think using mobile phone with learning made using mobile phone even boring and made me confused while studying from many places ...from, textbook, classroom notes, LOTM, or dozen of webpages.....

The next section measures the statistical differences in participants' attitudes towards mobile learning before and after the intervention.

7.4.1.3 Changes in attitudes to mobile phone learning (statistical differences)

Findings of the paired sample test revealed that there were no significant differences in students' opinions before and after the intervention except for paired statements 5 and 6 (see Table 26 below). The significance of the difference of paired statements 5 which investigated mobile's phone ability to enable teamwork is .037 which is < .05. This means that there was a significant difference in students' pre and post- responses. When analysing the frequency data, it revealed that the percentage of participants who agreed with this statement has increased significantly from 50% to 78%. This means that before the intervention, half of the research sample expected that the mobile phone can enable improved teamwork, however after actual experimentation with mobile phone learning, the majority of participants realized how the mobile phone encourages collaborative learning. In addition, the significance in the difference between paired statement 6 which stated that the operation of mobile phone learning does require effort is .027 which is <.05. Therefore, there was a significant difference in the students' responses in the pre- and post- phases. When checking frequency data, it emerges that nearly half of the participants were hesitant about the

ease of operating MALL in the pre-study phase (as 48% of them selected "Neutral"), whereas after the intervention, the majority of them agreed that mobile phone learning operation does not require much effort. It could be concluded from this difference in response, that participants became more familiar with MALL operation after practicing using it.

However, although there were no significant differences in participants' attitudes to MALL in the rest of the paired statements, compared to the slight changes in pre and post- responses, they gave an insight into how participants attitudes have been modified after experimentation with MALL. That is, responses of paired statements 1, 2, and 3 showed an increase in participants' views towards usefulness, ease of use, and speed of access to learning via mobile phones. Despite this, responses to statement 4 which investigated a preference for face to face learning, has gained a slight increase. This means that even though participants could perceive the benefits of mobile phones in learning, they still believe that the teacher's role cannot be replaced, but rather mobile phone learning might be accepted as a complementary tool to the traditional classroom. Moreover, a slight increase in participants' views towards the distraction and interference caused by mobile phone learning were detected in paired statements 7 and 9. This might mean that participants have also developed awareness about some of the drawbacks of mobile phone learning. In paired statement 8, which indicated that the mobile phone is best used for communication and fun, a drop was noted, , since they may have started to realize that mobile phones could be efficiently used in accomplishing tasks, e.g., in learning, not just social communication and fun (see Appendix R.1).

Table 26: Paired sample/ Pre- and Post- study attitudes towards MALL

	Mean	Std. Deviation	Sig. (2-tailed)
Pair 1	.194	1.302	.414
Pair 2	-.032	1.224	.884
Pair 3 .	.100	1.398	.698
Pair 4	.167	1.487	.544
Pair 5	.500	1.253	.037
Pair 6	.567	1.331	.027
Pair 7	-.379	1.399	.155

		-.233	1.755		.472
Pair 8	.	-.233	1.755		.472
Pair 9		-.100	1.125		.630

Key: shaded elements = significant differences between pre and post-intervention attitudes

The next section explores participants' perceptions of mobile phone affordances that enable learning.

7.4.2   Mobile phone affordances

In the above section, learners reported that mobile phone learning is simple and useful and gave some reasons to support their opinions. This section explores which mobile phone affordances participants perceived to allow them to achieve useful, easy, and an overall better learning experience (see 3.3.1). Investigating participants' perceptions towards mobile phones' learning affordances was a predetermined theme, as it was essential for this study to explore their awareness of relevant mobile phone features that distinguished it from traditional learning, and in turn makes it worth adopting. Both quantitative and qualitative measures were used to investigate the participants' understanding of mobile phone affordances/enablers which they found useful in enhancing their learning. That is, after the 5-week intervention, they responded to a number of Likert scale statements, pertaining to the investigation of particular mobile phone affordances and were also interviewed in this regard. Below the questionnaire statements that examined these mobile affordances are highlighted, and then extracts from participants' interviews regarding the most prominent affordances that they perceived as effective are presented.

7.4.2.1   Interactivity

Most participants argued that, unlike traditional learning methods, the communicative affordance of WhatsApp Messenger is the most unique feature provided by smart phones. They reported that it allows for social learning and student-teacher and student-student interaction, and in turn increases the learners' engagement with target vocabulary. Moreover, participants reported that this feature enabled them to

exchange knowledge, test their hypotheses and provide scaffolding support when needed in a safe learning environment. A number of statements in the post-study questionnaire were devised to measure the interactional aspect of mobile learning. For example, statement 1 in the post-study questionnaire in section 3b stated that online chat allows for communication with teacher and friends (below). Responses to this statement showed that 68.8% of the respondents agreed with it as they presumably have developed awareness of the communicative affordance provided by mobile phones, whereas 25% of the participants were neutral, as they may have tried it but may not have made a decisive judgment on whether they accept it or not. Another possibility is that they did not try it, so they could not judge it. Besides, 6.3% disagreed with this statement. This may mean that they might be rejecting communication via this medium. Another statement in the post-study questionnaire with the same content was devised for measuring learners' consistency while responding to the communicative aspect of MALL. Statement 12 in section 3b stated that online chat encouraged teacher-student interaction when discussing new information (see

Appendix H.3 and Table 28 below). Responses to this statement showed that 81.8% of the sample could see the benefits of online interaction, 9.1% of them were neutral, and 9.1% of them disagreed with the statement. This could be a confirmation that participants have become aware, as a result of the experiment, that teacher-student and student- student interaction via mobile phone is more feasible than before. Additional post-study questionnaire statements measure the communicative aspect of mobile phone learning (found in sections 7.3.2 and 7.3.1.1 above), which discuss negotiation of meaning strategy use.

Table 27: Level of agreement with statement 1, section 3b in the post-questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	12	36.4	37.5	37.5
	Agree	10	30.3	31.3	68.8
	Neutral	8	24.2	25.0	93.8
	Disagree	2	6.1	6.3	100.0
	Total	32	97.0	100.0	
Missing	System	1	3.0		
Total		33	100.0		

Table 28: Level of agreement with statement 12, section 3b in the post-questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	7	21.2	21.2	21.2
	Agree	20	60.6	60.6	81.8
	Neutral	3	9.1	9.1	90.9
	Disagree	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

In the same way, qualitative data from the interviews exemplified participants' views pertaining to the interactivity aspect of mobile learning. For example, the following three extracts illustrate how mobile phone, WhatsApp adoption encouraged participants to interact safely with one another, with the teacher, and with authentic online materials. For example, Esraa commented in (Post-Int._Main), that mobile learning enabled her to experiment with English language in a secure environment. Esraa said:

> It [WhatsApp] gave us space to practice English [safely].... without losing face....without losing marks...and it is something good since we don't have a chance to speak English elsewhere..... …

In (Post-Int._Main), Noura echoed that WhatsApp allowed for communication with friends and teacher and linked it to retention. She said:

> Group discussions are easy… real ….and allows for real communication with friends and teacher. ..I learned from these long interactions ….I think the time spent on this stick words in my memory.

Khadijah commented (Post-Int._Main), that mobile learning allows for interaction with online learning material as well:

> It is not only interaction within WhatsApp group chat, there is another type of interaction I think…..I mean while online search, I interact with online texts….I accept, reject, and think on what I read…..I learned a lot from reading various meanings and exemplary sentences.

Nawal, in (Post-Int._Main), preferred this style of learning to computer programs. She declared:

> I thought it was boring and artificial like when we used to use computer programs which gave me annoying sounds whenever I make an error……. But, group discussions are easy, real and allow for real communication with friends and teacher.

More examples of the participants' views and opinions about the communicative affordance of mobile phone are available in section 7.3.2 above, which discusses negotiation of meaning strategy use.

7.4.2.2   Mobility

Mobile phone mobility (anywhere/anytime learning) is the second most frequently mentioned affordance among participants. That is, the statement below in the post-study questionnaire was used to elicit participants' responses in this regard. Statement 1 in section 3A stated that vocabulary lessons via the mobile phone enabled learning anywhere and anytime. Responses to this statement (Table 29) showed that 75.8% of participants agreed with this statement, as it seems that this method allowed them to learn at both conventional and unconventional times and places. On the other hand, 15.2% disagreed with this statement as they did not find it encouraged them to learn anywhere and anytime. While 9.1% of them gave a neutral response to this statement, as they found mobile phone learning mobile phone neither encouraged nor discouraged anywhere/anytime learning or they perhaps did not understand the statement.

Table 29: Level of agreement with statement 1, section 3a in the post-questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	8	24.2	24.2	24.2
	Agree	17	51.5	51.5	75.8
	Neutral	3	9.1	9.1	84.8
	Disagree	5	15.2	15.2	100.0
	Total	33	100.0	100.0	

Further qualitative data was gathered pertaining to the description of how mobile phone mobility benefits learning. Data from interviews shows that the majority of participants perceived how the mobility affordances of web-enabled phones impacted their learning. For example, Reem, in (Post-Int._Main), explained that her learning has taken place at various times and places. Reem said:

> As I told you, I was able to learn anywhere and anytime…Whenever I could check out my WhatsApp, I also check my LOTM…..It could be in the car….while waiting for my turn…..or even before bedtime….

Noura, (Pot-Int._Main), discussed learning while commuting. Noura said:

> I made use of wasted time….during getting back home…..I read through LOTM and learn…….learning has become anywhere and anytime….. there is no need to be in a classroom or on my desk at home.

Maram, (Post-Int._Main), linked the property of mobility to studying for an exam. She said:

My [learning materials] have become in my pocket………..It saves times….let's say I have an exam tomorrow, yet I couldn't stay at home studying for any reason…..I can simply scroll through my LOTM in my mobile phone and learn for exam.

Hanan explained, (Post-Int._Main,) that by using a mobile phone, WhatsApp Messenger enabled her to overcome her problems pertaining to the difficulty in allocating time to study. Hanan said:

> WhatsApp group helped me….I used to have difficulty in specifying time to study…..but using the mobile phone helped me to review the new words or search for them anytime, in home or anywhere outside……This is how mobile learning benefited me.

Afnan added, (Post-Int._Main), that mobility affordances enabled her to review target language repeatedly. She said:

> Since I already spend long time on WhatsApp, I could open discussion group more frequently anytime and anywhere .....Before using mobile learning, I opened my course book almost only before exam.

Yet, Waad commented, (Post-FG_Main) that learning anywhere anytime caused confusion:

> I don't like the idea of learning anywhere and anytime….this confuses me…I am systematic and prefer to set a fixed time to study …..After that I stop to think about studying and get busy with my life.

7.4.2.3   Immediacy

Another mobile phone affordance that was appreciated by many participants is immediacy. Post-study questionnaire item number 19 in section 4 b investigated the potential for participants to send queries immediately. Responses to this statement showed that 53.1% of participants did not hesitate in sending messages when they need to, 31.3% were probably hesitant about sending questions, and 15.6% of them disagreed with it (see Table 30). This perhaps means that more than half of the research sample made use of the immediacy affordances of mobile phone.

Table 30: Level of agreement with statement 19, section 4b in the post-questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	7	21.2	21.9	21.9
	Agree	10	30.3	31.3	53.1
	Neutral	10	30.3	31.3	84.4
	Disagree	5	15.2	15.6	100.0
	Total	32	97.0	100.0	
Missing	System	1	3.0		
Total		33	100.0		

Although the post-study questionnaire did not sufficiently investigate participants' perceptions of the immediacy that could be afforded by the mobile phone, qualitative data obtained from interviews and the post-study focus group managed to further explore participants' views regarding this affordance, after their experience of mobile

learning. Qualitative data from post focus group discussions and interviews revealed that many of the research subjects found that the ability to find information instantly is a positive merit of mobile learning using WhatsApp Messenger, For example, Noura commented, (Post-Int._Main), that she immediately received responses to her queries. Noura said:

> The nice thing is that I don't need to wait till next day for my questions to be answered…Whenever I have a question, academic or administrative; I post it directly to WhatsApp group and got quick answer…

Wejdan added, (Pot-FG_Main), immediacy is even stimulated by group work. Wejdan said:

> …This experiment showed me how group learning is of great use…………Whenever I need to know about something, I can simply touch buttons and my friends are there to answer my questions.

Afnan, (Post-Int._Main), indicated that she benefited from the teacher's and friends' immediate responses. She said:

> I like it, because it is "on air", whenever I have a question, friends and teacher are there to offer help….Once I make a sentence, friends are there to correct….My entries are always checked and I received quick responses.

Khadijah, (Post-Int._Main), compared it to email correspondence:

> ……. We interact lively with the teacher and friends….I ask questions and have immediate replies….unlike email…..when I send an email, the response may be delayed long later.

7.4.2.4 Accessibility

Accessibility was also mentioned as one of the essential mobile phone affordances by the research sample. Statement 3 in section 3 of the post study-questionnaire (Table 31) was devised to collect responses in this regard. Responses to this statement that mobile phone learning allows for quick access to learning material showed that 65.6% of participants agreed with it as they probably could access information quickly using a mobile phone. 25% of the research sample neither approved nor discarded the statement, while 9.4% rejected it.

Table 31: Level of agreement with statement 3, section 3 in the post-questionnaire

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	9	27.3	28.1	28.1
	Agree	12	36.4	37.5	65.6
	Neutral	8	24.2	25.0	90.6
	Disagree	3	9.1	9.4	100.0
	Total	32	97.0	100.0	
Missing	System	1	3.0		
Total		33	100.0		

Findings from interviews also verified the above findings. Conforming to quantitative measures which investigated participants' perceptions regarding the ability of the mobile phone to access learning quickly, qualitative measures found that it was a common view amongst participants that the adoption of WhatsApp Messenger allowed them to have quick access to learning material and consequently enhanced their vocabulary learning.

Wejdan, (Post-Int._Main), said that she could easily access her classmates. Wejdan said:

> I don't need to be in class….nor I need to telephone call a friend…..I can easily contact all of my classmates and the teacher quickly and get fast responses.

Afnan added (Post-Int._Main,) that WhatsApp enabled her to access and revise the targeted vocabulary easily. Afnan said:

> It [WhatsApp] has become a quick reference. ..I mean I can use it to go over and study my new words easily instead of spending time looking for them in the textbook.

Also, Khadijah, in (Post-Int._Main), referred to quick access of information as one distinctive quality of Mobile learning. Khadijah said:

> …….What truly causes my learning is that it encouraged me to use online resources to learn English…….I browse internet to obtain information quickly in no time.

Afnan commented, (Post-Int._Main), that the speed of gaining information made learning using the mobile phone practical. Afnan said:

> …..You only need a good internet connection…and it is only a matter of simple touches to get information and learn…….

Also, Bushra indicated, in (Post-Int._Main), that mobile learning is a quick means to reach information. Bushra said:

> You don't need to waste time flipping through pages……You only need to do simple touches and know about the new words…………..When I need more information about words, I simply touch Safari and write down the word…….I can quickly find dozens of pages from which I can select what makes sense to me…..

7.4.2.5   Multimodality

The affordance of multimodality was referred to by many participants when discussing the advantages of learning vocabulary using the mobile phone/ WhatsApp. For example, Afnan, an above average vocabulary gain learner, (Post-Int._ Main) indicated that WhatsApp is useful because it is a full learning resource. She said:

> It is useful…….we can read, write, see pictures, and listen to sound files. We learn better this way. Sometimes when I can't say a definition of a word, I can simply look for a picture to explain what I mean and send it to the group.

Halima, an under average vocabulary gain learner, in (Post-Int._ Main) explained that WhatsApp multimodality helped her to practice difficult pronunciation. Halima said:

> WhatsApp is an excellent way to practice difficult pronunciation…. I tried it …I say and friends and teacher correct my pronunciation… and then I repeat what they said straightaway……it just sticks to my mind.

Wejdan, an above average vocabulary (Post-Int._ Main) adds that WhatsApp can accommodate all types of learners. She stated.

> [WhatsApp] fits how I like to learn…. I find myself best learn by images and picture….. I mean if a word is linked with a picture, it would stick to my mind more easily.

Khadijah adds that abstract words could also be illustrated by imageries. She said:
> WhatsApp images could explain even some abstract word like "Monotonously"……you remember the image of that man who chops the grass too carefully???…. It was really expressive

Fatima (Post-Int._ Main) added that WhatsApp conforms to her learning style. Fatima said:

> I like to learn by writing……….when I write things…I always remember them……..we almost write every in WhatsApp group discussion….whatever I found while searching online, I write it in WhatsApp and send it to the group.

However, Ghadi (Post-Int._Main) illustrated that she could not make use of the voice feature to overcome her slow writing. She said:

> I just felt my writing in English is too slow…..i could not cope with group pace…though I could not use the voice feature instead…..i just feel shy.

7.4.2.6   Availability

Availability is another mobile phone affordance mentioned by some of participants in the interviews.

Raghad in (Post-FG_Main) indicated that she uses the push/pull mode of Messages alert to control the level of Message distractions. She said:

> I always turn off the messages alert especially when I could not join the group chat…..too many messages are annoying

Mashael in (Post-FG_Main) explained that she draws on the affordance of availability to control the level of intrusiveness caused by WhatsApp messages. She said:

> Some time I when I am busy with family or outside, I put my mobile on silent mode or even turn it off…. I cannot open messages any time…..it is up to when I can receive learning

The next section discusses participants' views about the challenges which may impede implementation of MALL.

7.4.3   Challenges of using mobile phone learning, WhatsApp Messenger

This section reflects participants' concerns regarding mobile phone, WhatsApp Messenger integration with mainstream classes. Collected data uncovered a number of common challenges. These involve time, technical issues, personal preference, habit, and training, which are discussed below with excerpts from students' responses.

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A number of participants, even some of those who expressed their positive attitude towards the experiment, raised their concerns regarding the time issue. That is, adopting mobile phone learning requires a level of dedication, which was not needed before. In other words, learners who commit themselves to this kind of learning should put in effort and spend some time to benefit from it. This includes opening messages regularly, reading them, comprehending its content, and studying them. Besides, mini-vocabulary lessons sent by the teacher usually encouraged subsequent research by the student in order to fully understand the word. Most importantly, group discussion held three times a week, entailed engaging with friends and the teacher for about 40/50 minutes. They would discuss target words while practising vocabulary learning strategies and discussing topics relevant to their textbook or everyday life topics, using target words. Complying with this type of learning consumes additional learning time which was mirrored in a number of responses.

Anoud explained, (Post-FG._Main) that mobile phone learning was quite time consuming and was an ongoing learning process. Anoud said:

> I noticed what happened….I can't stand for ongoing learning… I am not used to this… I mean I need time for my family and myself….

Halima expounded, (Post-Int._Main), that time factor restricted her from embracing mobile learning. Anoud Said:

> Tell you the truth, my time is too tight….when I am back home, I usually have other chores…..I barely read the online chat before bedtime.

Khadijah, explained, in (Post-Int._Main), that the usefulness of the approach outweighed the time consumed:

> To be honest, the benefit we get from online learning is much more than the time we spent.

In addition, a few participants expressed concerns about using the technological tools in learning in terms of saving the content. That is, they expressed their worries about losing data sent by mobile phone.

For example, Waad explained, (Post-FG._Main), that she did not consider WhatsApp a reliable resource. Waad said:

> I don't trust technology….I keep whatever important in my note book to revisit when needed, even after a long time….many times my mobile phone got jammed due to crammed messages and be compelled to delete messages.

Bashayer, (Post-Int._Main), stated that her mobile phone was lost in the third week of the experiment and she installed a new WhatsApp account. Bashayer said:

> I lost my mobile phone and lost all data stored in it… I was also unable to follow the group in that week…..I then bought a new one and re-installed WhatsApp

Halima also commented, (Post-Int._Main), that WhatsApp is not reliable. Halima said:

> Anyone can delete data by mistakes from the mobile phone…….my son always plays with my mobile phone and can have access anytime to my WhatsApp account since users do no need password to log in….I was always worried about losing data.

Khadijah had an opposing view when she illustrated that data could be better saved in a mobile phone (Post-Int._Main). She said:

> Data is saved there in the cyberspace and I can recover it by ICloud…. unlike notebook and papers which I used to misplace them.

Though many of the participants indicated that they did not need to receive WhatsApp training, as it was already installed and easily used, English digital literacy was a concern for two participants who admitted their slow writing in English. That is, Mashael, (Post-Int._Main), commented:

> I am fast in writing Arabic WhatsApp messages ….I do this many times every day to communicate with family and friends……I know well the Arabic keyboard in WhatsApp….But, I was little bit slow while writing messages English … my spelling is not always correct and English keyboard is confusing….it takes time to write a sentence …but, I am getting better by time

Walaa similarly, (Post-Int._Main), expressed her stress while contributing in LOTM. Walaa said:

> Many times when I had something interesting to say, one of my friends said it before me…. Maybe because I take time thinking about how to say something… and I write slowly in English.

The next section selects 8 cases for in-depth individual study.

7.5   Case studies

7.5.1   Above average vocabulary gain group

Eight cases were selected from all the vocabulary gain groups to collect and maximize understanding of the behaviour of individual characters in each group throughout the intervention. Many of these cases showed similar behaviour relevant to their group, while a few of them showed irregular behaviour (see 4.6.5E.4.for vocabulary gain groups).

The next subsection gives examples of participants from the above average vocabulary gain group.

7.5.1.1   Afnan

Afnan was an ideal mobile phone learner who scored 5 out of 45 in her pre- test which means that she might not have been confronted with most of target words before the commencement of the study. However, after five weeks of mobile phone learning, Afnan received 42 out of 45 in her post- intervention test. This means that Afnan gained 37 words (The highest vocabulary gain in the group). One month later after the end of the experiment, Afnan scored 38 out of 45 which means that she had lost only 4 words (The lowest vocabulary gain in the group) (see vocabulary gain/loss in Appendix E.3). Afnan's achievement could be attributed to her frequency and quality of WhatsApp contributions. That is, Afnan participated intensively during the five weeks, without missing any of the sessions. In week 1, Afnan posted 30 entries throughout the three sessions of that week. In week two, she posted 45 entries during the three sessions held in that week. Then, she posted 28 posts in week three in the two sessions which ran. In the fourth week, Afnan entries reached 55 posts in the two sessions.. Finally, she posted 37 entries in the last two sessions of week five (see Appendix G.1 for frequency of contributions). Afnan's contributions were intensive, and when comparing it to her peers', she got the highest contribution average which is 39.

Against the quality of contribution rubric—the 5 point scale, Afnan scored 5 (see the quality of contribution rubric G.2). This means that her contributions were considered sufficient with good quality for running meaningful interaction. That is, she never missed any of the classes. During interactions, she was always on track and answered teacher's questions correctly. She successfully used negotiation of meaning strategies to modify interactions. She showed interest to discuss given topics and also gave opinions, reflected on her learning, and wrote informative comments. Afnan made neat sentences of her own using the newly learned words. Many times Afnan contributed with only one word, a phrase, or an emoticon, yet it was always meaningful. Afnan helped her peers by gently giving various types of corrective feedback and maintained a friendly spirit when interacting with friends and teacher. Extracts 6.2.1.1, 6.2.1.3, and 6.2.1.4 gave insight into the quality of Afnan's interactions and these could be found in the micro-genetic analysis.

Qualitative data from the pre-study focus group and post-study interview revealed Afnan's attitude about her mobile learning experience and how it impacted her perception about vocabulary learning and mobile learning. While discussing motivation to learn English in the pre-study focus group discussion, Afnan clearly stated that she is very motivated to learn English and she attributed this to her ambition to travel abroad for tourism, and to gain better employment opportunities. She also showed awareness towards the role of English to foster globalization. Yet, Afnan admitted that, even though she considered herself to be a hard worker and a good language learner, her language proficiency is not as accurate as it should be. She based this on the fact that she received only 6 years of English study at school, where English learning was primitive. Besides, she argued that English learners are not compelled to use English outside classroom and thus chances to practice English outside classroom are very rare. Even in rare opportunities, English is required to order in a restaurant, Afnan indicated, there are not many chances to interact with native speakers, which might be another hindrance. However, Afnan indicated that English language learning at university level, particularly in the English Language College, is a paradigm shift in terms of the learning materials and ways of presenting them, and this dramatically boosted her language proficiency.

Afnan also indicated vocabulary learning is essential and she sought to immensely expand her vocabulary repertoire by any means. She admitted the difficulty of memorizing and retaining words and wished, prior to the intervention to find new ways of learning vocabulary to make memorization efficient and enjoyable. Therefore, she stressed that she is open to try innovative means to learn English authentically outside the classroom boundaries.

Pertaining mobile phone technology, Afnan expressed her fascination with using mobile phone technology in general, various mobile phone applications, and WhatsApp Messenger in particular. She explained that she used versatile types of mobile phone applications including WhatsApp in socialization. She claimed that these applications like WhatsApp Messenger, Instagram, Snapchat, and Line enabled her to communicate with people free of charge. Afnan gave priority to WhatsApp Messenger as it is handy and not complicated and is becoming increasingly popular amongst the public.

In combining mobile phone technology with vocabulary learning in the current study, Afnan expressed her positive attitudes after the intervention in the post-study interview. This is because she recognized the advantages she could reap from integrating the mobile phone with vocabulary learning. At first, Afnan reported that combining mobile phone with learning makes studying more enjoyable. This enabled her to spend longer time learning, without forcing herself to sit at her desk and study from a textbook. She also referred to the Portability affordances of the mobile phone as a primary advantage. She indicated that this allowed her to study anytime and anywhere. She gave an example when she exchanged messages in university corridors, in the students' centre, while commuting, or while waiting for something. Afnan also indicated that Accessibility is a unique feature provided by mobile learning. That is, unlike traditional learning methods which restrict learners to their textbooks, Afnan indicated that mobile learning enabled her to have quick access to unlimited learning resources, printed text or multimedia / authentic or graded. This gave her the freedom to choose what to learn in accordance with her level and learning preference. Afnan also liked the Immediacy offered by the WhatsApp application. She used the expression "on air" to explain that her entries were immediately seen by friends and

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her teacher and after which she received an immediate response. She explained that she no longer needs to wait until the next day to ask her teacher in class. Afan also appreciated WhatsApp Multimodality and affirmed in her post-study interview that she found herself a visual person who enjoyed learning by linking words with imageries and thought this has a positive impact on her memory. She also liked using emoticons to express her emotions and considered them very expressive.

In comparing actual classroom settings and online virtual classes, Afnan emphasized that virtual classes extended learning time outside the classroom and this is the foremost advantage of mobile learning, especially as opportunities to encounter English elsewhere is scarce. Besides, unlike the classroom, she added that online classes provided a relaxed learning environment, in which interlocutors can discuss meaning informally. In these sessions, Afnan reported, group members can talk freely without worrying about making errors. Adversely, she stressed that the teacher kept repeating that errors were seen as opportunities to raise awareness and reform language. Thus, she viewed online classes as a medium to share knowledge and exchange feedback, rather than for highlighting mistakes or competing.

What is more, Afnan admitted that virtual classes fostered vocabulary learning. She explained that, unlike regular classes, in which vocabulary learning is mostly left to be done at home, she had a greater chance of practicing vocabulary learning strategies by mobile phone. This encouraged her to apply VLS to new words, make hypotheses, and then posted her productions for feedback. She added that mini vocabulary lessons were short and to the point and repeated frequently which increased her retention. Afnan particularly recognized the improvement in her retention before the exam when she did not need to revise target words, as she mostly remembered them all .Moreover, she asserted that WhatsApp has become a quick reference for her; she used it to revise and study many new words easily before exam, instead of spending time looking up words in her textbook. Yet, Afnan indicated that connection problems and battery life are drawbacks of mobile phone learning, as sometimes she got disconnected due to weak internet connection or short battery life.

7.5.1.2   Reem

Reem scored 5 out of 45 in her pre-test which means that she has encountered few of the target words prior the intervention In her post-test, Reem got 43 out of 45, a 38 word gain, which showed remarkable progress— the second highest vocabulary gain of all participants (see vocabulary gain/ loss in Appendix E.3). In her retention test, Reem scored 38/45 with only a 4 word loss. In examining Reem's WhatsApp contribution, she showed frequent consistent interactions over the five weeks. She posted 23 entries collectively during the three sessions of the first week. In the second week, which also comprises three sessions, Reem posted 52 entries. Following this in week 3, 4, and 5 in which 2 sessions were run in each, she posted 18, 24, and 23 entries respectively with 28 average contributions along the 5 weeks. This means that Reem showed a remarkable above average contribution compared to her peers (see Appendix G.1 for frequency of contributions). Reem's score for quality of contribution was also outstanding, as she received a 5 (see quality of contributionG.3).

In analysing Reem's interactions, I observed that Reem was comfortable in responding to the teacher's questions and in discussing different topics. This was evident in her fluent writing style and appropriate word choice. She also wrote sensible sentences and applied multiple feedback strategies afterwards to request or give feedback. Reem efficiently elaborated, simplified, or rephrased her output when her friends needed her to. She also gave them feedback to allow them modify their output as well. When she doubted her understanding, Reem employed various comprehension check strategies including requesting clarification, expressing difficulty, and confirming understanding. Reem   rarely initiated conversation, although her language level and extroverted personality (in online media) could allow so. Examples of Reems' interactions are found in Extracts 6.2.1.16.2.1.30 in micro-genetic analysis. Thus, there might be a link between Reems' achievement and the frequency and quality of her WhatsApp contributions.

Qualitative data obtained from Reem, uncovered her attitudes towards her mobile phone learning experience and showed how it had influenced vocabulary learning. During the pre-focus group discussion, Reem reflected on how important it is for her to

be highly proficient in language. First, she declared that she is interested in English language itself. She indicated that she is fascinated with English literature, reading English novels, and knowing about English culture. Furthermore, she affirmed that language proficiency, nowadays, is an essential requirement in job market.

Regarding vocabulary learning, Reem was aware of the necessity of owning a threshold vocabulary store to run on non-fragmented communications, yet she found deliberate/traditional vocabulary learning is a time and effort consuming task.

Reem was grateful for living in the age of the mobile technology revolution. She explained that she spent considerable time using versatile smartphone applications for communication, shopping, bank transactions, and online applications or reservations. She added that smartphone technology enables immediate access to multimedia and authentic printed materials **w**hich keeps her updated and connected to the whole world.

Reem acknowledged the innovation of using mobile learning, WhatsApp to connect a group of learners to share in knowledge construction for many reasons. First of all, she confirmed that this type of learning managed to convert her from a passive to an active learner. That is, though she considered herself a good and motivated language learner, many times, in a physical class, she felt shy to deliver an answer or give an opinion, and bound herself to note taking, lest her output is considered incorrect. Conversely, she found the virtual environment managed to provide a safe learning platform which focuses on what learners can do rather than what they cannot do by focussing on meaning and fluency, inconsiderate of other factors like grades or self-image.

Secondly, Reem confirmed that the mobile phone makes learning interesting as she believed that accomplishing any type of tasks via this device should be entertaining. In addition, Reem also referred to the affordances of the mobile phone like portability, Multimodality, interactivity, Accessibility, Immediacy, and Availability which enable her to learn anywhere and anytime regardless of time or physical place. She is also able to engage in real learning experiences with friends, have access to multiple learning resources, imageries, and audios, and control her learning.

Comparing virtual classes to regular ones, Reem saw online classes as effective simulation of real classes and an extension to English exposure time, during which she was encouraged to test hypotheses, experiment with language, and to receive feedback. Reem reported that this mechanism has positively impacted her memory and she did not require much effort to study prior to the exam. As she was impressed with MALL to such an extent, she suggested employing it in her French class too, while learning French vocabulary.

The next sub-section gives examples of participants from the average vocabulary gain group.

7.5.2   Average vocabulary gain group

7.5.2.1   Hanan

Hanan scored 5 out of 45 in her pre-test, whereas she received 30 out 45 in her post-test, with a 25 word gain, which places her in the average vocabulary gain group. In her retention test, Hanan got 10 out of 45 with a loss of 20 words (see vocabulary gain/loss in Appendix E.3).

 Hanan participated in virtual classes reasonably during the first three weeks, and then gradually made fewer contributions after this. That is, during week 1, 2, and 3 she posted 12, 20, and 14 entries respectively. Then, in the following two weeks, she posted 7 and 1 entries respectively. Thus, her average contributions was 8 with almost 3 absent sessions during the latter two weeks (see Appendix G.1 for frequency of contribution). In her interview, as well as the data obtained from the WhatsApp info tab, Hanan confirmed that when she missed a class, she used to lurk (observe) during group interactions or later when her time permitted (see WhatsApp sessions lurkers F.1).

Against the quality of contribution rubric, Hanan scored 3. This is mainly because she appeared infrequently to WhatsApp sessions. However, her contributions were meaningful and on track. That is, in analysing Hanan's entries, she was comfortably practicing vocabulary learning strategies while learning new words. She managed to generate sentences of her own, yet she always followed them with a feedback request

from the teacher. Hanan did not hesitate to express difficulty when she faced a problem, waited for responses from a teacher, and confirmed understanding. Henan's preferred way to ask questions was "one word +?" for example "Adj?" to elicit feedback. She excessively used emoticons to express feelings of happiness or anger for example and did not show initiative to comment on her friends' contributions, nor corrected their errors. Examples of Hanan's interactions are found in Appendix K.2.

In interviewing Hanan, she mentioned the reciprocal link between globalization and English language. That is, she thought one of them fosters another, which inevitably strengthens the power of English in the modern world. She also talked about the direct relationship between language proficiency and employment.

Referring to the importance of vocabulary learning, Hanan admitted the importance of vocabulary in running conversation and in comprehending academic texts, which was her concern. Yet, she thought vocabulary memorization is boring and tiresome and she was reluctant to memorize words every time she has an exam.

Hanan did not show considerable interest in mobile phone technology per se although she admitted the merits of the communicative affordance of the mobile phone, which are facilitated by low cost of 4G and Wi-Fi availability.

In combining the mobile phone to learning, Hanan discussed the affordances of mobile phones and how they support learning. She prioritized the Multimodality affordance and explained how it made learning more authentic and enjoyable. She talked about its impact on memory. She also appreciated the accessibility and the immediacy of the mobile phone and expressed her feelings of connectedness. Hanan enjoyed the interactivity of the mobile phone which allows her to practice vocabulary learning strategies through real interaction, unlike individual memorization which is mainly rote learning. However she explained that many times she preferred to only observe group interactions. At other times, she further explained, when busy or missed an online class, she followed up interactions among group members later on. She claimed these advantages, are enabled by mobile phone accessibility and availability.

7.5.2.2   Maram

Maram is an average vocabulary gain learner. She scored 5 out of 45 in her pre-test and28 out of 45 in her post-test, with 23 words gained. This increase places her in the average vocabulary gain learners group. In her retention test, Marram got 11 out of 45 with 17 a word loss (see vocabulary gain/loss in Appendix E.3).

 Maram participated in virtual classes reasonably during the weeks of the intervention except for the third week. During week 1, 2, 4, and 5 she posted 20, 7, 11 and 9 entries respectively, while in week 3, she had no contributions. Thus, her average contribution was 9.4. She explained in her interview, as well as data obtained from the WhatsApp info tab, that sometimes when she missed classes, she would observe ater when her time permitted (see lurkers F.1)

Against the quality of contribution rubric, Maram scored 3. Her contributions were, to an extent, meaningful and on track. She showed a satisfactory level of practicing the vocabulary learning strategies while learning new words. She managed to generate acceptable sentences of her own, yet she was not always confident with what she had produced. This was evident asshe would follow her postings with questions requesting feedback from the class. Maram sometimes expressed she had a difficulty when she faced a problem, waited for responses from teacher, and confirmed understanding. Maram mostly used emoticons meaningfully, although in a few instances, her uses of emoticons were unexplainable. She did not show initiative to comment on her friends' contributions, nor corrected their errors. Examples of Maram's interactions are found in Extract 6.2.3.1.2 and Appendix K.2.

In interviewing Maram, she talked about the role of English in the modern globalized world. Maram also talked about the relationship between language proficiency and employment.

Referring to the importance of vocabulary learning, Maram understands the importance of vocabulary in communication as well as in an academic setting. Yet, she found vocabulary memorization boring and tiresome. She preferred to learn vocabulary incidentally when it was encountered.

Maram did not show considerable interest in mobile phone technology per se, although she recognized how it facilitated communication. She stated that she is never usually keen on trying new mobile phone applications, yet she uses WhatsApp recently as it has become increasingly popular.

In combining the mobile phone with vocabulary learning, Maram referred to some of the advantages the mobile phone can impart on language learning, including group discussion and the practicing of vocabulary learning strategies through real interaction, unlike individual memorization which is mainly rote learning. Other advantages of the mobile phones given by Maram are Mobility, Accessibility, Multimodality, and flexibility. She explained, the size and weight of the device enabled her to learn wherever and whenever she wants. She talked about how receiving knowledge in multiple modes is interesting. In addition, she appreciated the flexibility afforded by the mobile phone, which allowed her to follow up interactions among other group members later on when time permits. However, Maram could not see mobile learning as a reliable source of learning, but rather for learning by having fun.

 It seemed that this (modest) degree of shift in Hanan's and Maram's attitudes, regarding vocabulary learning and mobile phone learning, enabled them to be in the average vocabulary gain group. In addition, the degree of their availability online (frequency of contribution) as well as the degree of using the negotiation of meaning strategies (quality of contribution) could be attributed to their average vocabulary gain. Other factors such as self-regulation study habits and language level could also have had an effect.

The next subsection discusses examples of participants from the below-average vocabulary gain group

7.5.3   Below-average vocabulary gain group

7.5.3.1   Halima

Halima scored 3 out of 45 in her pre-test which means that she presumably has almost no background knowledge of the target words. In her post-test, Halima got 17 out of 45 with a 14 word gain. In her retention test, Halima scored 6 out of 45 with a 11 word

loss. Halima's vocabulary gain proved that she showed some improvement after the intervention, however she had forgotten most of the vocabulary after one month from the intervention.

Examining the frequency of Halima's contributions, Hailma posted one entry in the first week and 7 entries in the second week, while she has no contributions in the following weeks to receive a 1.6 average frequency of contributions overall .

In analysing Halima's occasional entries, I found that they were mainly greeting or farewell messages and emoticons expressing feelings like laughing. Halima also recorded her voice one time to pronounce a target word and requested a feedback. Then, she manged to incorporate her peer's feedback and repronounced the word correctly. Moreover, she confirmed her peer's reply twice (see Extract 6.2.3.4.3).

In interviewing Halima, she recognized that having a working knowledge of English is important to be interconnected in this increasingly globalized world. She also recognized the importance of English in obtaining a decent job. Yet, Halima indicated vocabulary learning is tiresome and boring. She explained that no matter how much she studies vocabulary before exam, she forgot it quickly afterwards. Therefore, she preferred incidental vocabulary learning while working on other skills, except before exams when she paid special attention to memorizing new vocabulary.

Halima acknowledged mobile phone affordances and how they could improve the learning experience, including interactivity, immediacy, portability and multimodality. However, she still prefers to remain as an observer, due to the presence of affective barriers that hinder her involvement. That is, she stated that she is simply not ready to embrace this new type of learning, as it requires another set of skills she personally lacks. One of these, Halima stated, are automaticity, as spontaneous interaction requires interlocutors to exchange communication immediately. Online search is another skill, she stated, to enable learners to search online and select the appropriate piece of information from countless online resources. In addition, she asserted that learners in a m-learning environment should have a degree of confidence while testing their hypotheses and manipulating language, since they are expected to be active learners and no longer passive ones.

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Therefore, Halima did not favour the new open environment enabled by the mobile phone, as it is different from her conventional learning methods. She stated that she used to get information from a teacher and did not trust online learning resources. She argued why should she waste time while evaluating diverse learning resources and learning how to select suitable ones, as there is a teacher who is expected to tell them what to learn. What is more, Halima explained that the time factor is a major hindrance in adopting mobile phone learning. She explained that she is always too busy with other non-academic commitments at home, thus leaving no time for further academic tasks. However, if this method has to be mandated, Halima conceded, she needed time to gradually change her learning habits and to develop confidence toward using mobile phones for learning.

7.5.3.2   Ghadi

Ghadi is another below average vocabulary gain learner. She scored 4 out of 45 in her pre-test, which means that she presumably has little background knowledge of the target words. In her post-test, Ghadi scored11 out of 45 with a 7 word gain. In her retention test, she scored 4 out of 45 with a 7 word loss. Ghadi's vocabulary gain showed that she had some vocabulary gain after the intervention, however she lost all of the words after one month from the intervention.

In examining the frequency of Ghadi's contributions, she did not show any contributions during the 5 week intervention.

The interview with Ghadi revealed that she recognized the importance of English in the increasingly globalized world. She also recognized the importance of English in obtaining a respectful job. Yet, she found vocabulary learning tiresome and boring. She even often found it useless, as she always forgets what she has memorized. Therefore, she preferred to learn vocabulary incidentally, while working on other language tasks. However, before the exams, she usually exerted a special effort to memorize new vocabulary.

Upon the intervention, Ghadi recognized some advantages could be reaped from the integration of the mobile phone in learning. Although she did not engage in any of the

WhatsApp discussions and was only satisfied to take part in vocabulary lessons inconsistently, she referred to Portability, Accessibility, Multimodality, and Availability as essential mobile phone merits, distinguishing it from traditional classrooms. Ghadi appreciated the ability to access learning anywhere and anytime. She also stated that she can never read elaborated texts, therefore she found learning with visuals interesting and useful. She also liked the degree of control provided by the mobile phone, since she could govern the distraction caused by excessive messages.

Despite this perceived benefit, Ghadi still prefers to remain an observer and communicated her inconvenience of having a more active role. In other words, she stated that she is simply not ready to adopt this new type of learning since it needs additional skills such as spontaneous interaction, online research, confidence, and accepting criticism without losing face.

Ghadi and Halima did not seem to accept the new open environment enabled by the mobile phone. They stated that they used to get information from a teacher and did not trust online learning. They indicated that receiving knowledge directly from a teacher is easier and more convenient and learning via WhatsApp pushes them out of their comfort zone. They also explained that the time factor is a major problem in adopting mobile phone learning, as they are always busy with other non-academic commitments at home, thus leaving no time for further academic tasks**.** However, if this method has to be implemented, Halima argued that she needs time to gradually change her learning habits and to develop confidence toward the use of mobile learning**.**

The next sub-section gives examples of irregular cases in the above average and average vocabulary gain groups.

7.5.4   Irregular Cases

A few participants allocated in the above average as well as in the average vocabulary gain group did not follow the behaviour of their peers in the same group (see 4.6.5). That is, their vocabulary gain was unjustified by their practices /contributions as well as their beliefs about vocabulary learning and mobile phone learning.

7.5.4.1   Lujain (above average vocabulary gain participant)

Lujain has an above average vocabulary gain with no WhatsApp contribution. She scored 7 out of 45 in her pre- test. In the post-intervention test, Lujain scored 37 out of 45 with 30 words gained. In the retention test, she scored 12 out of 45 (25 words loss). Lujain made 0 WhatsApp contributions and a low quality of contribution (1, as she was lurking). It is evident that Lujain's high vocabulary gain is not correlated to her quantity and quality of WhatsApp contributions. Her high vocabulary gain as well as her high vocabulary loss could be attributed to her traditional learning practices.

In interviewing Lujain, she realized the importance of language learning and vocabulary learning. Although she found vocabulary learning tiresome, she spent considerable time using regular traditional memorizing and repetition strategies. It seems that Lujain is a hard worker and has good self-regulating study habits.

Lujain was interested in mobile phone technologies and social communication, yet she did not trust them for learning. In addition, she was not interested in trying new ways of learning (low levels of innovativeness) (see 8.5.3 and 8.5.5). She revealed that she is satisfied with traditional learning strategies and found those effective and secure.

Lujain did not refer to mobile phone affordances, however, she reported some lurking during online interactions and declared that she may try this method in future when she is ready.

7.5.4.2   Ebtihal (average vocabulary gain)

Ebtihal gained the least vocabulary items in the average vocabulary gain group. She scored 0 out of 45 in her pre- test. In the post-intervention test, Ebtihal scored 18 out of 45 (18 words gained), whereas in the retention test, she scored 6 out of 45 (12 words loss). She made high frequency WhatsApp contributions along the intervention (30.6). That is, in week 1, 2, 3, 4, and 5, she posted 42, 40, 43, 17, and 11 entries respectively. However, she had a low quality of contribution score (2).

It is evident that Ebtihal's vocabulary gain is not correlated with her high frequency of WhatsApp contributions, whereas it could be correlated with her low quality of

contribution. Also, Ebtihal's high vocabulary loss could be attributed to the low quality of her contributions.

Although Ebtihal was mostly available online, she was not on track most of the time. This was evident when she many times posted out of topic entries. Ebtihal showed that she could hardly cope with the pace of the conversation, yet she rarely used clear verbal comprehension check and feedback request strategies. Even when she used emoticons to do so, they were sometimes unexplainable. When searching online, she frequently failed to pick up relevant/ useful information. She always copied and pasted the result of her search without being able to explain it or simplify it when asked to do so (see Extract 6.2.1.2).

In her interview, Ebtihal referred to the importance of language learning and vocabulary learning, but she found vocabulary learning boring and hectic. She was very interested in mobile phone technology and social communication. She asserted that she is keen to use current mobile phone /social media applications and interested in always being updated.

When discussing mobile learning in the pre-intervention focus group, Ebtihal indicated that she had a high expectation of how learning would be enhanced by the mobile phone technology. She believed that mobile phone would prove to be advantageous when combined to any domain (education, business). She revealed that she is interested in trying vocabulary learning via mobile phones (high level of innovativeness).

After the intervention, she talked about the mobile phone affordances she has mostly appreciated, particularly interactivity, immediacy, and multimodality. She revealed that the interactive learning environment makes learning interesting and up to date. For example, Ebtihal talked about how this interactive environment gives support while learning, as she benefited from the scaffolding given by friends and the teacher. She further explained that although her weak language proficiency impeded her understanding many times, her friends were always simplifying their output until she comprehended their productions. Ebtihal enjoyed the feeling of always being connected, since there were not any concerns about having unanswered academic /

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administrative related questions. She also found the mobile phone's ability to present information with multiple modes, such as tests, images, and audios very useful and this had an influential impact on memory.

The next chapter discusses the findings of the previous three data analysis chapters.

Chapter 8:   Discussion

8.1   Introduction

This chapter discusses the findings of the current study presented in the previous three data analysis chapters in the light of the relevant literature discussed earlier in the literature chapters. It also incorporates additional references to the research literature in order to give a comprehensive interpretation to these findings. This chapter is divided into 5 sections, with the first section being further divided into two subsections. It starts with a discussion of the findings of the vocabulary gain/achievement and relates them to the literature of vocabulary acquisition in general and vocabulary learning using MALL in particular. Following this, it moves on to discuss the correlation between the volume of WhatsApp contributions and vocabulary gain and loss, the correlation between quality of contribution and vocabulary gain and loss, and then links these findings with the corresponding research literature.

 The second section of this chapter discusses findings pertaining to mobile phone learning and learning via WhatsApp Messenger and the impact of mobile phone affordances on vocabulary gain. The next section discusses the impact of motivation to learn English in the social learning environment, and then discusses the impact of the mobile phone (affordances) on learners' acceptance of the mobile phone learning environment.

The next section talks about pedagogy in an online social environment. This section is divided into further subsections. First, it gives a comprehensive explanation of how learning is constructed when using this online social environment. It then moves on to discuss the teaching presence, learners' engagement, and learner autonomy in this new environment. Finally, it demonstrates the challenges participants face during this mobile phone learning experience and links them to the common challenges that learners reported while using MALL.

Finally, as a way of summarising the points made in this chapter, it concludes by answering the research questions posed earlier.

Recommendations for future research and the pedagogical implications of this study are made in the concluding chapter.

The next section discusses findings about vocabulary gain.

8.2   Vocabulary learning

The section discusses in detail the findings pertaining vocabulary gain and the impact of the quantity and the quality of WhatsApp contributions on vocabulary gain.

8.2.1   Vocabulary gain

Findings of the present investigation pertaining to participants overall vocabulary gain indicates that all participants gained vocabulary at a varied rate (with an average of 24 words out of 45 words tested) after the 5 weeks vocabulary learning intervention. This replicates and confirms findings of previous vocabulary learning research investigating the effect of direct teaching on vocabulary gain. For example in his experimental classroom study, Schmitt (2008) shows that about 50% of words were remembered after direct teaching of a total of 20 target words which led him to conclude the superiority of incidental and direct vocabulary learning together over only incidental learning. In the same vein, the findings of Hyso and Tabaku's study (2011), conducted with 80 first-year students studying English as their major in a university in Albania, shows that direct teaching of vocabulary in a university context was important and leads to more vocabulary gain and better text comprehension. Further, Yali (2010), conducted a case study to investigate the role of reading in L2 vocabulary acquisition, and the effect of vocabulary instruction on vocabulary learning of ESL university level students in China in which he concludes that the combination of the incidental and intentional learning instruction leads to greater vocabulary gains and better retention.

Findings of this study also fit well with Jafari's study (2016) which used a mixed method design to investigate the role of WhatsApp in the vocabulary learning

improvement of 60 Iranian EFL students, 30 males and 30 females studying at two male and female junior high schools. A pre-test and post-test were used for an experimental and a control group. The experimental group received vocabulary instructions electronically four days a week for four weeks using WhatsApp while the control group was taught vocabulary from their textbook in the classroom using the traditional methods employed in all Iranian schools for teaching English.The results revealed that using WhatsApp played a significant role in vocabulary learning for these students and also demonstrated that there was no substantial gender differentiation regarding vocabulary knowledge after usingWhatsApp. However, the study does not provide any insights into the causes of the significant difference in the scores of the experimental and control group. The findings of the present study also align with Başoğlu's findings (2010) who found that the participants using the mobile application could remember the words better than those who followed the traditional methods. They also acknowledge the results of Stickler and Hampel (2010) who indicated that an online language course allows for practicing and learning communicatively.

The following section discusses the influence of quantity and quality of contributions on vocabulary gain and vocabulary loss.

8.2.2   Influence of quantity and quality of learning on vocabulary gain, loss and retention

Variation of vocabulary gain in the present study correlates positively and reasonably (strong / moderate) with the frequency of participants' WhatsApp contributions. In other words, participants who show high average WhatsApp contributions are more likely to gain more words. This could be explained by the fact that frequent online contributions are most likely made by learners who spend a lot of time online which gives them more opportunities to encounter target words in different context, to access training, and to reuse these words. This undoubtedly enhances vocabulary gain and reduces vocabulary loss.

Online presence and repeated exposure to vocabulary learning opportunities are supported by the majority of vocabulary acquisition research, e.g Nation(2001) and Schmitt (1997, 2007), which asserts that planned repetition and frequent exposure to target words promote the chances of words transferring to long term memory. Nation (1990) suggests that a word needs to be repeated from 5 to 16 times or more to be learned. This concurs with evidence from previous studies on mobile phone learning, e.g. Chen (2008), Lu (2008), Kennedy and Levy (2008), all of which investigate the use of mobile phones for the frequent delivery of bite sized vocabulary materials to English learners at spaced intervals. They show that EFL groups of learners gained more vocabulary compared to their counterpart control group and that they preferred using their phones because of the ease of access to materials and the ability to practice anytime and anywhere. However, these studies did not consider group interaction, and group practice features of the mobile phone (the core of this study) as the evolution of online social networking sites were not available when these studies were conducted.

The present study also positively and strongly correlates vocabulary gain and retention to the quality of WhatsApp contributions. In other words, the findings show that more effort spent using diverse negotiation strategies and vocabulary learning strategies (quality of WhatsApp contributions) (see quality of contribution rubric in Appendix G.2) while vocabulary training, the more likely target vocabulary is gained and retained. Such findings concur with numerous researchers (e.g. Jepson, 2005; Castrillo,2014) who conclude that learners' interactions via an online medium in which negotiation of meaning strategies are used to make meaning, receive feedback, and adjust the output, leads to improved second language acquisition and allows learners to better remember words.

Learning is not an inherent feature within technology, but rather technology is perceived as a medium which is a source of interaction and conversation, and when used for learning, enables collaboration among group members to make meaning and construct learning. Therefore, we can argue that it is learners' use of diverse negotiation of meaning strategies triggered by conversations via mobile phone (quality

of contribution in this study) along with high levels of word encounter/practice (quantity of contributions) that lead to vocabulary gain and retention. This finding is also supported by Pica (1994), who claims that those strategies "in which a listener requests message clarification and confirmation and a speaker follows up these requests, often through repeating, elaboration, or simplifying the original message" are central for language learning (p. 497). In the same sense, the Interaction Hypothesis makes the case that meaning negotiation in communication breakdowns can push learners to modify their output and provide corrective feedback and this is very important for second language acquisition (Gass & Mackey, 2007; Bower & Kawaguchi, 2011).

The quality of contribution / vocabulary gain and retention correlation is acknowledged by another set of relevant theories such as the mental effort hypothesis and depth of processing hypothesis. The mental effort hypothesis, postulated by Craik and Begg (1979), cited in Hulstijn (1992), states that:

(a) When subjects have to infer or induce the solution of a problem,
they will invest more mental effort than when they are given the solution to the problem.
(b) Information that has been attained with more mental effort can later be better retrieved and recalled than information that has been attained with less mental effort (P.113).

Accordingly, I argue here that effort exerted while accomplishing language tasks like making inferences, testing hypotheses, practising VLS by using negotiation of meaning strategies - which allow learners to solve language problems and enrich their vocabulary learning experiences - and repeating this effort over time, helps in vocabulary retention.

Furthermore, findings pertaining to the influence of quality of contributions on vocabulary gain are also in line with what researchers hypothesize about the complexity of vocabulary knowledge (Ooi and Kim Seoh, 1996; Dubin, 1989). That is, they affirm that because vocabulary knowledge is multifaceted in nature (depth of knowledge dimension, see 2.4.1), vocabulary competence/ gain does not occur through simple repetition or surface memorization. Rather, learners need to employ

vocabulary learning techniques/ strategies to learn the multiple facets/ dimensions of vocabulary knowledge which in turn enable them to use them productively while solving language tasks (Schmitt, 2000; Hedge, 2000; Nation, 2001). The current study provides evidence that learners' use of diverse vocabulary learning strategies in WhatsApp discussion groups (measured by quality of contribution rubric) aids in vocabulary gain.

It is interesting to note that the greatest influence on vocabulary retention in this research is the number of online contributions made by individual students rather than the quality of these contributions. In other words, it is apparent that frequency of contribution is essential to increase vocabulary gain and reduce vocabulary loss, while quality of contribution is vital in enhancing vocabulary gain and retention (see 5.4.4.3), rather than vocabulary loss.

The next section discusses how mobile phone affordances impact on beliefs and attitudes about vocabulary learning and learning via mobile phone.

8.3   MALL/ WhatsApp Messenger

The section discusses in detail the affordances of mobile phones and how they impact on learning, as well as the impact of mobile phone and WhatsApp Messenger on vocabulary learning beliefs and practices.

8.3.1   The impact of the affordances of mobile phones on vocabulary learning

Aligning with the literature concerning mobile phone affordances, participants in the current study identified a number of mobile phone affordances that distinguishes mobile phone learning from classroom learning (see 3.3.1). These are introduced in order here starting with the affordances that participants found most useful first, before moving onto those considered the least important. These are Interactivity, Portability, Accessibility, Multimodality, Immediacy, and Availability.

The majority of participants found that mobile phone learning provides a better opportunity for a group of learners to interact and learn collaboratively (see 7.4.2.1) than in the regular classroom. The participants' positive attitude is congruent with many researchers' views about how the communicative affordances of mobile phones serves learning (Conole and Dyke, 2004; Lloyd, et al.; 2007; Schrock, 2015). For example, Conole and Dyke (2004) state that communication is the most useful affordance as it has the potential to engage learners in collaborative learning. That is, in their opinion, users are engaged in longer virtual discussion that encourages reflection and critiques when compared to real-life classroom discussions. They also refer to learners' ability to save conversations and go back to them when needed, an advantage that cannot normally be found in the regular classroom context. Participants in this study confirm that this feature of being able to save information ~~saving~~ is of great importance as it allows for revisiting the discussions at personally convenient times.

Research into the communicative approach to language teaching which states that social interaction is essential to language learning, supports the findings of this study (e.g. Hall & Verplaetse, 2000; Lantolf, 2000). Proponents argue that the dialogue between group members is more authentic, interesting, and induces lower levels of anxiety. When compared with computer tutoring programs, learning by social interaction is arguably more authentic and enjoyable for many, as well as being potentially more meaningful as learners are interacting with real people rather than a computer. These findings about the affordances of interactivity align with the research into the affordances of technology that indicates technology has new forms of learning with the use of dialogue and communication. This in turn creates new forms of communities in a virtual environment and a new means of sharing knowledge (Conole & Dyke, 2004; Atkinson, 2008; Schrock, 2015). This also aligns with the notion of Community of Inquiry discussed below. For a more comprehensive picture of how communication takes place among groups and how this leads to learning, see section 8.5.1.

The second most important mobile phone affordance reported by the majority of participants in the current study, that facilitates their learning and distinguishes it from traditional learning is that of mobility (see 7.4.2.2). They reported that the high portability of the platform due to its relatively small size and light weight gave it an advantage over a traditional heavy textbook or a fixed desktop computer. This is ~~in~~ consistent with the literature about mobile phone affordances which indicates that learners learn on the move since they gain a piece of knowledge in one location and apply it in another (Conole & Dyke, 2004; Burden & Atkinson, 2008; Schrock, 2015) . This advantage, as they explained, makes learning more attainable since they can learn whenever and wherever they desire throughout the day. This also connects to Sharpels' (2006) assertion that mobile technology better interprets how knowledge and skills can be transferred across contexts since people increasingly try to accumulate learning within gaps in the day while on the move.

In addition, the mobility feature enables student to learn away from their usual environment. That is, data revealed that busier students who would normally find it difficult to find the time to sit and study vocabulary used this feature. They showed that they could learn away from their usual places of study. For example, such students navigated the Whatapp group whilst in the car, while queuing, or while waiting in a doctor's clinic (see 7.4.2.2). This conforms to Sharpels' (2009) studies which show that by using mobile technology learners learn outside their own offices (such as in a friend's house, at places of leisure or worship) which led him to conclude that there is no consistent connection between topic of learning and location of learning. Learners in this study, similar to many other learners who use mobile technology, reported that the feature of mobility provided a sense of control and thus enabled better use of potential wasted time and study at their convenience. This conforms to Laurillard's (2007) assertion that the mobility feature of new technologies motivates learners as it gives them a sense of control over their learning.

Similar to findings from previous studies, (Conole & Dyke, 2004), learners in the current study found the affordances of immediacy a significantly useful feature that distinguished it from traditional learning. It allowed for immediate responses to entries / queries from friends and teachers. Learners in this study found this feature

particularly useful as it gave them a feeling of 'connectedness' with other social group members. That is, they explained whenever they asked a question, a friend or a teacher was there to reply. They gave some key words to describe the immediacy of mobile phone learning like "on air" and "life" which reflect that they are always connected (see 7.4.2.3). The notion of connectedness, or feeling of involvement, is referred to in the mobile phone literature by Rettie (2003), who stated that the feeling of connectedness achieved by mobile phone immediacy, allows learners to be aware of each other, strengthens online social bonds, and is the determining factor in making choices among different online communication options. Similarly, learners in this study reported, during interviews, that immediacy is one of the advantages of the WhatsApp application, over other online applications such as emails, since the immediacy provided by WhatsApp promotes better/easier connectedness due to the fact that logging in each time is not necessary (see 7.4.2.3).

Rettie (2003) relates the notion of connectedness in a mobile environment to social presence. He explains that the awareness that others are online gives a feeling of connectedness even when there is no message exchange. This, in turn, could provide a further explanation of how learning is supported in the current study. In other words, learners in this online social group always feel connected because other social group members are available to give immediate responses. Furthermore, Ijsselstein et al. (2003, p. 927) propose an awareness model in which connectedness and social presence are complementary. In their awareness model, they suggest that although, the level of social presence may be low, the feeling of connectedness can still be strong, which proposes a sense of keeping in touch, sharing, belonging and closeness (ibid). The concept of social presence is one of the 3 key elements of the Community of Inquiry model (COI) (Garrison, Anderson and Archer, 2000). In this study, a further group of students preferred to lurk when they could, (not contributing and without any pressure to reply immediately) but were seemingly benefitting from both synchronous and asynchronous chat (see F.1).

The affordance of accessibility as a distinctive feature offered by mobile phone learning has been mentioned by many of the participants. Findings from the post-study questionnaire and interviews showed that participants could access information

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quickly whenever needed, with the added bonus of not needing to carry textbooks around when wanting to learn. Additionally, the online search feature enabled them to access numerous authentic resources available online from which they selected whatever they found suitable (see 7.4.2.4). Participants noted that due to the freedom that this accessibility offered, it was unnecessary to go through the learning material sequentially, but instead allowed for scrolling through WhatsApp chat in a non-sequential way (back and forth) and process their learning according to individual needs and preferences. Such findings about accessibility corroborates with Sorgenfrei's (2013) notion of learner control in which accessibility adds to the learners' feelings of control and provides the freedom to navigate through the learning material and select what is to be learned.

Multimodality is another essential mobile phone affordance appreciated by many of the participants of this study (see 7.4.2.5). Participants asserted that different modalities such as images, sounds, and videos made learning more enjoyable and created multimodal opportunities to communicate and share experiences. They added that multimodality is useful because it caters for different learning styles in which they enjoyed the freedom to select from different articulations, both when information is delivered and when communicating thoughts. They found that these multiple modes of learning impacted on both memory and recall. These findings about the impact of multimodality on learning are congruent with findings of previous studies (see 2.9.2 and 3.3.1.6). In addition, participants did not mention any disadvantages in the use of multimodality, with the exception of Ghadi who indicated feeling of shyness when posting her voice to the group7.4.2.5).

Availability is another mobile phone affordance mentioned by a couple of participants in the interviews. This allowed them to maintain communication but moderate the distraction and regulate the intrusiveness caused by mobile phone learning. That is to say, the participants appreciated the potential to turn on/off the mobile phone and the push/pull alert notification (of messages) so as to be better able to govern the intrusiveness and distraction. Some of them stated that they chose the pull notification mode so that they could read messages later at a more convenient time. Other groups

of students kept their messaging alarm always on in order to always know what was being sent. This connects to Schrock's (2015) explanation that the affordance of availability gives mobile phone users the choice to be perpetually connected, partially connected, or disconnected according to the user's comfort zone. Therefore, as he states "Individuals strategically draw on the affordance of availability to produce gradations in how they might be reached" (p. 1237). Participants reported in the post-interviews that the affordance of availability motivated them to learn using mobile phone. It gives them a degree of control since they pull information when needed and learn at their own pace. This finding also conforms to Sorgenfrei et. al. (2013) who presents a taxonomy exploring different degrees of control that learners might have in an educational setting which integrates technology. They put timing and pacing control at the top of their taxonomy.

Additional functionality of WhatsApp included auto-correction of spelling mistakes while typing. Learners also used the audio feature to convey thought faster instead of texting if they wished to overcome problems with digital literacy. They searched online for authentic resources and imported multimedia to enrich their conversation.

The next section discusses how motivation to learn English influenced the acceptance and the use of mobile learning.

8.4   Motivation to learn English

Looking at the influence of motivation to learn (English) was not initially one of my original objectives of inquiry. However, investigating the reasons for participants' excessive withdrawal from the intervention in phase 1, I discovered that participants' lack of motivation to learn English was a key factor which deterred them from proceeding with the mobile phone learning intervention.

The next section looks at the impact of motivation on social learning via mobile phone.

8.4.1   The Impact of language learning motivation on online social learning

An abundance of literature shows that one of the most important benefits of technology integration is enhancing learners' motivation to learn the target language

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(Warschauer, 2004). Many studies identify the advantages that technology integration can impart to language learning which they claim eventually boost learners' motivation (Sweller, 2003; Mayer&Mereno, 2003). Some of these advantages include enabling self-regulation and individualization. However, the findings of this study go beyond a simple relationship between technology integration and motivation.

Findings from the first phase of this study largely showed that interest in mobile phone technology was insufficient to induce students to continue learn English via mobile phones. That is although most of the participants in phase 1 showed a general interest in using mobile phone technology in daily socialization, they withdrew gradually from the chat group from the second week onwards of the intervention. This corroborates with Wang and Higgins' (2006) findings who report that they had high dropout rates in students taking an online course. This means that simply using the mobile phone for learning did not convince the learners to continue learning English. Interviews with some of the participants in phase one revealed lack of motivation to expend additional time and effort to learn English outside the classroom, since they did not feel the need to learn. English was merely a subject that needs to be passed in order to move on to enrol in a desired Arabic specialty afterwards. Others could not perceive a link between the mobile phone and learning, which they see as predominantly invented for social communication.

Accordingly, I conclude that motivation to learn English can significantly influence participants' attitudes and behaviours towards mobile learning and that learners should be sufficiently motivated to learn the language before trying new methods.

Other learners who participated in the intervention revealed that technology integration further motivated them to learn English as it enhanced their learning experience significantly. Findings from these students align more closely with a body of literature in this area (Sweller, 2003; Mayer & Mereno, 2003; Warschauer, 2004; Keogh, 2017), which indicates that learning a language using technology can be enjoyable, and practical. This latter group of learners feels that WhatsApp allowed them to have more space to share opinions in an anxiety free environment without

being graded which eventually motivated them to make further contributions and make more hypotheses about language.

The next section discusses the impact of mobile phone affordances on vocabulary learning beliefs and changes in participants' attitudes to vocabulary learning.

8.4.2 The impact of the affordances of mobile phones on vocabulary learning beliefs (learners' acceptance of learning via mobile phone)

The mobile phone learning experience managed, to a certain extent, to change participants' attitudes towards vocabulary learning. That is, before commencing the intervention most of the participants reported that vocabulary learning is challenging, tiresome, boring, and outdated. These earlier views about vocabulary learning is similar the findings of a number of studies which have reported on EFL learners' attitudes to vocabulary learning (Nation, 2001; Nation and Laufer 2001; Schmitt, 2007).

However, after the intervention, many participants reported that their vocabulary learning experience was enhanced by the wealth of advantages afforded by the mobile phone and WhatsApp technology. Participants' positive views about vocabulary learning using the new medium could be strongly linked to their beliefs and satisfaction about the medium itself. That is, data from multiple sources revealed that although some of the participants were initially sceptical about how mobile phones would benefit their learning, many accepted the new learning medium as they found it allows for easy, useful, enjoyable, and practical learning. Participants' reasons for accepting the new technological mode reflects the key principles of Technology Acceptance Models (TAM): Usefulness and ease of use (see 3.3.3). Thus, they concluded that vocabulary learning via mobile learning was no longer difficult and was simpler than traditional vocabulary learning methods. This was because it was felt to be simple, useful, and did not require n~~eed~~ special training. The contents of the vocabulary lessons as only small chunks over spaced intervals was felt to be easier to memorize than elaborate printed lessons.

One of the elements of usefulness in the TAM model is the element of enjoyment and the majority of participants in the main study reached the consensus that vocabulary learning via mobile phone is enjoyable due to the interaction with friends and teacher which blurs the line between formal and informal learning. This allowed them to feel that learning is not an outdated one-way transition of knowledge from autocrat teacher who possesses knowledge, but is rather a horizontal exchange of ideas during which learning is constructed in an anxiety free environment. Besides, they stated that the enjoyment could be due to using the device itself since they found the learning experience real and allows them to cope with current technological advances.

These findings from the current study about how mobile phone affordances have positively influenced learners' vocabulary learning beliefs are largely supported by a body of mobile phone learning research (e.g. Jepson, 2005; Lu, 2008; Zhang, 2011; Rambe & Bere, 2013; Awada, 2016; Keogh, 2017). Many of these studies investigate the effectiveness of mobile learning while teaching various language areas such as vocabulary, writing, reading, or academic/general topic discussions. Many learners in these studies reinforced the notion that mobile phone learning allows for a richer learning experience due to the advantages it provides for the learning process.

The next section discusses learning and teaching in an online social environment.

8.5   Learning and teaching in online social environment

The next section discusses pedagogy in the online social environment comprising the teachers' role, learner engagement, learner autonomy, and challenges of adoption in an online social environment.

8.5.1   How learning is constructed in an online social environment

Data generated from analysis of the content of the WhatsApp discussions as well as learners' views of how they learned give ample insight into how learning is constructed. We can assume that learning takes place at two levels: the vocabulary lessons sent by the teacher that originally constituted the primary input (content) and the social interaction in the chat groups.

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Participants indicated that the design of the vocabulary lessons facilitated their learning since they were bite-sized chunks at spaced intervals which can be easily memorised anywhere and anytime, unlike a seemingly more crammed and elaborate traditional lesson. The confirmation of the success of this design is affirmed by theories of memory function such as cognitive load (Sweller, 1992), spacing effect (Cepeda et al., 2006), and dual coding (Paivo, 2006). Findings from this study relevant to the effectiveness of mini-vocabulary lessons and how they impacted students' learning were explored in early mobile phone studies (Stockwell, 2007; Kennedy and Levy, 2008; Lu, 2008).

The WhatsApp group interaction offered a space for learners to build upon and expand knowledge which I argue is a key tenet for learning. In these interactions, students' attention proved to be mainly focussed on understanding the message. This supports Coady and Huckin's (1997) suggestion that typical vocabulary learning exercises are not necessarily vocabulary builders. In this research, students' attention was not on vocabulary building per se but on communication. Thus, group interaction via WhatsApp seems to be the causal learning factor which is examined closely here to explore how it contributes to learning.

The essence of current WhatsApp interaction, as any genuine interaction, is the interlocutors' use of negotiation of meaning strategies that enable learners to form and test ideas, confirm understanding, ask questions and receive feedback, Learners reported that they were encouraged to make hypotheses about language and test them, after which they received feedback from the teacher and friends (see 6.2). Aligning with Foster (1998) who attributes learning in a physical classroom to learners' use of negotiation of meaning strategies as well as Castrillo et. al. (2014) who suggest that learning in a virtual environment takes place due to learners' use of these strategies, I argue that this WhatsApp social environment enabled the participants to construct learning by using this set of negotiation of meaning strategies. WhatsApp data analysis showed that learners' skills in using these strategies developed over time as the intervention proceeded. Accordingly, learners showed growing confidence in using these strategies, while the teacher's interventions were gradually reduced in the

later weeks of the intervention. This no doubt led to an increase in learner autonomy (learner autonomy is discussed in 8.5.5).

I argue here that effort exerted while accomplishing language tasks such as making inferences, testing hypotheses and practising VLS using these negotiation of meaning strategies enabled learners to enrich their vocabulary learning experiences. (see discussion of the "mental effort hypothesis" in section 8.2.2).

Furthermore, this WhatsApp virtual group space could be viewed as corresponding to the Vygotsky's Zone of Proximal Development (ZPD) (1987). The Zone of Proximal Development is defined as the distance been individual actual development and overall group development (see 2.7.2). In other words, within group collaboration, weaker learners should strive to enhance their actual proficiency level by seeking assistance from more capable learners. It is expected that through observing, participating and receiving feedback on what learners can do with group support today, they will be able to do independently in the near future (Vygotsky, 1987). Examination of the WhatsApp group discussions showed evidence of scaffolding. This is when more capable participants provided assistance to weaker ones with aspects of vocabulary knowledge, grammatical structure, and knowledge content. In many instances scaffolding was elicited when learners expressed difficulty, requested clarification, or asked for feedback (see 6.2.1, 1, and 6.2.3 as examples). Similarly, Keogh (2017) conducted a study in which learners interacted through a WhatsApp group to discuss and reflect on given printed materials. Findings from the analysis of student interactions highlighted instances where students benefited from scaffolding as learners build upon and expand their knowledge. Keogh (2017) concluded that WhatsApp virtual discussions enabled more scaffolding and augmented learners' engagement and allowed them to perceive learning as a natural social interaction.

A further insight into how learning takes place in an online environment is given within the realm of the Community of Inquiry (COI) framework which provides insight into the complexity of online learning (Garrison 2007). The COI framework is consistent with the constructivist view of learning postulates that educational experience falls at the

interplay of three dimensions: social presence, cognitive presence, and teaching presence (Garrison, 2007).

The COI framework helps to understand how the mechanism of online learning works in the current research by analysing each construct separately. Social presence is described as an ability to conduct effective purposeful communication and to maintain cohesion among group members (ibid). The nature of social presence in the current study is seen in learners' behaviours in online chat where they communicate openly. Data obtained from the interviewees reveal that learners develop a sense of community and social bonds when they are online and collaborating with others in the learning tasks. Learners also seemed to have the ability to adopt new identities in the virtual online medium which added to their confidence and comfort while participating. Sara, for example, indicated that the medium helped her to feel less intimidated about ~~to~~ participating than when in the classroom as there was no eye contact. Similarly, in his study, Sam (2016) talked about how group members felt competent and participated more as the study proceeds as they constructed news identities and felt valued members of the group.

The second dimension of the COI framework is cognitive presence. Cognitive presence is defined in terms of "a cycle of practical inquiry where participants move deliberately from understanding the problem or issue through to exploration, integration and application" (Garrison, 2007, p. 65). In other words, cognitive prescience is a progressive development of inquiry which moves through exploration, construction, resolution and confirmation of understanding through collaboration in an online community of inquiry. In this study, cognitive presence was evident when tracking learners' engagement in knowledge exchange, connecting ideas, making hypotheses about language use and structures and negotiating for meaning. Yet, researchers indicate that inquiry hardly tends to moves beyond the exploration stage (Garrison, 2007). They explain that this could be attributed to the unrealistic nature of communication or the nature of the teaching presence (Garrison, 2007).

The third construct in the COI model is teaching presence which plays a significant role in supporting social and cognitive presence in any community of inquiry, greatly influencing levels of interaction. This is discussed in 8.5.2 below.

8.5.2   Teaching presence

The researcher's insight into the teacher's role allowed the development of a more comprehensive picture into how learning could take place. Successful learning in an online social environment could be seen to take place at two levels: the structural level or organizational (teaching presence) and the interactional or conversational level. Both of these could be said to be the responsibility of the teacher.

The mobile phone experience reported in this research was designed to have a strong teaching presence in which the teacher created a structured learning environment by steering the conversation and providing chances to help students to expand the conversation. In many instances, the teacher's decisions such as proceeding (carrying on an interaction), slowing down (the pace of the interaction), emphasizing a point, or shifting the topic were influenced by the behaviour and needs of the students. It is this interplay between the teacher and students which proved to be the key

(see Appendix B for teacher's use of conversational rules to guide the interaction).

Teaching presence is a key construct in the Community of Inquiry model (see above). It has three subclasses: design, facilitation and direct instruction (Garrison, 2007). These are said to have a great influence on the success of interaction. That is, the level of interaction increases if teachers gives it structure, explicitly guide conversations, encourage group members to integrate their ideas, and encourage them to solve particular problems. These elements are important but will depend on the level of support needed by the students, especially when the learning environment is new to them and/or they are unaccustomed to working without a teacher. This was evident in this study when the level of teacher dependency started to decrease towards the end of the intervention.

At the level of interaction, Sharples, et al. (2006), Jeapson (2005), Castrillo (2004), Sam (2016), Keogh (2017) and many others view conversation as essential for learning, and they view learning as a construction of knowledge between teacher and learners and learners and learners rather than knowledge received from the teacher. This conversation can also be seen in terms of Laurillard's conversational framework (2002) in which she sees the concept of learning when using technology as a conversational process. This concept adds to our understanding of the teacher's responsibility and the learners' behaviors in a mobile learning environment.

Laurillard sees learning as "a dialogic process" between a teacher and learners. At the level of description, or at the start of a learning process, a teacher shapes the structure of the conversation. They decide the concepts to be discussed, the learners then ask questions to understand the teacher's output, the teacher elaborates, or maybe another learner does, the learners articulate their own understanding of the concept and may ask to check their understanding, and the teacher, or another learner, confirms understanding. This is very similar to many of the 'conversations' that took place in this research (see T.1).

At a higher conceptual or experiential level, Laurillard (2002) describes how learners make hypotheses and test their hypotheses, may ask for feedback from a teacher or peers to adapt their product according to the received feedback, and thus can improve their actions in future. Again, this is very similar to conversations that took place in this research (see 6.2.3). For Laurillard (ibid), this interaction is further enriched by students' reflection on their experiences and leads to learning.

The next section discusses aspects of learners' engagement in the online social environment.

8.5.3   Learners' engagement

Many of the learners in this study had high levels of engagement. This engagement could be seen as cognitive, behavioural, social or affective in nature.

Behavioural engagement, according to Fredricks et al., (2004), refers to participants' practices in the WhatsApp group (LOTM) in which there were a range of behaviours in dealing with WhatsApp messages. For example, many of them explained that they checked their WhatsApp messages excessively, opening messages instantly as soon they were sent, contributed in virtual classes or merely observed sequenced interactions, searched online when needed, consulted various resources, posted their contributions and asked for feedback. Learners' behavioural engagement also involves the shift in learners' behaviour as some students explained that their study habits changed due to mobile learning. For example, they used more vocabulary learning strategies and negotiation of meaning strategies while learning vocabulary, they learned anytime and anywhere, and made use of commuting and waiting times in WhatsApp learning group chat (6.27.3.1.1, and 7.3.2). The participants' behaviours in the current study are similar to the participants' behaviours in many other studies investigating the impact of mobile phone learning on learners' achievement (e.g. Sharples, et al., 2006; Jeapson, 2005; Castrillo, 2004; Sam, 2016).

Cognitive engagement generally refers to the psychological investment in learning which involves exerting effort toward learning and using self-regulation strategies such as memorization, planning, and monitoring (Mesaros et. al, 2009). In the current study, following Jepson (2005), the term cognitive engagement applies to cognitive processes in which conversers use negotiation of meaning strategies to better understand each other and in turn increase input comprehensibility. Studies in second language acquisition (Foster, 1998; Foster and Ohta, 2005) as well as studies in mobile phone learning (Castrillo, et al.,2014; Jepson, 2005) assert that learners' use of negotiation of meaning strategies leads to language learning and helps a piece of learning to transfer to long term memory (see 8.5.1). Another facet of cognitive engagement could be traced when learners engaged with learning materials itself. That is, the participants showed what they did with target words and mini vocabulary lessons which could contribute to a large extent to their learning. Data revealed that they were mainly occupied with practicing vocabulary learning strategies including using target words in new sentences of their own, comparing between target words and already known words, making hypotheses about language form and use, interacting with online

resources and selecting appropriate pieces of information to learn. Besides, they stated that the repeated mini lessons sent by teacher helped them to constantly review target words which strengthened their memory. This type of participants' cognitive involvement is supported by vocabulary learning research which suggests that training in vocabulary learning strategies leads to better vocabulary learning achievement (Nation, 2001; Schmitt, 1997).

A further type of engagement that participants exhibited is affective engagement. The term affective engagement here is used to refer to two different constructs. First, it could mean participants' positive or negative attitudes towards the experiment such as feelings of interest, enjoyment, convenience, and comfort, or conversely feelings like boredom, inconvenience, or burden. Findings related to these types of feelings were shown while discussing participants' attitudes (in 7.4.2.1). Participants' attitudes to mobile phone learning aligns with literature concerned with users acceptance of technology (see 3.3.3) which demonstrated that learners accepted a particular type of technology if they found it easy and useful. Thus, the many of the participants expressed their acceptance of current innovation as they perceived these benefits.

The other construct posited under affective engagement is the participants' ability to express their emotions via the WhatsApp group although communication via this medium lacks properties found in face-to-face communication like body language and facial expressions. Data from WhatsApp conversation analysis showed that participants were using emoticons abundantly to express feelings such as happiness, anger, disappointment, and embarrassment, or even sometimes tried to use contractions to convey meaning in the shortest way to cope with conversation pace (see 6.2.4.2). Learners' use of emoticons to express feelings or to compensate for body language and facial expressions is also referred to in other studies (Keogh, 2017).

8.5.4 Learners' patterns when using mobile phone technology for language learning

Findings obtained upon observing the behaviours and the achievement of the 33 participants and particularly upon analysing the eight individual case studies longitudinally enabled me to identify a pattern of different types of learners when introduced to mobile phone technology. Classifying learners according this pattern is fuzzy as we cannot draw definite lines between categories since learners' attitudes toward technology and English learning may not be constant from day to day. We also cannot distinguish between mobile phone learning and traditional learning within a learner, as blended learning was mostly adopted with varying degrees. However, we can identify four main categories as follow:

First, learners who are interested in smart phone technology and are motivated to learn English in the same time are probably the most successful learners. These learners show considerable contribution level, effective use of negotiation of meaning strategies, and expectedly high test scores. Most of the learners in the above average vocabulary gain group and some of those in the average vocabulary gain group follow this pattern. Afnan and Reem from the above average vocabulary gain group and Khadijah and Dalia from the average vocabulary gain group properly fit into this category.

A second category is those who are interested in smart phone technology, but are not equally motivated to learn English (or do not intend to make enough effort to learn vocabulary deliberately). These learners discontinued mobile phone learning after spending some time trying it. They mostly find interest in using technology is not sufficient incentive to pursue learning using this modality, such as most of the learners in phase one. Others belonging to this group also might prefer infrequent participation or mere lurking. Hanan, Maram, and Sara are good examples of learners who fit into this group.

A third strand of leaners are those who do not like smart phone technology or may not perceive its utility in a learning context, however they are enthusiastic about learning English using traditional methods as they seem more familiar and convenient

for them. This group are expected to have infrequent participation and may observe online interaction sparingly. This group of learners mostly fit in the above average as well as average vocabulary gain group with little or even no participation in WhatsApp sessions. They also showed varying degrees of vocabulary loss. Lujain, Waad, and Nadoo are examples of participants fitting into this category.

The last group of participants is neither like technology nor like English learning. This group showed minimal level of improvement and they are mostly found in the under average vocabulary gain group with high vocabulary loss (mostly forgetting all what they learned).

The following section talks about aspects of learner autonomy.

8.5.5   Learner autonomy in an online social environment

Learner autonomy can be defined as being responsible for one's own learning (e.g. Cotterall, 2000) or as the "learners' ability to take control over their own learning" (Reinders and White, 2016, p. 146). The learning environment set up as part of this intervention seems to have led to the development of greater autonomy amongst some learners by the end of the second week (see 4.7.1.1). This was an unexpected finding given the original teacher led design of the intervention and was not part of the research agenda. The extent that learners were able to take charge of their learning, control their learning goals and processes, and make decisions while learning, was evident. They made decisions about what and when to learn, and at what pace, chose when to participate or when to passively observe interaction, and decided when to be available online or not. These behaviors enable learners to take more charge of their own learning and engage in a distinctive language learning experience. Learner responsibility and control is discussed in Laurillard (2007) who considers it as one of the distinctive merits of mobile learning.

Aspects of learner responsibility and control of learning were found in interviews when participants talked about how they approached their learning and in the content analysis of WhatsApp interactions. Many participants indicated that they felt that they gradually gained more responsibility for their learning as they no longer waited for the

teacher to impart knowledge. Instead they searched online to select an appropriate piece of information to post on line, after which they discussed their findings and built on each other's' knowledge in order to learn.

Unlike in traditional learning practices, learners in this study were able to experience an elevated level of command over their learning which presumably allowed them to employ better metacognitive strategies concerning planning for their learning. They were able to allocate opportunities to study regardless of time and place, remain better connected with the learning community, and have more freedom to decide what to learn and at what pace. They explained that they can control their interaction in terms of cost since WhatsApp enabled them to exchange an unlimited number of messages with an unrestricted number of characters at no cost. Furthermore, some participants noted that WhatsApp instant message interactions enhanced their sense of control since it allowed them time to think about their responses to messages, and search online to find information before responding, unlike immediate conversation in the classroom. In addition, the WhatsApp autocorrect feature helped in maintaining control on their output.

These findings about levels of learner control in mobile phone learning link to other findings about technology and the affordances of mobile phones including Laurillard (2002), Madell, et al. (2007), Treem & Leonardi (2012), Sorgenfrei (2013), and Schrock (2015) who discuss the notion of control allowed in the use of instant messages via web-enabled phones.

The next section discusses obstacles faced in MALL implementation.

8.5.6   Challenges of MALL integration

At a pedagogical level, findings of the current study highlight a number of impediments in adopting mobile learning. These barriers are synthesized across the two study phases. These include academic load, language barrier, and lack of digital literacy in the target language.

Some participants, mostly from phase 1 of the study, explained that though they were interested in mobile phone technology, they did not favour incorporating it officially into their daily learning routine, as they were already overloaded academically. That is, every day after returning from university, they were usually busy with academic assignments and memorization for exams. Therefore, they could not add to their workload. Others put it differently; they indicated that at home, they needed to feel disconnected from academic life. Thus, a line needed to be drawn in order to allow them to detach themselves from university life yet mobile learning blurs these lines between study and personal life. Shundog and Higgins (2006) stated that mobile learning is still a kind of learning that needs effort and brainwork and many people, students or employees want to relax or listen to music after a long day of work or study.

Many participants, particularly from phase 1, reported that their low English proficiency was a hindrance while adopting mobile phone learning. That is they are skillful at exchanging messages using WhatsApp and other mobile phone applications, whilst simultaneously playing computer games, listening to music, and watching television, yet these multi-tasks were accomplished, as they stated in Arabic in which they feel comfortable, rather than in English. Besides, a few participants from both phases referred to their poor typing skills (in English) as an impediment demotivating them from adopting MALL. Some of them faced problems with spelling which required time to search for correct spelling. This, as they explained, could be facilitated by the autocorrect feature in WhatsApp, yet it sometimes failed to make correct guesses. This type of difficulty hindered conversation flow or led to loss of interest in continuing with the discourse. Another obstacle emerged from the fact that some learners had insufficient digital skills. It was possible to lose data accidently from their technological devices if they were not careful and they did not know how to retrieve it from iCloud. This deterred them from trusting mobile phone technology as a learning tool and consequently they preferred printed materials. Although the research sample, following Prensky (2001) can be considered digital natives since they are born after 1980, probably meaning that they spend their lives immersed in technology and are digitally skilful and literate in their mother tongue, they face digital literacy challenges

when reading for knowledge, comprehending, critical thinking, and writing words in English. As such, there is clear evidence of lack knowledge of the essential principles of electronic devices.

Research into the pros and cons of using mobile phones in learning identifies further types of challenges caused by MALL. More specifically, a study conducted by Yeboah and Ewur (2014), to identify the influence of WhatsApp Messenger on student's achievement in Ghana showed that WhatsApp implementation is not without drawbacks. Interviews with 50 students revealed that WhatsApp consumed students' study time, negatively impacted on spelling and grammar and sentence construction, reduced concentration during lectures and distracted students from doing assignments.

This chapter summarizes many of the points made by returning to and answering the research questions posed earlier.

8.6   Answers to research questions

The first research question addresses the impact on vocabulary gain using smart phones:

RQ 1   What is the impact on vocabulary gain of using web-enabled phones for learning?

a. In what ways does the quantity of WhatsApp contributions impact on vocabulary gain and retention/loss?

b. In what ways does the quality of WhatsApp contributions impact on vocabulary gain and retention/loss?

All participants gained vocabulary at a varied rate (with an average of 24 words out of 45 words tested) after the 5 weeks vocabulary learning intervention. This corroborates with findings of previous vocabulary learning studies which asserted the superiority of incidental and direct vocabulary learning together over only incidental learning as they lead to greater vocabulary gains and better retention (Schmitt, 2008; Yali, 2010; Hyso and Tabaku, 2011). Findings of this study pertaining to vocabulary gain also align with

findings of previous studies using mobile phones technology (Lu, 2008, Saran, 2010; Kennedy and Levey 2008) and WhatsApp technology in vocabulary development (Castillo, 2015; Jafari, 2016; Başoğlu, 2010; Stickler and Hampel, 2010). Both quantity and quality of WhatsApp contributions impact on vocabulary gain but from different perspectives.

a) Variation of vocabulary gain in the present study correlates positively and reasonably (strong / moderate) with the frequency of participants' WhatsApp contributions. In other words, participants who show high average WhatsApp contributions are more likely to gain more words after the intervention. This could be interpreted by the fact that frequent online contributions are most likely to be made by learners who spend time online, thus giving themselves multiple exposure to target words in different contexts with more opportunities of accessing vocabulary training and recycling which enhance vocabulary gain and retention. This cycle of online presence and repeated exposure to vocabulary learning opportunities is supported by numerous vocabulary acquisition studies (Nation, 2001; Schmitt, 1997, 2007). These studies showed that planned repetition and frequent exposure to target words enhance the possibility of words transferring to long term memory. That is, Nation (1990) indicates that a word needs to be repeated from 5 to 16 times or more to be learned, as previously stated. This also aligns with evidence from previous studies on mobile phone learning, e.g. Chen (2008), Lu (2008), Kennedy and Levy (2008), which investigate the effectiveness of mobile phones for the frequent delivery of bite sized vocabulary materials to English learners at spaced intervals. They show that EFL groups of learners gained more vocabulary compared to their counterpart control group and that they preferred using their phones because of the advantages mobile phones afford like easy access to materials and the ability to practice anytime and anywhere. However, these studies did not consider group interaction, and group practice features of the mobile phone (the core of this study) as the evolution of online social networking sites were not available when these studies were conducted.

b)

Vocabulary gain and retention also positively and strongly correlate to the quality of WhatsApp contributions. In other words, the higher the quality of learners' WhatsApp contributions, in terms of using diverse negotiation strategies and vocabulary learning strategies while vocabulary training and recycling , the more likely they are to gain the target vocabulary and retain it. This aligns with findings of other studies which state that learners' interactions via an online medium in which they use a variety of negotiation of meaning strategies to make meaning, receive feedback, and adjust their output, contribute to second language acquisition and allow learners to better remember words. (e.g. Jepson, 2005; Castrillo,2014).

Technology is a medium which is a source of interaction and conversation, and when used for learning, enables collaboration among group members to make meaning and construct learning. Therefore, we assume that it is learners' use of diverse negotiation of meaning strategies while conducting their conversations via mobile phone (quality of contribution in this study) along with high levels of word encounter/practice (quantity of contributions) that leads to vocabulary gain and retention. This finding is supported by Pica (1994), who asserts that these negotiation strategies, by which conversers ask for message clarification and confirmation, are essential for language learning. In the same vein, the Interaction Hypothesis states that the corrective feedback triggered by a breakdown in communication that leads to a modified utterance resulting from negotiation of meaning is extremely important for second language learning (Gass & Mackey, 2007; Bower & Kawaguchi, 2011).

Vocabulary retention in this research is probably dependant on both the number of online contributions made by individual students and the quality of these contributions. That is, it is apparent that quality of contribution is essential to promote vocabulary gain, while quantity of contribution is vital in enhancing vocabulary retention and reducing vocabulary loss (see 5.4.4.3). In other words, where memory is

concerned, learners benefit from multiple recurrent quality contributions (see 5.4.3 and 8.2.2).

RQ2   In what ways do WhatsApp learning conversations support vocabulary gain?

WhatsApp group conversations seem to be the causal factor for vocabulary gain as they offer a space for learners to build upon and expand knowledge. In these interactions, students' attention was predominantly on understanding the message (see 8.5.1).

Engaging in these WhatsApp interactions compelled participants to use negotiation of meaning strategies, as in face-to-face conversations, to enable the formation of ideas, testing ideas, confirmation of understanding, asking of questions and receiving feedback (see2.7.3, 6.2, and 8.5.1). WhatsApp data analysis showed that learner's skills in using these strategies may have been developed over time as the intervention proceeded. Accordingly, learners showed growing confidence in using these strategies, while the teacher's interventions were gradually reduced towards the later weeks of the intervention. This no doubt leads to an increase in learner autonomy (learner autonomy is discussed in 8.5.5). How learning takes place using these negotiation of meaning strategies in WhatsApp environment could be justified by a number of theories.

The mental effort hypothesis could provide an explanation to the correlation between using negotiation of meaning strategies and vocabulary gain and retention. It stated that when learners have to infer the solution of a problem, they apply more mental effort than when given the solution to a problem, and in turn piece of learning could be better retained and retrieved (Craik and Begg, 1979). Accordingly, I suggest here that effort exerted while engaged in language tasks including making inferences, testing hypotheses, and practising vocabulary by using negotiation of meaning strategies - which allow learners to solve language problems and enrich their

vocabulary learning experiences - and repeating this effort over time, help in vocabulary gain and retention.

Furthermore, the impact of effort exerted while learning (quality of contributions) on vocabulary gain also conforms to what researchers hypothesize about the complexity of vocabulary knowledge (Ooi and Kim Seoh, 1996; Dubin, 1989). That is, they asserted that vocabulary competence/ gain does not occur through simple repetition or surface memorization. Rather, the multiple dimensions and complex nature of vocabulary knowledge (depth of knowledge dimension, see 2.4.1) require learners to employ diverse vocabulary learning techniques/ strategies to learn and use them productively while solving language tasks (Schmitt, 2000; Hedge, 2000; Nation, 2001). The current study provides evidence that learners' use of diverse vocabulary learning strategies/ negotiation of meaning strategies in WhatsApp discussion groups promote vocabulary gain.

In addition, Vygotsky's (1987) Zone of Proximal Development (ZPD) provides a further explanation to how learning is constructed in WhatsApp. The Zone of Proximal Development is known as the distance between a learner's actual development and overall group development (Vygotsky, 1978, cited in Webb, 2009). That is, within a group discussion, weaker learners should try to improve their actual proficiency level from the collaborative assistance of more capable learners. It is expected that through observing, participating, receiving feedback that what learners can do with group support at this point, will be done independently later (ibid). WhatsApp group discussions in this study showed evidence of scaffolding. This is when students with higher proficiency level provided support to weaker ones with aspects of vocabulary knowledge, grammatical structure, and knowledge content. In many situations scaffolding was requested when learners expressed difficulty, requested clarification, or asked for feedback (see 6.2.1, 6.2.2, and 6.2.3 as examples). In this vein, Keogh (2017) conducted a study in which learners interacted through a WhatsApp group to discuss and reflect on given printed materials. Findings from the analysis of student interactions highlighted instances where students benefited from scaffolding as

learners build upon and expand their knowledge. Keogh (2017) concluded that WhatsApp virtual discussions enabled more scaffolding and augmented learners' engagement, and perceive learning as a natural social interaction.

The Community of Inquiry (COI) framework, which provides insight into the complexity of online learning (Garrison 2007), could provide a comprehensive interpretation of how learning takes place in an online environment. As the COI framework postulates that the educational experience falls at the interplay of social presence, cognitive presence, and teaching presence (Ibid), we seek to understand how the mechanism of online learning works in the current research by analysing each construct separately.

That is, social presence in the current study is perceived when learners could communicate openly. Data obtained from the interviewees showed that learners developed a sense of community and social bonds when online and collaborating with others in the learning tasks. Learners also seemed to have the ability to embrace new identities in the virtual online medium which enhanced confidence and comfort during participations. This conforms to Sam (2016) who talks about how group members feel competent and participated more as the study proceeds because of this adopted new identities and the feeling of being valued members of the group.

Cognitive presence, the second level of the COI framework, is a progressive development of inquiry, which moves through exploration, construction, resolution, and confirmation of understanding through collaboration in an online community of inquiry (Garrison, 2007). Cognitive presence, in this study, was perceived when examining learners' engagement while exchanging knowledge, developing ideas, making hypotheses about language use and structures, and negotiating for meaning. However, researchers indicate that inquiry hardly tends to moves beyond the exploration stage due to the unrealistic nature of communication or the nature of the teaching presence (Garrison, 2007).

Teaching presence, the third construct in the COI model, plays a significant role in supporting social and cognitive presence in any community of inquiry and greatly

influences ~~on~~ levels of interaction. It has three subclasses: design, facilitation and direct instruction, which seem to have great influence on the success of interaction (Garrison, 2007). First, a teacher's responsibility in designing an online social environment involves providing structure, explicitly guiding the conversation, encouraging group members to integrate ideas, and encouraging solutions to particular problems and thus facilitating and increasing the level of interaction (ibid). In the current study, the teacher seemed to have a strong teaching presence in term of organizing the interactions and creating a structured learning environment by steering the conversations and providing students with opportunities to expand on the tasks to help students to expand it. In many situations, the teacher's decisions to proceed, slow down, stress a point, or shift the topic were responses to the behaviour and needs of students. Thus, this interplay between the teacher and students proved to be one of the causal factors for successful interaction (see Appendix B for teacher's use of conversational rules to guide the interaction).

The level of structure and guidance a teacher gives to the interaction seems to depend on the level of support needed by the students, especially when the learning environment is new to them and/or they are not accustomed to working independently. This was evident in this study when the level of teacher dependency started to decrease towards the end of the intervention. At the level of instruction, Sharples, et al. (2006), Jeapson (2005), Castrillo (2004), Sam (2016), Keogh (2017), and many others, view learning as a construction of knowledge between teacher and learners and learners and learners rather than knowledge received solely from the teacher.

 This conversation can also be seen in terms of Laurillard's conversational framework (2002) in which she sees the concept of learning when using technology as a conversational process between a teacher and learners. In this process, the teacher decides the concepts to teach the learners who then ask questions to check understanding of the teacher's output, the teacher elaborates, or maybe another learner does, the learners articulate their own understanding of the concept and may

ask to again check understanding, and the teacher, or another learner, confirms understanding. This is very similar to many of the 'conversations' that took place in this research (see T.1).

At a higher level, Laurillard (2002) describes how learners make hypotheses and test their hypotheses, request feedback from a teacher or peers to modify their output according to the received feedback, and thus are better able to improve their actions in future. Again, this is very similar to conversations that took place in this research (see 6.2.3).

RQ3: What is the role of mobile phone technology in supporting learning?

a. What are the affordances of mobile phone technologies which contribute to (vocabulary) learning?

b. How do the affordances of mobile phone technologies impact on learner motivation?

a)

Participants in the current study have identified a number of mobile phone affordances that distinguishes mobile phone learning from classroom learning. These are interactivity, mobility, immediacy, accessibility, multimodality, and availability (see 7.4.2, 7.5).

Interactivity is the most important mobile phone affordance that was appreciated by many participants. The majority of participants found that mobile phone learning provides a better opportunity for a group of learners to interact and learn by collaboration (see 7.4.2.1) than in the regular classroom. The participants' positive attitude aligns with findings of other studies about how the communicative affordance of mobile phones aids learning (Alsied & Pathan, 2013; Mayer 2003; Sharples, 2000; Conole and Dyke, 2004). This is because learners are engaged in longer authentic, more interesting, and generally anxiety free virtual discussions in which they produce their output via testing hypothesis, asking questions, requesting feedback, modifying

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output, and then making meaning (ibid). In turn, this encourages more reflection and critical analysis compared to real classroom discussions. This type of engagement allows for the transference of receptive knowledge to productive knowledge (Nation (2001), Sonbull and Schmitt (2010), Zhang (2011), and Moghadam (2012)). Learners also refer to the ability to save conversations and go back to them when needed, as this advantage cannot normally be found in regular classroom discussions. (Conole and Dyke, 2004), and (see 7.5, and 8.3.1).

Mobility is another important mobile phone affordance appreciated by the majority of participants in the current study (see 7.4.2.2, 7.5, and 8.3.1).Mobility concerns the physical characteristics of mobile phones such as size, weight, and battery life (7.4.2.2 Participants found that the high portability of a mobile phone due to its relatively small size and weight gave it an advantage over traditional heavy textbooks or a fixed desktop computer. This feature, as they confirmed which means learner can learn at their convenience and further allows for studying in different environments and contexts. This conforms to the views of Sharpel (2007), Treem &Leonardi (2012), and Schrock (2015) who demonstrate that laptops, mobile phones, and wearable technologies (that can fit on the finger, around the neck, or on the wrist) have different degrees of portability. This enables learners to learn away from their usual learning environment because they can be carried and transported everywhere, and in turn provide the learners with more control over their learning (ibid).

The affordance of immediacy is perceived by many learners as an important affordance that distinguishes the mobile phone learning environment from more traditional learning contexts (7.4.2.2 7.4.2.3 , 7.5, and 8.3.1). Immediacy means immediate or rapid exchange of information as recipients or other interlocutors requires (Conole and Dyke 2004; Rettie, 2003). Learners in this research found Immediacy useful because it gives them a feeling of connectedness with other members in the online social group, enables a sense of familiarity with the other group members to develop plus a sense of keeping in touch, sharing, and belonging. This aligns with Rettie (2003) who states that the feeling of connectedness achieved by mobile phone immediacy, helps learners to be aware of each other, strengthens online

social bonds, and is the causal factor in making choices among different online communication options.

The affordance of accessibility can also be seen to contribute to learning in general and vocabulary learning in particular in this study (see 7.4.2.4, 7.5, and 8.3.1). Accessibility is described as easy online access to information being available through various different channels such as portals, websites, knowledge networks, or shared community users (Conole and Dyke, 2004). Participants indicated that this feature allowed them to access information online quickly whenever they needed which was not available in traditional learning contexts. Also, they reported that online search features enabled them to access countless authentic resources from which they selected whatever they found suitable. Another ~~merit~~ advantage obtained due to the freedom of accessibility is a participant's ability to follow a non-liner path of learning or navigate non-sequentially through the learning materials. It also allow for learning to take place at the individual's preferred pace by scrolling (back and forth) through WhatsApp chats and process the~~ir~~ learning according to individual needs and preferences. They concluded that the merits of accessibility proved to add to learners' feelings of control and enable them to learn according to their needs. Most of these findings about accessibility conform to findings of previous studies investigating mobile phones and technology affordances (Alsied & Pathan, 2013; Mayer 2003; Sharples, 2000; Conole and Dyke, 2004).

Multimodality is another important mobile phone affordance valued by many participants in this study. It implies using multiple media such as sound, image and text to make meaning (Hrastinski et. al, 2015; Anastopoulou, Sharples & Baber, 2011). Many participants in this study reported that it has made their learning experience (by the mobile phone) distinctive and different from traditional learning. They found different modalities this study used such as images and sounds make learning more useful, enjoyable, and create multimodal opportunities to communicate and share experiences. They also indicated that the multimodality affordance accommodated their different learning styles as they enjoyed the freedom of selecting from different multimedia content, both when information is delivered and when they contribute

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information. For example, when searching online, they sometimes imported multimedia (pictures) to convey meaning instead of writing as it was found to be both quicker and easier. Few of them reported that they used the audio feature to record their voices instead of texting to overcome problems with digital literacy. They thought that these multiple modes of learning have an impact on their memory and recall. These findings about the impact of the affordance of multimodality on learning is congruent with findings of Dual Coding theory which states that learning outcomes are enhanced when more than one of the senses is employed, for instance, simultaneously seeing and hearing, so that more connections are made (Piavo, 2006; Chen et al., 2008). Also, the findings about the usefulness of the affordance of multimodality in this study comply with previous findings of previous research investigating mobile phones affordances (Chen and Wang, 2008; Shen, 2011; Willemse and Bozalek, 2015).

Availability is another mobile phone affordance that facilitated participants' learning as it enabled them to maintain communication but moderate distractions and regulate the intrusiveness caused by mobile phone learning (7.4.2.6, and 8.3.1). Learners could govern this type of intrusiveness and distraction by having the option to turn on/off the mobile phone and the push/pull alert notification (of messages) according to their comfort. For example, some participants indicated that they chose the pull notification mode so they could read messages later at their convenience, while others kept their messaging alarm always on as they could not stop themselves from knowing what the teacher constantly sends. Evidence from participants' post-interviews reveals that the affordance of availability motivated them to learn using a mobile phone as it gives a degree of control over learning since they pull information when needed and learn at their own pace. These findings relevant to learners views about how they controlled the degree of their connectedness were discussed in previous studies about the affordance of availability (Schrock, 2015; Sorgenfrei et. al., 2013; Haythorne and Thwaite, 2005; Licoppe's, 2004).

Additional affordance of WhatsApp reported by few participants is WhatsApp auto-correction feature. This was considered to be useful as it reduced spelling problems and enabled learners to contribute more freely.

b)

The mobile phone learning experience managed, to a certain extent, to motivate participants to learn vocabulary after changing their attitudes to vocabulary learning, better engaging them in the learning, and enhancing learners' autonomy.

That is, prior the intervention, most of the participants indicated that vocabulary learning is challenging, tiresome, boring, and outdated which resonates with other research in the area (Laufer and Nation, 1998; Goulden and Nation, 2011; Alamri and Suleiman, 2011). However, many of these earlier views about vocabulary learning have changed due to the influence of technology and mobile phones learning interventions following the findings of research in this (McKinsey (2012; Thornton and Hauser, 2005; Stockwell, 2007; Quinn, 2011; Saran and Seferoğlu, 2010; Kennedy and Levy, 2008; So, 2009). The positive changes in learners' attitudes, in the current research, evidenced in the post-study questionnaire responses and interviews can be attributed to the mobile phone and WhatsApp affordances (see 0 and 8.4.2). Therefore, we can presume that changes in participants' views about vocabulary learning could be strongly linked to their beliefs and satisfaction about the affordances provided by the new medium itself (the mobile phone device). Learners' acceptance of and satisfaction with the use of mobile phone technology as a learning medium is most likely because they found it enables easy, useful, enjoyable, and practical which conforms to research findings about technology Acceptance Model (Phan and Daim, 2011; Hepler & Mazur (2007), and Liu et al., 2010) (see 7.4.1.2, and 8.4.2).

Another way of how the affordances of mobile phones and WhatsApp can impact learners' motivation is recognized when many of the participants show high levels of engagement (see 8.5.3). Different types of engagement can be sorted into cognitive, behavioural, social or affective in nature (Fredricks et al., 2004).

Behavioural engagement, in this study, refers to participants' practices in the WhatsApp group (LOTM) and how they respond to WhatsApp messages. It is shown when many of the participants explained that they checked their WhatsApp messages excessively, opened messages instantly as soon they were sent, contributed in virtual classes or merely observed sequenced interactions, searched online when needed, consulted various resources, posted contributions and asked for feedback (see 7.4.1 and 8.5.3). Learners' behavioural engagement also involves the shift in learners' behaviour as some students explained that their study habits changed due to mobile learning (see 8.5.3). For example, they become able to learn anytime and anywhere, making use of commuting and waiting times in WhatsApp learning group chat (6.2, 7.3.1.1, 7.3.2, and . 8.5.3). The participants' behaviours in the current study are similar to the participants' behaviours in many other studies investigating the impact of mobile phone learning on learners' achievement (e.g. Sharples, et al., 2006; Jeapson, 2005; Castrillo, 2004; Sam, 2016).

Learning using mobile phone technology enhances learners' motivation to learn vocabulary and this is also manifested in the level of cognitive engagement learners display (8.5.3). That is, participants in the current study demonstrated facets of cognitive engagement throughout the intervention which might be attributed to their motivation to learn vocabulary using WhatsApp. Cognitive engagement generally refers to the psychological investment in learning which involves exerting effort toward learning and using self-regulation strategies such as memorization, planning, and monitoring (Mesaros et. al, 2009). In the current study, following Jepson (2005), the term cognitive engagement applies to cognitive processes in which conversers use negotiation of meaning strategies to better understand each other and in turn increase input comprehensibility. In other words, learners were engaged with the learning materials including their use of vocabulary learning strategies and negotiation of meaning strategies. For example, data provides evidence that they were busy making hypotheses about target words, using them in sentences of their own, and comparing target words with words already known. This type of cognitive engagement using the mobile phone affordances reflected the level of motivation to learn that many learners have had (8.5.3). This conforms to findings of other studies which assert that mobile

phone learners are engaged cognitively with learning materials by using negotiation of meaning strategies which leads to improved levels of language learning and facilitates the transference of new knowledge into long term memory (Castrillo, et al.,2014; Jepson, 2005; Keogh, 2017). In addition, repeated mini lessons sent by the teacher helped learners to constantly review target words positively impacting on memory as evidenced in the data. This type of cognitive involvement is supported by vocabulary learning research which suggests that training in vocabulary learning strategies leads to better vocabulary learning achievement (Nation, 2001; Schmitt, 1997).

Affective engagement is further evidence of the motivation learners gained by mobile phones learning. That is, many participants' negative attitudes regarding vocabulary learning have been replaced by more positive ones. This was expressed when they reported feelings of interest, enjoyments, convenience, and comfort towards vocabulary learning after using the mobile phone as a learning medium (see 7.4.2.1, and 8.5.3). Participants' attitudes towards mobile phones learning experience align with theories relevant to users' acceptance of technology, which demonstrates that learners accepted a particular type of technology if they found it easy and useful. Thus, many of the participants expressed their acceptance of current innovation, as they perceived the corresponding benefits (Phan and Daim, 2011).

The development in learners' autonomy, in terms of being responsible for/taking control of one's own learning can also be seen to reflect how many participants were motivated to learn by mobile phones (see 8.5.5). The extent that learners were able to take charge of their learning, control their learning goals and processes, and make decisions while learning showed that they were interested in learning and were taking the initiative. This contrasts with more traditional ways of in which learning is mostly driven by a teacher who decides and plans the learning (see 4.7.1.1 and 8.5.3). These findings conform to previous research about the impact of technology and the affordances of mobile phones on developing learners' autonomy which discuss the notion of control allowed in the use of instant messages via web-enabled phones

(Laurillard, 2002; Madell, et al., 2007; Treem & Leonardi, 2012; Sorgenfrei, 2013; and

Schrock, 2015).

Chapter 9:   Conclusion

9.1 Introduction

In this chapter, I start by listing a summary of the main findings of this study. After that, I put forward some pedagogical implications for successful mobile phone learning integration. Finally, I conclude by giving the limitations of this research and suggestions for future research.

9.2 Summary of the main findings

Findings of the current study show that all students who participated in the main study acquired vocabulary yet at varying levels. It could be said that their vocabulary gain was a result of the combination of the mobile phone learning experience as well as traditional learning. However, the data shows that the most successful learners were those who were motivated to learn English and at the same time were interested in the mobile learning experience. This means that the time and effort they expended in mobile learning enriched their learning experience and helped them in transferring this knowledge to long-term memory.

The following points summarise the main findings:

1. A number of factors seem to contribute to vocabulary gain in a WhatsApp mobile learning environment (see 8.2.2). Both the quality and quantity of contribution correlate with vocabulary gain and retention. Whereas the quality of chat contributions appears to have a greater impact on vocabulary gain, the quantity of chat contributions clearly affects vocabulary loss. In other words, for memory and recall, frequency is what matters, while for vocabulary learning, both frequency and quality of contributions are important.

2. Vocabulary gain and retention seem to be mainly attributable to the use of vocabulary learning strategies and the negotiation of meaning strategies. Repetition (through vocabulary messages) had an influential impact on

vocabulary gain and in reducing vocabulary loss. Observation of interaction, even without actual participation (lurking), also tends to have an impact on learning (see 8.5.1).

3. This research concludes that the functionality offered by mobile phones can have a positive impact on language learning if the conditions are favourable. Smart phones are able to provide new opportunities that facilitate learning and make it easier, useful, portable, interactive, accessible, multimodal and controllable. These affordances can redress the constraints of context, time and lack of connectivity with teachers, friends and learning resources (see 8.3.1).

4. The affordances offered by the latest mobile phone technology undoubtedly require the transformation of the roles of the teacher and of the learners. At the students' request, the teacher / researcher in this study became more of a mentor, providing guidance on demand and learners changed from being passive receivers of knowledge to information generators, collaborators, information seekers/givers and critical thinkers (see 8.5).

5. Technology fostered teacher-student and student-student interaction in turn can lead to the collaborative construction of knowledge (see 6.2 and 8.5.1).

6. In this research, conceptual understanding of how learners learn online and how the complex processes underlying synchronous and asynchronous online learning can be interpreted by making use of several theoretical frameworks (namely, the mental effort hypothesis, Vygotsky's ZPD, the Community of Inquiry model, and Laurilllard's conversational framework (see 8.5).

7. It appears that the experience of learning online can transform many of the negative beliefs about vocabulary learning and in this study, many learners began to see it as easier and more enjoyable (see 0).

8. The use of the mobile learning environment led to an improvement in learners' use of vocabulary learning strategies and it is likely that in the future, they will better understand how the affordances of mobile phones could enrich the learning environment (see 7.3.1.1).

9. It seems likely that WhatsApp-based collaborative learning, which in this study was based around the familiar questioning-responding leading environment, will encourage some shy, less confident students to participate and engage more productively than in a face to face classroom. (See7.4.3).

10. It could be argued that not all students want to use technology for learning despite acknowledging the learning benefits that can be obtained from mobile phone learning using WhatsApp. A few participants in this study are unlikely to accept the inconvenience of shifting their learning styles in the future and seemed to be hesitant about receiving learning material and countless messages out of class. These participants considered mobile phone learning intrusive to their personal and family lives (see 7.4.3).

 And finally:

11. It might be suggested that interest in mobile phone technology alone is insufficient to guarantee a successful MALL experience and significant vocabulary gain. In other words, the use of and interest in technology alone seems to be unable to encourage those participants who are not motivated to learn English, to alter their attitude and become more inspired or invest to in learning English using mobile phones (see 8.4.1).

The next section discusses the implications of these findings on language teaching and learning.

9.3 Pedagogical implications

Pedagogically, if mobile learning is increasingly going to penetrate our educational context, teachers, learners, and administration need to consider the following suggestions for successful mobile phone learning integration:

1. Before implementing the use of technology, the profiles of the learners need to be considered. Their readiness to use the technology, their technical skills, their interest in using technology and in language learning all need to be taken into account. This will enable teachers to make the correct decisions regarding the suitability of MALL for their learners and to expect a level of success with mobile phone integration.

2. Both learners and teachers need to first develop awareness of the advantages mobile learning could impart on the leaning process. They need to identify features/affordances of mobile learning, which makes it similar but distinct from the physical classroom setting.

3. Teachers should explicitly inform learners that developing learner autonomy is a goal of mobile phone learning. Therefore, time should be devoted to raising learner awareness of learning goals, the processes of learning, strategies to choose from, tasks and learning resources.

4. Pedagogical expertise will continue to have an essential role that should be re-examined and expanded to account for features of mobile learning. Although, it is difficult to design deliberately for learning that is spontaneous, mobile phone affordances could support these types of learning.

5. Learners and teachers should try to collaborate while constructing learning using the affordances of mobile phone technology, to best enrich the learning experience and distinguish it from regular classroom learning.

6. A teacher in a mobile phone learning environment should encourage learners to inquire about areas of difficulties and reflect on their understanding, which

invites further interaction between teacher and peers and can lead to further amendment for future planning. For example, this was evident in this research, when one of the students suggested sending a message at the beginning of each day, to introduce the words of the day.

7. Teachers must be aware that mobile phone activity should be different from regular classroom activity in design and outcome. That is, when designing mobile phone activities /materials, mobile phone device features should be considered, such as small screen size and battery life.

8. Mobile phone learning is not designed for elaborated text materials, but is best used to highlight/emphasize interesting themes and continue building on them with group interaction anywhere and anytime. The outcome of mobile learning cannot be fully predicted, since a teacher might expect a number of outcomes, but others could emerge due to the spontaneous learning environment.

9. Institutions need to provide training on the applications assigned to be integrated in learning and learners need time to shift their learning habits, adapt to this new learning approach, develop digital (mobile) literacy, and develop autonomy (learn how to learn).

10. Teachers should develop an evaluation tool for assessing mobile phone learning based on constant observation of learners' behaviours in a mobile phone environment and assessing the process and the outcomes learners produce. Learners too can be involved in the evaluation processes.

9.4 Research limitations

The study has a number of limitations. For example, the research did not take into account the learning gain that the learners may have made by using traditional methods alongside mobile phone learning. It was not possible to provide an accurate measurement of how much effort the participants exerted in this form of learning and this inevitably will have influenced the findings of the post-tests.

The current study also did not exploit the WhatsApp features to the fullest. For example, it rarely made use of the voice feature when practicing pronouncing difficult words. However, the voice feature could be used to redress the poor digital literacy that some learners complained about.

University teachers and parents' views (parents are the students' guardians) about mobile learning were not considered in this study. Their opinions would have given a more comprehensive picture about the potentiality of mobile learning in this context.

The design of the vocabulary test was limited to questions in a multiple-choice format, which possibly reduced its validity, and reliability, since some of the students might have selected the right answer through guessing. This format was selected in order to conform to the test format students have in their regular setting.

This study managed to provide an overall account of the development of aspects of learner autonomy, however, tracking changes in learner behaviour that reflect the significant development in learners' autonomy would need a more prolonged study. Moreover, this study failed to decide whether participants were engaged in WhatsApp interaction because they simply enjoyed it or because they were taking charge of their learning.

This study analysed learner interaction based on learners' use of negotiation of meaning strategies. If I were to improve the design of this study, I would analyse interactions using Laurillard's conversational framework to consider the role of the teacher.

9.5 Insight for future research

The findings of this research extend existing research evidence, which states that the mobile phone platform has the potential to enrich vocabulary learning. Yet, our understanding of how learning takes place remains ambiguous due to the scarcity of empirical research. More studies are needed to verify the findings of this study about

how and why learning is constructed and the roles of different parties involved in the learning process.

The current study paid special attention to the role of the learner, focusing on the cognitive and social processes they employed. Future studies will be necessary to focus on the teacher's role in this new environment. Research should be dedicated to investigating the teacher's awareness of the particular features of the mobile learning environment and how their understanding of these features might influence their teaching goals, strategies, plans and design.

As a number of studies in mobile learning (Sam, 2016; Keogh, 2017; Awada, 2017), advocate limited teacher presence to enable learners to be fully independent and to take charge of their learning by setting goals, making decisions and choosing among available strategies, which all add to learner autonomy. Future studies are needed to examine the extent to which a teacher should be present and what factors impact on the teacher's levels of control. In this vein, more longitudinal case studies might track the development in learner autonomy over a period of time.

This study partially used the COI framework in order to have a more comprehensive picture of the dynamics among the different parties involved in learning, including the learners, the teacher, the learning resources and the technology. Future research in this area is recommended to further construct a more comprehensive profile on mobile learning, by showing the intricate interplay among the COI dimensions and degree of presence of each dimension in relation to the learners' language level, motivation, and self-regulation. Future studies might also depict other/better possible frameworks to interpret the interplay between these variables.

We also need to take into account the self-regulating study habits, which play an essential role in students' readiness to engage cognitively. Shea and Bidjerano (2012) explained that "individual difference characteristics interact with instructional environment in intricate ways to produce specific learning outcomes" (p. 317). This could further interpret the differences in learner achievement in an online environment.

Lastly, since this study focussed on how and why vocabulary is acquired in a MALL environment, it would be interesting for future studies to investigate how other language skills are learned using the interactive medium of MALL.

Appendix A   Frequency of technology use

A.1   Frequencies of use of various texting means (SMS, WhatsApp, Twitter, Snap Chat,

Frequency of use of the SMS/MMS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	3	9.7	10.0	10.0
	0	18	58.1	60.0	70.0
	1-10 time	7	22.6	23.3	93.3
	10-20 times	1	3.2	3.3	96.7
	20+ times	1	3.2	3.3	100.0
	Total	30	96.8	100.0	
Missing	System	1	3.2		
Total		31	100.0		

Frequency of use of the WhatsApp messenger

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-10 time	1	3.2	3.3	3.3
	10-20 times	4	12.9	13.3	16.7
	20+ times	25	80.6	83.3	100.0
	Total	30	96.8	100.0	
Missing	System	1	3.2		
Total		31	100.0		

Frequency of use of the Twitter

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	1	3.2	3.3	3.3
	0	12	38.7	40.0	43.3
	1-10 time	11	35.5	36.7	80.0
	10-20 times	2	6.5	6.7	86.7
	20+ times	3	9.7	10.0	96.7
	5	1	3.2	3.3	100.0
	Total	30	96.8	100.0	
Missing	System	1	3.2		
Total		31	100.0		

Frequency of use of the Snap Chat

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	2	6.5	6.7	6.7
	0	2	6.5	6.7	13.3
	1-10 time	3	9.7	10.0	23.3
	10-20 times	5	16.1	16.7	40.0
	20+ times	18	58.1	60.0	100.0
	Total	30	96.8	100.0	
Missing	System	1	3.2		
Total		31	100.0		

Appendix B   Teacher's use of conversational rules

B.1   Opening

The teacher opened the conversation by a good morning message and students responded to her greeting. After that, the teacher introduced words of the day and encouraged group members to find more information about target words. Accordingly, students responded the teacher's request.

Extract

T: Good Morning Every body

Esraa: Good morning ✿

T: Today we are going to discuss five words:

Irresistible

Excluded

Unintelligible

Definitive

 Complementary

T: Please try to search for their meanings, derivatives, and use to be discussed at 7:00 p.m. During the
           day I will send you reminders.

R : Inshalla we will do our best

Extract

Teacher opened the discussion with a question

7:02 p.m. … T: Hello ladies, do you want to review some words before exam?

7: 03 p.m. … Afnan: Yes 💕

7: 03 p.m. … Wejdan: Yes

7: 03 p.m. … Sara: Yes please

7: 04 p.m. … Reem: Yes

7: 05 p.m. … Walaa: Yup

7: 06 p.m. … Bashayer: Yeah

7: 06 p.m. … Khloud: Yup

B.2   Turn taking

Unlike face-to-face verbal conversation, WhatsApp conversations do not involve true turn taking as it is possible for more than one contribution to be sent simultaneously. And many entries are sent concurrently by different students. Other entries which exhibit turn takings are traced when participants wait deliberately to see how others responded.

Extract

7:21 p.m. …T: Let's start by reviewing some already taken words

7: 22 p.m. … T: Collaboration

7:22 p.m. … Wejdan: Working as a group

7:22 p.m. … Hanan: Participating

7:22 p.m. … T: Great

7:23 p.m. … T: What part of speech is collaboration?

7:24 p.m. … 332: It's a noun

7: 24 p.m. … Hanan: I think words end with tion is noun

*7:24 p.m. …Hanan: Are noun^*

B.3   Topic shift

One way to guide a conversation, the teacher changed the topic after checking interlocutors' understanding of a current topic and felt they are ready to move on.

Extract

7: 44 p.m. …T: Can you use it (restriction) in a sentence?

7:47 p.m. …Afnan: Schools have many restrictions more than universities.

7:47 p.m. …T: 👍

7:47 p.m. …Reem: Read the restriction first then you can join the club.

7:48 p.m. …Kholoud: These are the restrictions of using mobile phone!

7:50 p.m. …T: nice sentences

7:50 p.m. …Reem: 👍

7:51 p.m. …T: are you familiar with how to use restriction?

7:51 p.m. …Khloud: Yes

7:51 p.m. …Reem: yes

7:51 p.m. …T: Let's go on to see what unification means   (topic shift)

Extract

7:52 p.m. …T: Can we move on to complementary?   (Topic shift)

7:52 p.m. …Sara: Yes

7:52 p.m. … Reem: Yes

7:52 p.m. … Afnan: yes

7:52 p.m. … T: Well, what does it mean?

B.4   **Closing**

In an attempt to prepare a ground to end the conversation, I used some closing

formulae. In turn, students responded to me showing that they understood my intent.

1. *8: 04 p.m. ….T: Anyway, I found our chat enjoyable. I wish you liked it too. Talk to you tomorrow at the same time. goodbye*
2. *8:05 p.m. …Afnan: Thank you 🌼🌼*
3. *8:05 p.m. …876; thanks, Bye ❤*
4. *8:05 p.m. …Wejdan: Inshalla, we had fun too.*

Appendix C   Sample of vocabulary lessons

C.1   Vocabulary lesson in phase 1
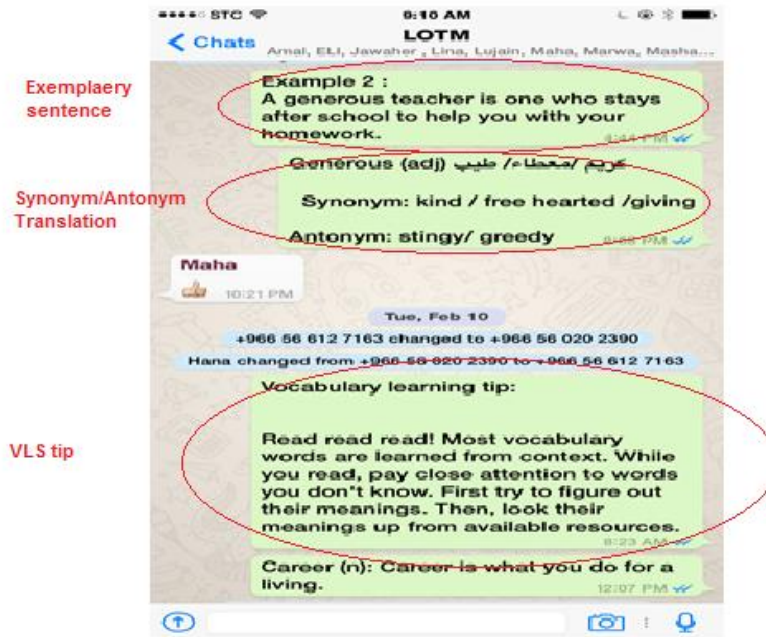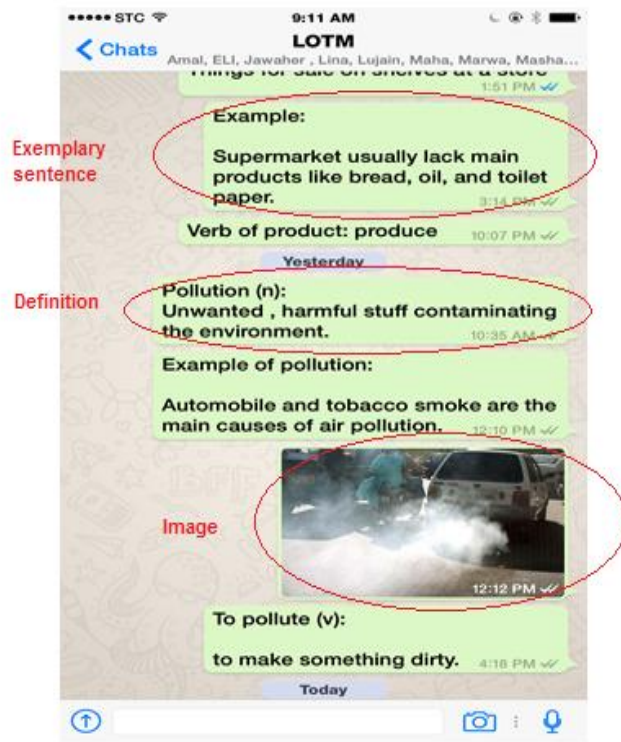
C.2 Example of interaction in Phase 1
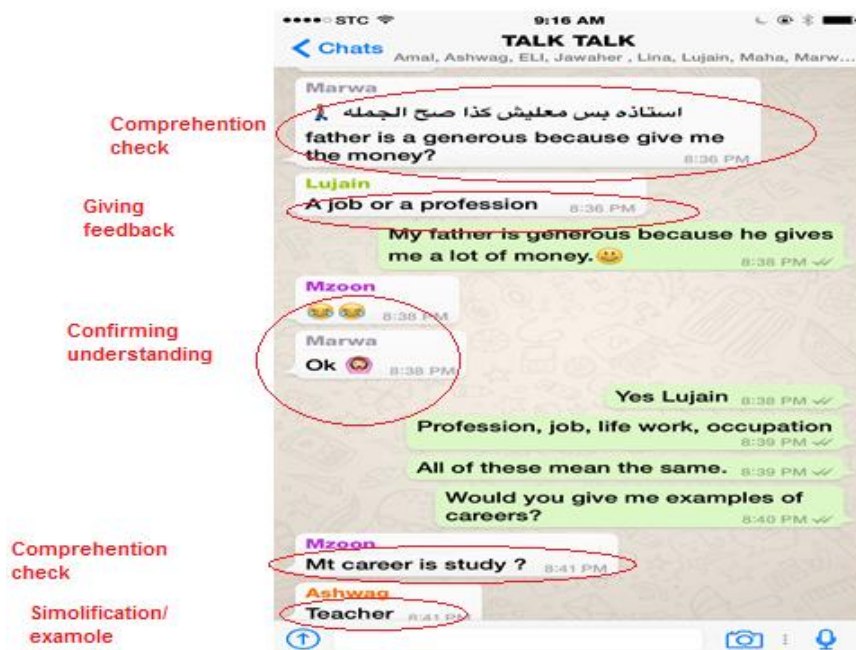
C.3 **Example of vocabulary lessons/images in the main study**

C.4 Example of interaction in the Main study
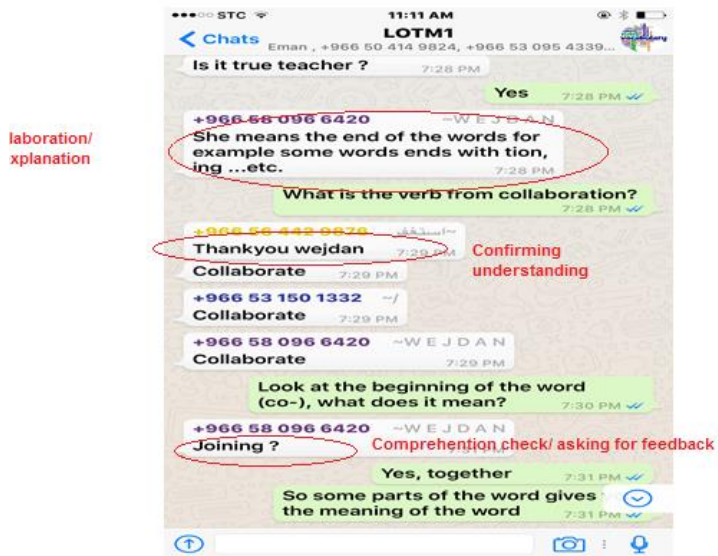
Appendix D **Vocabulary tests**

D.1 **Phase 1, Pre-study test**

Name:…………

ID:………………..

Section:…………..

Date:……………..

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Q1: Write an Arabic equivalent to each word:

1. Prefer: ………………….
2. Shop assistant: ………….
3. Persuade:………………..
4. Colleague: ……………..
5. Disappointed:…………...
6. Generous:……………….
7. Discuss:…………………
8. Celebrity:………………
9. Confident…………….

Q2: Match each word with its definition:

A   B

1. Product   Unwanted, harmful stuff contaminating the environment

2. Discuss   Things to sell

3. Pollution   To put into proper order

4. Career   Speak with others about something

5. Arrange   A job that a person does for a living

6. Improve   Chance or possibility

7. Opportunity   To make something better

8. Colleague   Someone you work with

Q3 : Fill out the blank with an appropriate word from the box:

interesting-celebrity-generous-disappointed-prefers-prescription-discussion- helpful

1. Ahmed donates money to the poor. He is ……………… .

2. Sarah likes chocolate more than caramel. She ……………chocolates.

3. Our teacher's advice about how to study vocabulary was ………………. .

4. Hayat Al-Fahad is a famous ………………..

5. The …………….about the exam's questions was useful.

6. The teacher was …………..by her students' bad scores on the final exam.

7. I was sick, so the doctor wrote a ……………for me.

8. We received an ………….. to Ahmad and Sara's Wedding.

Q4: Circle the correct word to complete the sentence:

1.   The movie I saw yesterday was frightened/ frightening.

2.   I was bored/ boring, so I decided to go shopping.

3.   Ali's ambitious/ ambition to be rich led him to do anything to get money.

4.   Shop assistant/ assist offered to send the exchanged table to home.

Q5: Put 2 of the following words in a sentence of your own:

Interesting/ generous/ celebrity/ persuade/ career/ arrange

1.   ………………………………………………………………………………………

2.   ………………………………………………………………………………………

D.2 Main study: pre-study, post-study, and retention tests

Vocabulary test (with answer key)

Question One

 Select the correct spelling of the following words`:

1. a) resolf   b) rezolve   c) resoulve   d) resolve

2. a) lonjevity   b) longevity   c) longivity   d) laungivity

3. a) sentenarian   b) centinarian   c) centenarian   d) centeranian

4. a) contemborary   b) kontemporary   c) contemprory   d) contemporary

5. a) perpetual   b) perbetual   c) berpetual   d) perpshual

Question Two

Select the odd word out:

1. a) hero   b) leader   c) citizen   d) protagonist

2. a) chaos   b) disorder   c) confusion   d) tidiness

3. a) crucial   b) important   c) critical   d) trivial

4. a) division   b) cooperation   c) association   d) collaboration

5. a) concept   b) myth   c) idea   d) notion

6. a) practical   b) nostalgic   c) homesick   d) emotional

7) a) unintelligible   b) incomprehensible   c) illegible   d) unintentional

Question Three

Select the best word to complete the definition:

1. ………………….is very boring because it has regular, repeated patterns.

a) Monotonous   b) Hilarious   c) Enormous   d) Marvellous

2. ……………………. is to describe things that are different from each other, but when they go together, they make something even better.

a) Complimentary   b) Commendatory   c) Complementary   d) Compensatory

3. …………………… means something that is equal or corresponds with another in value.

a) Equipment   b) Equivalent   c) Aquarium   d) Acquainted

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4. If you describe something as **………………..**, you mean that it is so exciting so that you cannot stop yourself from thinking about it.

a) distressing   b) horrific   c) irresistible   b) melancholic

5. The **……………….** are people who have the power to make decisions and to make sure that laws are obeyed.

a) neighbourhoods   b) majorities   c) communities   d) authorities

6. If you describe something as **…………..**, it means it contains a hidden meaning or it is difficult to understand

a) overt   b) obvious   c) explicit   d) cryptic

Question Four

Fill in the blank with a word that collocates with the underlined word:

1. We …………….. <u>a break</u> every two hours.

 a) do   b) make   c) take   d) get .

2. I'm hoping that if I work hard, I'll …………………. a <u>promotion</u> soon. It would be great to have a higher position with more responsibility.

a) do   b) make   c) take   d) get

3. When someone phones to ………………………… <u>a complaint</u>, you need to keep calm and sympathize with them as much as possible.

a) do   b) make   c) take   d) get

4. You should always confirm <u>appointments</u> you ………………………on the phone by sending a follow-up email.

a) do   b) make   c) take   d) get

5. You need to ………………………a lot of <u>training</u> to become a good programmer.

a) do   b) make   c) take   d) get

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1. I'd like to ………………your <u>attention</u> to the high number of sales in July due to our Ramadan promotion.

a) draw   b) give   c) take

2. I'll be out of the office next week; I'm going to ……………….<u>a conference</u> on climate change.

a) attend   b) presence   c)watch

3. Our company designs sophisticated business clothing for women. Our ………<u>market</u> is female executives aged 35-45.

a) commercial   b) target   c) preferred

4) Everyone agreed with the plan except for Mohammad, who …………………a few strong <u>questions.</u>

a) put   b) said   c) raised

5. We have a partnership with that company, and we often do …………..<u>ventures</u>.

a) cooperate   b) joint   c) together

Question Five

Choose the correct form of the word to fit the given context

1. When it comes to weather, London is completely; a sunny day………………. can turn to black and rainy all of the sudden.

a) unpredictability   b) unpredictable

2. The exam was fairly …………………… enough; I finished it in less than hour.

a) straightforward   b) straightforwardly

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3. Species extinction is not a ………………………problem; it is very real.

a) hypothesis   b) hypothetical

4. The painting has been done with …………………attention to details.

a) meticulous   c) meticulously

5. Oil prices fell this week to their lowest level in 14 months, …………. because of over-production.

a) apparent   b) apparently

6. ……………………… is a process by which two or more countries join together and become one country.

a) Unified   d) unification

Question Six

Select the best word to complete the sentences

1. He slammed the bedroom door and *fled*

a) fled   b) simulated   c) flickered

2. Before paying any effort to *decentralize* population, a good infrastructure plan has to be adopted in minor cities.

a) compliment   b) predict   c)decentralize

3. *Some of the potato chips snacks resemble barbecue flavour.*

a) resemble   b) stimulate   c) coordinate

4. *The company's employees have dwindled from over 4000 to a few hundred.*

a) dwindled   b) contradicted   c) restricted

Question Seven

Read the following sentences, and then circle the correct answer for each statement:

1. She tried to ***undermine*** my efforts by complaining about me to my boss. The word ***undermine*** in the sentence is closest in meaning to:

a) to sustain   b) to make less likely to succeed   c) to promote

2. The fridge should work just fine once it is ***unplugged*** and cleaned out. The word ***unplugged*** in the sentence does **NOT** mean:

a) disconnected   b) removed from an outlet   c) turned on

3. The city is prepared for the annual tourist ***invasion***. The word ***invasion*** in the sentence is closet in meaning to:

a) attack   b) offense   c) arrival

4. The technology allows data to be ***transmitted*** by cellular phones. The word ***transmitted*** in the sentence is closest in meaning to:

a) to be transformed   b) to be conveyed   c) to be verified

5. The new film is a ***sequel*** to the very successful comedy of Mr. Ben. The word ***sequel*** does ***NOT*** mean:

a) consequence   b) overview   c) continuation

6. Nobody knows ***precisely*** how many people are still living in Syria. The word ***precisely*** is closest in meaning to:

a) nearly   b) accurately   b) approximately

7. The idea of living in a ***perpetual*** peace is interesting, but hardly practical. The word ***perpetual*** is closest in meaning to:

a) endless   b) repeated   c) occasional

8. Women are always ***excluded*** from any political decisions. The word ***excluded*** does not mean:

a) eliminated   b) involved   b) ignored

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9. Perhaps she should have a more **contemporary** style. **Contemporary** does not mean:

a) current   b) modern   c) antique

10. In schools, monthly fire drills **simulate** emergencies to ensure school preparedness. The word simulate is closest in meaning to:

a) control   b) stimulate   c) imitate

11. Diamonds have little **intrinsic** value and their price depends almost on their scarcity. The word **intrinsic** in the sentence is closest in meaning to:

a) extrinsic   b) real   c) extraneous

12. Women **outnumber** men in the recent population statistics of this country. The word **outnumber** does **NOT** mean:

a) to exceed   b) to be greater   c) to outperform

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Appendix E

E.1 **Table 2: Test scores; Pre-, post-, and retention tests**

Names	Pre-test score Out of 45	Post-test score Out of 45	Retention test score Out of 45
1.Kholoud	12	43	37
2. Halima	3	17	6
3. Esraa	10	39	26
4. Mashael	4	19	5
5. Hanan	5	30	10
6. Lujain	7	37	12
7.Bashayer	6	35	19
8. Abeer	3	17	5
9. Dina	1	16	4
10.Raghad	9	30	15
11. Afnan	5	42	38
12. Reem	5	43	39
13. Noura	6	40	30
14. Maram	5	28	11
15. Sara	4	25	14
16. Wejdan	10	42	35
17. Nada	12	42	18
18. Ajwad	1	16	3
19. Waad	0	29	7
20.Wed	4	24	5
21.Walaa	4	26	4
Second group			
22. Anoud	0	18	4
23. Ghadeer	9	24	11

24.Dareen	11	40	31
25. Ebtihal	0	18	6
26. Khadijah	19	45	39
27. Fatima	9	41	34
28. Ghadi	4	11	4
29.Dalia	2	29	17
30. Nawal	5	37	21
31.Nadooo	5	38	28
32. Bushra	8	34	29
33. Jewell	0	12	0

E.2   Pre-, Post-, and Retention Vocabulary Tests
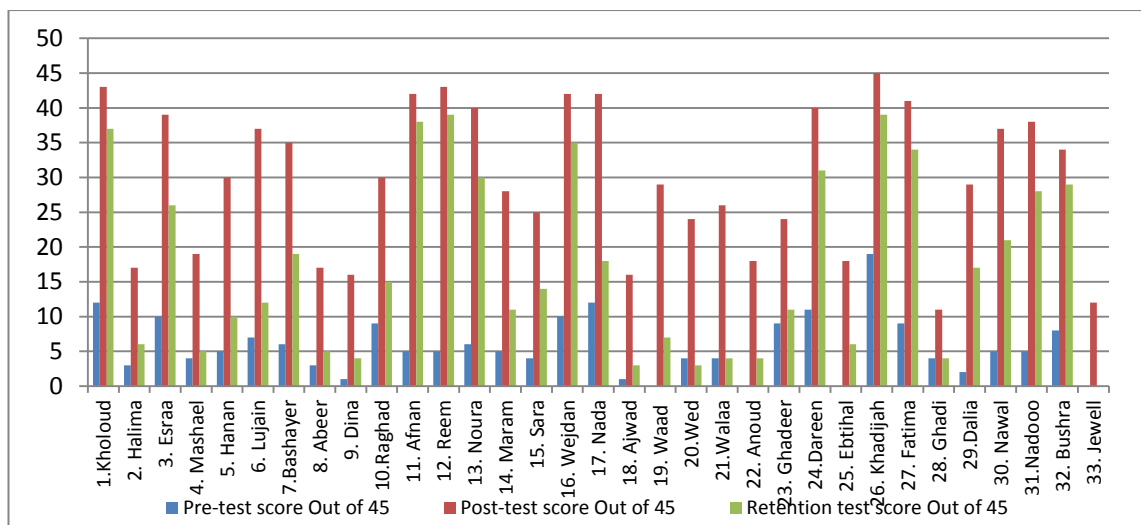
E.3 Table 3: Vocabulary gain / loss

Name	Vocabulary gain (post-tes-pre-test)	Vocabulary loss (Retention test-post-test)
1.Kholoud	31	-6
2. Halima	14	-11
3. Esraa	29	-13
4. Mashael	15	-14
5. Hanan	25	-20
6. Lujain	30	-25
7.Bashayer	29	-16
8. Abeer	14	-12
9. Dina	15	-12
10.Raghad	21	-15
11. Afnan	37	-4
12. Reem	38	-4
13. Noura	34	-10
14. Maram	23	-17
15. Sara	21	-11
16. Wejdan	32	-7
17. Nada	30	-24
18. Ajwad	15	-13

19. Waad	29	−22
20.Wed	20	−19
21.Walaa	22	−22
22. Anoud	18	−14
23. Ghadeer	15	−13
24.Dareen	29	−9
25. Ebtihal	18	−12
26. Khadijah	26	−6
27. Fatima	32	−7
28. Ghadi	7	−7
29.Dalia	27	−12
30. Nawal	32	−16
31.Nadooo	33	−10
32. Bushra	26	−5
33. Jewell	12	−12

E.4 Grouping participants according to vocabulary gain

	Referent Name	Vocabulary gain
Above average vocabulary gain 28–38 words	1. Reem	38
	1. Afnan	37
	2. Noura	34
	3. Nadoo	33
	4. Nawal	32
	5. Fatima	32
	6. Wejdan	32
	7. Khloud	31
	8. Lujain	30
	9. Nada	30
	10. Dareen	29
	11. Waad	29
	12. Bashayer	29
	13. Esraa	29
Average vocabulary gain 18–27	1. Dalia	27
	2. Khadijah	26
	3. Bushra	26
	4. Hanan	25
	5. Maram	23
	6. Walaa	22

words	7. Raghad	21
	8. Sara	21
	9. Wed	20
	10. Anoud	18
	11. Ebtihal	18
Under–average vocabulary gain 7–17 words	1. Ghadeer	15
	2. Ajwad	15
	3. Dina	15
	4. Mashael	15
	5. Halima	14
	6. Abeer	14
	7. Jewell	12
	8. Ghadi	7

Appendix F   **Lurkers**

F.1   **Lurkers per weeks in LOTM1 and LOM2**

No. of weeks	Chat session	Name of lurkers duing session time	
		LOTM 1	LOTM2
Week1	Session 1	Waad-Lujain	Anoud-Ghadi
	Session 2	Bashayer- Walaa	Raghad-Anoud
	Session 3	Dina-Waad-	Ghadi- Jewell
Week2	Session 4	Dina-Lujain	Raghad
	Session 5	Abeer- Lujain	Anoud
	Session 6	Walaa	Not Applicable
Week3	Session 7	Abeer- Dina-Lujain-Halima-Walaa	Raghad- Nada
	Session 8	Abeer- Dina- Maram	Anoud
Week4	Session 9	Lujain- Hanan	Ghadi
	Session 10	Abeer-Halima	Raghad-Anoud-Ghadi
Week5	Session 11	Halima- Hanan	Raghad-Ghadi- Jewell
	Session 12	Abeer-Dina- Hanan- Lujain	Not applicable

Appendix G   **Quantity and quality of contributions**

G.1   **Number of contributions per week, average contributions, and quality of contributions, over the five weeks**

No of Contributions Per week	Week 1	Week 2	Week 3	Week 4	Week 5	Mean of contributions over 5 weeks
1. Khloud	15	12	24	20	34	21
2.Halima	1	7	0	0	0	1.6
3. Esraa	21	12	24	4	2	12.6
4. Mashael	1	1	3	2	2	1.8
5. Hanan	12	20	7	1	0	8
6. Lujain	0	0	0	0	0	0
7.Bashayer	0	50	0	1	31	16.4
8.Abeer	0	0	0	0	0	0
9. Dina	0	0	0	0	0	0
10.Raghad	2	16	6	0	3	5.4
11.Afnan	30	45	28	55	37	39
12.Reem	23	52	18	24	23	28
13.Noura	14	10	9	24	4	12.2
14.Maram	20	7	0	11	9	9.4
15.Sara	10	14	4	11	4	8.6
16. Wejdan	27	16	12	15	15	17
17.Nadoo	8	0	8	17	1	6.8

18.Ajwad	0	0	0	0	0	0
29.Waad	17	2	9	1	6	7
20. Wed	0	0	0	7	0	1.4
21.Walaa	0	0	0	15	1	3.2
LOTM2						
No of Contributions Per week	Week 1	Week 2	Week 3	Week 4	Week 5	Mean of contributions over 5 weeks
22.Anoud	0	0	0	0	0	0
23.Ghadeer	0	0	0	0	0	0
24.Dareen	5	2	9	47	11	14.8
25.Ebtihal	42	40	43	17	11	30.6
26.Khadijah	45	13	14	22	14	21.6
27.Fatima	29	45	18	15	11	23.6
28.Ghadi	0	0	0	0	0	0
29.Dalia	0	4	15	37	12	13.6
30.Nawal	13	23	1	7	7	10.2
31.Nada	11	4	24	27	12	15.6
32.Bushra	66	20	30	45	19	36
33. Jewell	0	0	2	5	0	1.4

G.2 **Quality of Contribution Rubric**

Rank	Description
5	Her average contribution is above 20. She appears online across the 5 weeks with almost the same frequency. She uses variety of vocabulary learning strategies while learning. She makes hypothesis about new language and tests her hypothesis. She can make meaning by many ways by producing neat sentences with correct word choice and syntax, by using meaningful phrases or one word answer, or by using meaningful emoticons. When searching online, she selects the right piece of information to post online, and she never copies and pastes information but paraphrases using her own words. She uses all negotiation of meaning strategies effectively and easily during the interaction like feedback, comprehension check and modification strategies. She always lurks if she is unavailable online.
4	Her average contribution is above 10. She appears online across the 5 weeks. She uses some vocabulary learning strategies while learning. She makes hypothesis about new language. She always makes meaning by using phrases, short answers, or by using expressive emoticons. She sometimes makes meaning by producing acceptable sentences of her own choosing correct vocabulary. When searching online, she selects the right piece of information to post online, and never copies and pastes information, but rather paraphrases with her own words. She managed to use some negotiation of meaning strategies while interaction like feedback, comprehension check and modification strategies. She sometimes lurks when she is unavailable online

3	Her average contribution is above 5. She might have low or no contributions in one of the 5 weeks. She uses less vocabulary learning strategies while learning. She tries to make hypothesis about new language but not always successful. She always makes meaning by using short phrases, one word answer, or emoticons. She sometimes uses sentences of her own using the newly learned words but need to be more developed. When searching online, she copies and pastes selected information. She uses some negotiation of meaning strategies like asking for feedback, comprehension check but rarely uses modification strategies like simplifying her output or giving elaborative explanation. She , sometimes lurks when she is unavailable online
2	Her average contribution less than 5. She might have low or no contributions in some of the weeks. She does not use vocabulary learning strategies while interaction. She rarely makes hypothesis about new language. She tries to makes meaning by using one word answer. Her use of emoticons is many times unexplainable. She rarely posts relevant information. When searching online, she copies and pastes information. Few times, She uses negotiation of meaning strategies like asking for feedback, comprehension check but never uses modification strategies like simplifying her output or giving elaborative explanation. She sometimes lurks when she is unavailable online.
1	She rarely appears in any of the online sessions, but she sometimes lurks during or after online sessions.
0	Neve participates, never lurks

G.3 **Grouping students according to their vocabulary gain and relating it to average contribution, quality of contribution, and vocabulary loss.**

	Referent Name	Vocabulary gain	Average contributions	Quality of contribution	Vocabulary loss
Above average vocabulary gain 28–38 words	1. Reem	38	28	5	−4
	2. Afnan	37	39	5	−4
	3. Noura	34	12.2	4	−10
	4. Nada	33	15.6	4	−10
	5. Nawal	32	10.2	4	−16
	6. Fatima	32	23.6	5	−7
	7. Wejdan	32	17	4	−7
	8. Khloud	31	21	5	−6
	9. Lujain	30	0	1	−25
	10. Nadoo	30	6.8	3	−24
	11. Dareen	29	14.8	4	−9
	12. Waad	29	7	3	−22
	13. Bashayer	29	16.4	3	−16
	14. Esraa	29	12.6	4	−13
Average vocabulary gain 18–27 words	1. Dalia	27	13.6	4	−12
	2. Khadijah	26	21.6	5	−6
	3. Bushra	26	36	3	−5
	4. Hanan	25	8	3	−20
	5. Maram	23	9.4	3	−17
	6. Walaa	22	3.2	2	−22
	7. Raghad	21	5.4	1	−15
	8. Sara	21	8.6	3	−11
	9. Wed	20	1.4	2	−19

	10. Anoud	18	0	0	−14
	11. Ebtihal	18	30.6	2	−12
Under– average vocabular y gain 7–17 words	1. Ghadeer	15	0	2	−13
	2. Ajwad	15	0	1	−13
	3. Dina	15	0	0	−12
	4. Mashael	15	1.8	2	−14
	5. Halima	14	1.6	2	−11
	6. Abeer	14	0	0	−12
	7. Jewell	1.4	0	0	−12
	8. Ghadi	7	0	0	−7

Appendix H **Research Instruments**

H.1 **Research instruments relating to each research question together with advantages and disadvantages of each instrument.**

Instrument	Advantages	Disadvantages	Research Question Answered
Questionnaires	- Practical - Large amounts of info obtained - Easily quantified through SPSS - Can be used to compare and contrast other research methods	- Is inadequate as a single measure - Can lack validity - Truthfulness of respondents is questionable - Only obtains a limited amount of information	Question 3
Focus Groups	- Conversation stays on track - Participants can interact with each other - Topics can be easily modified as appropriate - Participants become more involved in the research	- Can be influenced by one or two dominant people - Can be difficult to deal with sensitive topics - Are somewhat artificial and this influences responses	Question 3 -Give information about smart phone owner ship -Introduce the intervention (Teacher's and learners' roles)
Pre/Post/ Retention Test	- Useful for determining 'value added' - Helpful to know the current status of the participants - Helpful in determining whether the assumed nature of the participants has been achieved	- Difficult to determine whether changes are a result of what has occurred in the classroom or just natural maturation - Dropout rates can affect the statistics - There is a tendency to teach to the 'post-test'	Question 1
Interviews	Misunderstandings are easily clarified	Difficult to analyze if used as a single	

		instrument	
	• Rapport can be developed more easily, leading to more detailed responses • Candidates can be carefully selected, thus saving time and money • High level of flexibility	• Time consuming • Requires excellent interviewing skills • Biases of interviewer may have an impact	Question 2 Question 3
Content analysis and individual cases studies	• Provides detailed information • provide insight into more personal information a bout individual behaviours	• Time consuming to analyze • Provides lots of data, researcher has to sift through	Question 2

H.2   Pre-study Questionnaire (Main study)

Pre-study Questionnaire

Using web-enabled phones to consolidate vocabulary learning for university level students in Saudi Arabia

This study, which is a requirement to obtain PhD degree, aims to measure the ability of mobile phones to enhance the quality of learning vocabulary by mobile phones and investigates learners' acceptance to this new mode of study.

 To participate in this study, please fill out the following questionnaire.

Section 1: Demographic information

Name: (optional) 33 students

Class: Reading II

Mobile phone number:……………………..

Section Two

Your beliefs about vocabulary learning

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A. Please, respond to the following statements by selecting **ONE** of the given responses.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I believe that learning vocabulary is important when learning English language.					
2. I think that learning grammar is more important than learning vocabulary.					
3. I do not always have enough words to freely express my thought in English in real life.					
4. I think that knowing a word is all about knowing its meaning.					
5. I think new vocabulary could not be easily picked up and learned while reading.					
6. I think teachers should teach new vocabulary in class.					
7. I think that it is the role of students to always notice new words and learn them.					
8. I find vocabulary memorization difficult and boring.					
9. Occasionally, I recognize the form and the meaning of newly learned words without being able to reuse them in other situations.					
10. In my writing or speaking, I prefer to use words that I have already mastered rather than newly learned words.					
11. The task of vocabulary memorization is mostly left for us to be done at home.					
12. I think it is possible to delay the task of vocabulary memorization to be done immediately before an exam.					
13. I find that words with difficult					

pronunciation can easily be forgotten.				
14. I find that long words are more difficult remember than short ones.				
15. I find that words with irregular forms are more difficult to remember than words with regular forms.				

B. I use some strategies to learn new vocabulary, **please tick the relevant ones:**

Responses	Vocabulary Learning Strategies
	1. I group the words by type (e.g., nouns, verbs, adjectives).
	2. I divide the word into parts
	3. I guess meaning from context.
	4. I work in a group to learn about words
	5. I ask my class mates for meaning.
	6. I discuss words to make meaning
	7. I make a picture of new words in my mind.
	8. I write the new word in a sentence.
	9. I connect the word to synonyms and antonyms
	10. I translate new words to Arabic.
	11.I go over new words several times at first.
	12.I write the new words in a list.
	13. I use mobile phone to look up new words
	14. I use multimedia

Section Three

A. Mobile phone Use

1. Do you have a mobile phone?　　　a) Yes　　　　　b) No

2. Please circle the category of mobile phone you own:

   a) Mobile phone with no internet connection
   b) Mobile phone with internet connection (Smart phone)

All of the student have smartphones

If you do not own a smartphone you should thankfully quit and submit your paper

B. Please, respond to the following statements by selecting **ONE** of the given options:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
3. I like to experiment with new information technologies.					
4. When I hear about a new information technology, I look forward to examining it.					
5. Not only I do use mobile phone for voice calls, but also I use it for texts messaging, gaming, downloading music, and payment services.					
6. I use a variety of smartphone applications (e.g., WhatsApp, Instagram, Snapshot) to keep up with social life.					

c) Please tick the **"frequency of use"** of the application you use to send/receive phone messages every day.

Use Per Day	0	1-10 time	10-20 times	20+ times
SMS/MMS				
e-mail				
WhatsApp Messenger				
Facebook				
Twitter				
Instagram				
Snapchat				
LINE				

Section Four

Current use of mobile phone in Learning

Please tick the most appropriate response:

	Very often	Sometimes	Rarely	Never
1. I send an enquiry messages to my teacher and I get immediate reply				
2. I receive administrative notices like exam dates/rooms or grades from the university on my mobile phone.				
3. I receive short lessons from teachers via mobile phone				
4. I chat and learn informally with classmates on my mobile Phone.				

Section Five:

Your expectations about mobile learning

Please respond to the following statements by selecting **ONE** of the given responses:

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1. I think learning English by mobile phone messages would be useful.					
2. I think using smartphone technology to learn English would make learning easier.					
3. I think that using smartphone technology would help us to access learning quickly.					
4. I would prefer face to face learning than learning online with my mobile phone					
5. I think that mobile learning would enable learners to work in a team.					

6. I think that learning how to use mobile learning systems will not need effort.					
7. I think using smart phones in learning is rather a distraction.					
8. I think mobile phones are best used for social communication and fun.					
9. I think mobile learning would intrude/interfere with my personal life.					

H.3 **Post-study Questionnaire Post-study Questionnaire**

Using web-enabled phones to consolidate vocabulary learning for university level students in Saudi Arabia

This study, which is a requirement to obtain PhD degree, aims to measure the ability of mobile phones to enhance the quality of learning vocabulary by mobile phones and investigates learners' acceptance to this new mode of study.

 To participate in this study, please fill out the following questionnaire.

Section 1: Demographic information

Name: (optional)   **Class: Reading II**

Mobile phone number:……………………..

Section Two:

Your beliefs about vocabulary learning

A. Please, respond to the following statements by selecting **ONE** of the given responses.

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	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I believe that learning vocabulary is important when learning English language.					
2. I think that learning grammar is more important than learning vocabulary.					
3. I do not always have enough words to freely express my thought in English in real life.					
4. I think that knowing a word is all about knowing its meaning.					
5. I think new vocabulary could not be easily picked and learned while reading.					
6. I think teachers should teach new vocabulary in class.					
7. I think that it is the role of students to always notice new words and learn them.					
8. I find vocabulary memorization difficult and boring.					
9. Several times, I recognize the form and the meaning of newly learned words without being able to reuse them in other situations.					
10. In my writing or speaking, I prefer to use words that I have already mastered rather than newly learned words.					
11. The task of vocabulary memorization is mostly left for us to be done at home.					
12. I think it is possible to delay the task of vocabulary memorization to be done immediately before exam.					
13. I find that words with pronunciation difficulties can easily be forgotten.					
14. I find that long words are more difficult to be remembered than short ones.					
15. I find that words with irregular forms are more difficult to be remembered than words with regular forms.					

B. I use some strategies to learn new vocabulary, **please tick the relevant ones:**

	Vocabulary Learning Strategies
	1. I group the words by type (e.g., nouns, verbs, adjectives).
	2. I divide the word into parts
	3. I guess meaning from context.
	4. I work in a group to learn about words
	5. I ask my class mates for meaning.
	6. I discuss words to make meaning
	7. I make a picture of new words in my mind.
	8. I write the new word in a sentence.
	9. I connect the word to synonyms and antonyms
	10. I translate new words to Arabic.
	11. I go over new words several times at first.
	12. I write the new words in a list.
	13. I use mobile phone to look up new words
	14. I use multimedia

Section 3:

About your experience of mobile learning

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1. I believe that learning vocabulary is important when learning English language.					
2. I think that learning grammar is more important than learning vocabulary.					
3. I do not always have enough words to freely express my thought in English in real life.					
4. I think that knowing a word is all about knowing its meaning.					
5. I think new vocabulary could not be easily picked and learned while reading.					
6. I think teachers should teach new vocabulary in class.					
7. I think that it is the role of students to always notice new					

words and learn them.					
8. I find vocabulary memorization difficult and boring.					
9. Several times, I recognize the form and the meaning of newly learned words without being able to reuse them in other situations.					
10. In my writing or speaking, I prefer to use words that I have already mastered rather than newly learned words.					
11. The task of vocabulary memorization is mostly left for us to be done at home.					
12. I think it is possible to delay the task of vocabulary memorization to be done immediately before exam.					
13. I find that words with pronunciation difficulties can easily be forgotten.					
14. I find that long words are more difficult to be remembered than short ones.					
15. I find that words with irregular forms are more difficult to be remembered than words with regular forms.					

Section Four:

Mobile Learning

a) Vocabulary lessons / strategy training

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1. Online vocabulary messages enable me to study words whenever and wherever I want.					

2. I found studying vocabulary lessons by messages easier to memorize than paper based vocabulary lessons.					
3. Vocabulary lessons in LOTM improved my pronunciation of new words.					
4. Vocabulary lessons improved my spelling of new words.					
5. Vocabulary lessons helped me to understand different meaning of a word.					
6. Vocabulary lessons helped me to know about words parts of speech.					
7. Vocabulary lessons helped me to learn about word affixes.					
8. Vocabulary lessons helped me to know about words synonyms and antonyms.					
9. Continual repetitions of words in LOTM enabled me to remember words better.					

b) Online chat

	Strongly Agree	Agree	Neutral	Disagree	Strongly disagree
1. Online chat encouraged me to communicate with teacher and friends.					
2. Communication between teacher and students using mobile was not always easy due to problems with internet connectivity.					
3. Online classes gave me a better chance to reuse new words in self-made sentences.					
4. Online chat enabled me to paraphrase information in my own words.					
5. I use the newly learned words while					

discussing real life topics introduced by the teacher.					
6. Online chat helped me to share my ideas with class.					
7. Online chat enabled me to comment on our friends' opinions.					
8. Online chat enabled me to organize my ideas.					
9. Many times, I did online search to be able to answer teacher's questions.					
10. While searching online, I ensure I select the right information before posting it to group chat.					
11. Friendly environment of online chat made leaning less formal.					
12. Online chat encouraged teacher-students' interaction when discussing new information					
13. Online chat helped me to correct my understanding of some misunderstood information					
14. Online chat enabled me to know about different point of views of my class mates.					
15. Over time, I gained more confidence in making new sentences and posting them to LOTM.					
16. Our errors were gently corrected while chatting online.					
17. The teacher gave us useful comments during online classes.					
18. I got more feedback from classmates in online chat than regular classes.					
19. I feel free to post questions to the group discussion whenever I need.					
20. For me, I was happy to just learn from observing teacher-students interactions in online chat.					
21. Overall, I liked the experience of learning vocabulary via WhatsApp application of mobile phone.					

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Section 5

Intention to Use M-learning

	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1. I would like to continue explore mobile learning in the future.					
2. I would use m-learning if it was recommended to me by my teachers.					
3. I will enjoy using m-learning systems.					
4. I would recommend others to use m-learning systems.					

Section six:

Please rank your experience of learning vocabulary via mobile phone WhatsApp Messenger, as 1 is (poor) and 5 is (excellent).

1   2   3   4   5

H.4 Post-study interview and post-study focus group questions

The following interview questions mostly guided the interviews:

1. How did you find the experiment? Why?
2. Do you like the idea of using smart phones to learn vocabulary? What did you like or dislike about it?
3. How do you study new words by mobile phone?
4. What did you do with the messages once you received them?
5. What did you do if you find the content of the message difficult to understand/memorize?
6. Did you find receiving dozens of messages per day annoying?
7. How often did you join/interact with friends via LOTM?
8. Did you feel shy/ embarrassed when other students correct your participation? Explain
9. How might the multimedia messages extend your learning?
10. How could using smart phone improve your vocabulary learning?
11. What are challenges mobile learning faces in future integration?

Appendix I   **Examples of coding system in NVivo**

I.1.1   **Pre-FG 1&2_Main**

Pre-FG 1&2_Main		
Pre-determined Code	Emergent sub-code	Ex. of key words
Reasons for learning English	Proceed academically	• Success • Pass exam • Study easily
	Employability	• Job hunting • Earn more money • Job position • Prestigious position
	Globalization	• International business • Business reports • Open up to the world • Learn abroad • Become updated
	Self-image	• Confident • Project image • Educated • Classy
	Interest in English culture	• English song • English movies • English novels • English literature
	Travel around the world	• Europe • America • East
Vocabulary learning beliefs/attitudes	Difficult	• Consumes time • Need effort/tiresome • Needs memorization • Quickly forgotten
	Boring	• Outdated • Tedious • Not interesting
Vocabulary learning approach	Deliberate /planned	• Memorize • Write words • Say words
	Incidental	• Pick up • By product • While other activities
Mobile phone learning Expectation	Useful	• May be interesting • May be up-to-date
	Simple	• May be easy to use • May be not complicated

	Does not know		• Don't know • Have no idea • May work/ may not

I.1.2 Post-Int._Main & Post-FG_Main

Post-Int._Main & Post-FG_Main			
Acceptance Mobile learning			
Attitude of learning vocabulary via mobile phone	Pre-determined codes	Emergent sub-codes	Ex. of key words
	Easy	____	• Simple • Doesn't need training • Handy
	useful	Enjoyable	• enjoyable • Interesting • Fun
		Up-to-date	• Updated • New • Modern
		authentic	• Real • On air • Life
	Not useful	Distractive	• Avoid the new • Complicated • Multiple resources to study from

I.1.3 Post-Int._Main &Post-FG_Main

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Post-Int._Main &Post-FG_Main		
Advantage of learning vocabulary by mobile phone	**Predetermined +Emergent codes**	**Ex. Of key words**
	VLS practice	• Word meaning • Word parts • Part of s • Translations/ Arabic meaning • Using words/sentences
	Negotiation strategies	• Ask questions • Make guesses • Ask/give feedback • Explain • Use simpler words • Use simpler grammar • Check understanding
	Interaction	• Active • With friends • With teacher
	Mini vocabulary lessons	✓ Small portions/chunks ✓ Stick to memory ✓ Images/audios
	Online search	✓ Ads./ menus/ news Other social network sites

How does mobile phone help you in learning?		
Knowledge construction through……	Interactivity Mobility Accessibility Control	

I.2 Exemplary extracts of NVivo coding

I.2.1 Code (Motivation to learn English)

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Sub-codes: Academic progress, globalization, self esteem

Academic progress

Source: Pre-FG2_ Main, Khadijah

Improving my language level is important to **proceed in my college** since English is the medium of study.

Source: Pre-FG 2_Main, Ebtihal

I am experiencing difficulties in my progression in the college….I think **if I could improve my English I would proceed** simply and pass exams.

Employability

Source: Pre-FG 1_Main, Afnan

It's important to the extent that without English qualifications, you will not be accepted in job market even you are keen in your specialty. Some jobs don't use English, yet employers entail proficiency in English language as one of the conditions for job acceptance.

Source: Pre-FG 2_ Main, Dalia

English facilitates employability in **job market**….. It has significant influence on earnings.

Source: Pre-FG 2_Main, Halima

English is important if you want to work and have a **good position in your work** …. Nowadays, all employers require high language proficiency.

Globalization

Source: Pre-FG 1_Main, Wejdan

Globalization and English are pull factors for one another………..While, English connect people worldwide together and helps in exchanging economics and culture, globalization, on the other hand, strengthen the position of English in different countries and cultures.

Source: Pre-FG 2_ Main, Ajwad

English is the international language which enables **people around the world with different languages and cultures to communicate and understand each other, to exchange knowledge, and to run business effectively.**

Source: Pre-FG 1_Main, Esraa

I am eager to learn English fluently as fast as possible … I want to join my brother and study for my postgraduate degrees in America . …**Studying abroad** is my target after graduating.

Source: Pre-FG 1_ Main, Reem

Even without studying abroad,   **reading international articles written in English updates you with new advances in any field around the world**………That is why English is important.

Self-esteem

Source: Pre-FG1_Main, Ragad

…..Even the society respects people who speak English….English speakers **look more educated. …**Some people tend to scatter English words in their speech to let others think they are educated or from a higher class.

Source: Pre-FG1_ Main, Dina

My parents always encourage me to learn English……. **They think English speakers as more successful, self-esteemed, and classy.**

Source: Pre-FG2_Main, Nada

English is everything…..;If you know how to speak and write English, you will have self-esteem, you would look better educated………….to the extent that **others would be convinced to your argument** more easily particularly when you insert some English words while conversing.

I.3   Code: Expectation of mobile phone learning

I.3.1   Sub-codes: interesting, easy- useful- up-to-date-boring- complicated-difficult.

Source: Pre-FG1_Main, Afnan

 " **I expect that we must integrate technology to be** updated **and open up to the world."**

Source: Pre-FG2_Main, Ghadi

 "I think technology would complicate **things."**

Source: Pre-FG2_Main, Nawal

"We tried using computer labs before, they were boring and difficult to use….. **If mobile phone**

technology works in a similar pattern, I won't use it if it is optional"

Source: Pre-FG1_ Dina

"**My worry is that it would be a distraction …… we would study from many resources……….there would be no focusing.**"

Source: Pre-FG1_ Main, Jewell

" **I expect that** we must use technology to be more civilized"

Source: Pre-FG1_ Main, Lujain

 "I think technology would make learning **difficult ……** I think it would be a **distraction** ………….there would be no focusing."

I.4   Code (Interactivity)

Source: Post-Int_Manin, Nadoo

Group **discussions** are easy… real ….and allows for real **talking** with friends and teacher. ..I learned from the **give and take** between teacher and learners….I think the time spent on this firms the words in my memory…unlike memorization.

Source: Post-Int_Main, Reem

We become more active students…………We are kept **busy asking questions**, **giving comments, giving opinions, say what is difficult, asking for explanation**…. And this I think will increase our chances to remember words………….Its unlike classroom in which we listen to the teacher and take notes.

Source: Post-Int_Main, Kholoud

WhatsApp Chat helped us to **learn in group**…..We **talk together**…I **learn from what my friends say**…..i can **ask them questions and they reply**…..we can **discuss things** together

Source: Post-In_Main, Fatima

Communication with friends and the teacher is the best thing….we **learn from each other**…**weak learners can learn from good ones.**

Appendix J   **WhatsApp conversations(Example of coded extracts)**

J.1   **Code (Modification)**

Subcodes (simpler vocabulary, elaboration, give example…….

J.1.1   **Source: LOTM 1**

1. *9:35 p.m. …T: Ok then, Tell me ladies what factors might affect your life expectations?*
2. *9:35 p.m. …Esraa: My marks on tests.*
3. *9:38 p.m. …Reem: University*
4. *9:38 p.m. …T: can't get you*
5. *9:38 p.m. …T: Do you know what life expectancy means?*
6. *9.38 p.m. …Esraa: the traditionals of my family   (simpler vocabulary/ simplification)*
7. *9:39 p.m….Reem: Yeah*
8. *9:39 p.m. …T: Not really ☹*
9. *9:39p.m. …:Reem: Ita like hopes, right?   (simpler vocabulary/simplification)*
10.   *9:41 p.m. …Esraa: For example I hope to be a doctor so my tests grades will affect my future plan.   (giving example/ elaboration)*
11. *9:41 p.m. …Reem: And Expectations?   (simpler syntax/simplification)*
12. *9:41 p.m. …Afnan: Good expectations   (stress/ elaboration)*
13. *9:41 p.m. …Afnan: You mean what factors affect our expectations about life?*
    (simpler syntax/ simplification)
14. *9:41 p.m. …T: Right,*
15. *9.42 p.m. …T: So what factors might affect your expectations about life?*
16. *9.42 p.m. … Reem: What factors affect my hopes?   (simpler vocabulary/simplification)*
17. *9.42 p.m. …T:Yes*
18. *9.42 p.m. …T: Ok, so what factors affect your hopes?*
19. *9.43 p.m. …Reem: My degrees in Exams   (giving example/elaboration)*
20. *9.43 p.m. …T: Do you think money would be one factor?*
21. *9.43 p.m. …Afnan: May be health, when I see people older than me and I imagine myself in her place,*
22. *9.43 p.m. …T: So do you think health is one of the factors, Afnan?*
23. *9.44 p.m. …Afnan: Yes*
24. *9.44 p.m. …T: So I am asking about factors that influencing the quality of your lives (simplify input)*
25. *9.44 p.m. …Esraa: Yes, I got it*

26. *9.44 p.m. …T: Ok, give me examples*

27. *9.44 p.m. …Afnan: Health*   (elaboration)

28. *9.45 p.m. …Esraa: Education*   (elaboration)

29. *9.45 p.m. …Noura: money*   (elaboration)

30. *9.45 p.m. …T: Yes, health, education, money, obesity, and more. All of these factors can affect your lives expectancies.*

J.1.2   Source: (LOTM2).

1. *8:21 p.m. …T: Do we need complementary pills in our diet?*

2. *8:21 p.m. …Fatima: yes*

3. *8:21 p.m. …Jewell: Yah*

4. *8:21 p.m. …Bushra: I think yeah*

5. *8:22 p.m. …T: why?*

6. *8:22 p.m. …Bushra: Because we don't eat enough food*   (explanation/elaboration)

7. *8:22 p.m. …Jewell: you don't eat enough?!*   ☹

8. *8:22 p.m. …Bushra: No I mean vitamins*   (simpler vocabulary/simplification)

9. *8:23 p.m. …Fatima: we eat lots of junk food, high in fat, low in vitamins*   (explanation/ elaboration)

10. *8:23 p.m.… Jewell: I see*

11. *8:23 p.m. …Dareen: No we don't we can eat enough healthy food so we don't need complementary pills* (elaboration)

12. *8:23 p.m. … Ebtihal: We can take vitamins from natural resources*   (explanation/elaboration)

13. *8:23 p.m. …Ebtihal: Like vitamin D from the sun*   (giving example/simplification)

14. *8:24 p.m. …Jewell: I think some people need to take it*   (explanation/elaboration)

15. *8:25 p.m.…T: I agree with you all. If you have a balanced diet you may not need complementary pills, yet if you eat less healthy food you may need them.*

16. *8:25 p.m. …Ebtihal: Taking TOO MUCH vitamens can make you at risk* (explanation/ elaboration)

17. *8:25p.m. …Bushra: Ibtihal you can ask the doctor first.*   (elaboration)

J.1.3   Source: (LOTM!)

1. *7:50 p.m. …T: What does being a positive person imply?*

2. *7:50 p.m. …Raghad: Living with a positive thinking all the time*   (explanation/elaboration)

3. *7:51 p.m. …Reem: Look for the good things in the bad*   (simpler vocabulary/simplification)

4. *7:51 p.m. …Raghad: And don't give up*   (simpler vocabulary/simplification)

5. *7:51 p.m. …Wejdan: You will be always optimistic and never be defeated in worst*

   circumstances (explanation/elaboration)

6. *7:51 p.m. … T: So what does imply mean?*

7. *7:52 p.m. … Reem: may be suggest* (simpler vocabulary/simplification)

8. *7:52 p.m. … T: On the contrary, how does negative person look like?*

9. *7:52 p.m. … Reem: always sad* (elaboration)

10. *7:52 p.m. … Afnan: Thinking negatively* (elaboration)

11. *7:52 p.m. … Raghad: Depressed* (elaboration)

12. *7:52 p.m. … Wejdn: Disappointed* (elaboration)

13. *7:53 p.m. … Mashael: Complain a lot* (elaboration)

14. *7:53 p.m. … T: I gree, good analysis*

J.1.4   Source: (LOTM1)

1. *8:03 p.m. … T: Do you know the word "undermine"?*

2. *8:03 p.m. … Khloud: yes, to weaken* (simplify input)

3. *8:03 p.m…. Khloud: or damage* (simplify input)

4. *8:05 p.m. … T: Well, What happens when someone keeps undermining your effort?*

5. *8:07 p.m…. Reem: Feel sad* (elaboration)

6. *8:038p.m….Khloud: feel anger* (elaboration)

7. *8:08 p.m…. Reem: Yeah and maybe stop doing what I was doing…* (elaboration)

8. *8:09 p.m…. Khloud: or make more effort* (elaboration)

9. *8:09 p.m. …Noura: Depression* (elaboration)

10. *8:09 p.m. …T: I like what khloud has just said. You may play it smart and work even harder*

    to show that you can do it.

11. *8:10 p.m. … Khloud: yeah be positive and never give up👍* (elaboration)

12. *8:10 p.m. … Afnan: Sure*

J.1.5   Source: LOTM1

1. *8:21 p.m. … T: Why do you think centenarians achieve this age?*

2. *8:23 p.m. … Noura: Luck and nutrition* (elaboration)

3. *8:23 p.m. …Reem: Good health* (elaboration)

4. *8:24 p.m. … Khloud: Destiny* (elaboration)

5. *8:24 p.m. … Afnan: Genes* (elaboration)

6. *8:26 p.m. … Waad: it could be all these together* (elaboration)

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7. *8:27 p.m. …T: I agee with you Waad. It's a combination of factors like genes, health, nutrition,
life style, habits, and destiny*

J.2 Code: Clarification request

Sub-codes: questioning, express difficulty, confirm understanding

J.2.1 Source: (LOTM1)

17. *7:58 p.m. …Reem: You will lose underpayment unless the property remains intact*
18. *7:58 p.m. … Noura: Can you explain this sentence?*   *(clarification request /question)*
19. *7:58 p.m. … Noura: What is underpayment?*   *(clarification /question)*
20. *7: 59 p.m. … Khloud: like deposit*
21. *7: 59 p.m. … Reem: Money you pay to hold something*
22. *7:59 p.m. … Reem: If the property was damaged you'll lose the underpayment.*
23. *7: 59 p.m. … Noura: What do you mean by property?*   *(clarification request/ question)*
24. *8:00 p.m. … Khloud: Things you have*
25. *8:00 p.m. … Afnan: Thing you own*
26. *8:00 p.m. … T: Aparment means عقار*
27. *8:00 p.m. …T: Apartment or villa, a unit you want to buy or rent.*
28. *8:01p.m. …Reem: So if there is a damage in the apartment for example you will lose the deposit
you paid at the beginning*
29. *8: 01 p.m. … T: So are you familiar with intact then?*
30. *8:01 p.m. … Afnan: yeah*
31. *8:02 p.m. … Noura: Undamaged*

J.2.2 Source: (LOTM1)

19. *7: 40 p.m. …T: What are some of your qualities that make you a distinctive person?*
20. *7: 40 p.m. … Sara: I can't understand this question*   (express difficulty)
21. *7:40 p.m. … Sara: Two difficult words*   (express difficulty)
22. *7:41 p.m. … Reem: I think distinctive is close to distinguish?*   (clarification request)
23. *7:41 p.m. … Wejdan: Yes, distinctive adj, distinguish v?*
24. *7:41 p.m. … T: You are right Wejdan*
25. *7:41pm …. Sara: So you are asking about …*   (express difficulty)
26. *7:43 p.m. …T: Hellooooo*
27. *7:44 pm. … T: Can anyone explain my question?*
28. *7:45 p.m. …Reem: May be what characteristic makes me different from others*
29. *7:45 p.m. … Wejdan; What is special about me*
30. *7:45 p.m. … Sara: Fine got it*   (confirm understanding)

31. *7:45 p.m. …Reem: Being who you are*

32. *7:46 p.m. … Khloud: See the positive side of unpleasant situation*

33. *7:46 p.m. … Afnan: My voice😄*

34. *7:47 p.m. … Sara: Eating alot 😊(elaboration)*

35. *7:47p.m. … Afnan: 😊*

36. *7:47p.m. …Khloud: 😊*

J.2.3   Source: LOTM1

1. *7:51 p.m. …T: Or, they are distributed away from the center*

2. *7:51 p.m. …Bashayer: yes   (confirming understanding)*

3. *7:51 p.m. …T: This is decentralization*

4. *7:51 p.m. …T: Got it?*

5. *7: 51 p.m. Bashayer: Yes   (confirming understanding)*

6. *7:51 p.m. …Afnan: Yup   (confirming understanding)*

7. *7:52 p.m. …T: Good 👍*

8. *7:52 p.m. …Khloud: Yes   (confirming understanding)*

9. *7:52 p.m. …Reem: Yes   (confirming understand)*

J.2.4   Source: LOTM1

Reem, Halima, Bashayer confirmed their understanding for their teacher when discussing the word *restriction*.

T: Are you fine with (restriction) now?

Reem: 👍   (confirm understanding)

Halima: 👍   (confirm understanding)

Bashayer: Yep   (confirm understanding)

J.2.5   Source: LOTM2

1. *3:43 p.m. … T: What do you think longevity bills are for?*

2. *3: 43 p.m. …Walaa: For health may be*

3. *3:43 p.m.… Halima: To maintain healthy in order to live longer*

4. *3: 44 p.m.… Walaa: May be vitamins and minerals*

5. *3:44 p.m. …Sara: I see   (confirm understanding)*

6. *3:44 p.m … T: How do you pronounce the word longevity?*

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7. *3:45 p.m … Halima*: Recording / lɒnˈgevəti/

8. *3:45 p.m … Walaa*: Recording /lɒnˈdʒevəti/

9. *3:45 p.m …T: Yes Walla. Would you resay it Halima*

10. *3:46 p.m …Halima: Recording* /lɒnˈdʒevəti/   (confirm understanding)

11. *3:46 p.m … T:* 👍

J.2.6   Source (LOTM1)

1. *7:36 p.m. …T: Does It (meticulously) have positive or negative connotation?*

2. *7:38 p.m. …Afnan: Positive*

3. *7: 38 p.m. …Sara: I don't know*

4. *7:39 p.m. …Wallo: I think it depends*

5. *7:39 p.m. …Afnan: I don't understand*   (clarification request)

6. *7:40 p.m. …Wallo: We can use it in both of them*

7. *7:40 p.m. …Afnan: I think its good to be careful and pay attention to details*

8. *7:42 p.m. …Wallo: No I meant we can use it in positive n negative*

9. *7:42 p.m. …Dew: I agree*

10. *7:44 p.m. …Dew: when a teacher corrects the exam meticulously students lose a lot of marks* 😂

J.2.7   Source: (LOTM2)

1. *8:21 p.m. …T: Do we need complementary pills in our diet?*

2. *8:21 p.m. …Fatima: yes*

3. *8:21 p.m. …Jewell: Yah*

4. *8:21 p.m. …Bushra: I think yeah*

5. *8:22 p.m. …T: why?*

6. *8:22 p.m. … Bushra: Because we don't eat enough food*

7. *8:22 p.m. …Jewell: you don't eat enough?!* ☺   (clarification request)

8. *8:22 p.m. …Bushra: No I mean enough vitamins*

9. *8:23 p.m. …Fatima: we eat lots of junk food,*

10. *8: 23 p.m. …Fatima: high in fat*

11. *8: 23 p.m. Fatima : low in vitamins*

12. *8:23 p.m. …Jewell: I see*

J.2.8   Source: LOTM1

1. *7:36 p.m. … T: Does the word meticulous have positive or negative connotation?*

2. *7:36 p.m. …Afnan: positive*

3. *7:36 p.m. …Sara: I don't know*

4. *7:36 p.m. … Walaa: Negative*

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5. *7:36 p.m. …Dareen1: it depends*

6. *7:37 p.m. …Sara: what do you mean Dareen?*   *(clarification request)*

7. *7:37 p.m. … Walla: she means we can use it in both ways*

8. *7:37 p.m. … Afnan: I think it is good to be careful and pay attention to details*✋

9. *7:37 p.m. … Walaa: No I meant we can use it in positive and negative*

10. *7:38 p.m. … Waad1: I agree. I think it is negative when a teacher corrects the exam meticulously students loose a lot of marks.*

11. *7:38 p.m. … Sara: I got it, for example a doctor needs meticulous care when doing a surgery (positive)*

12. *7:39 p.m. … T: I like all of your examples. It shows that connotation of meticulous depends on context.*

J.2.9   Source: LOTM2

1. *7:25 p.m. …T: Well, would you put it (decentralized) in a full sentence please?*

2. *7:29 p.m. …T: Hello* 😄

3. *7:29 p.m. …Wejdan: I am thinking*   (express difficulty)

4. *7:29 p.m. …T: Waiting for you*

5. *7:33 p.m.…Wejdan: I found this*👆

6. 7:33 p.m.…Reem: Cant find any   *(express difficulty)*

7. *7: 33 p.m. …Wejdan: She caught me decentralized and without justification….but I could not understand it ! (express difficulty)*

8. *7:34 p.m. …Khloud: The minister decided to decentralize the transport industry*

9. *7:34 p.m. …Wejdan: but I couldn't put it in a sentence by myself actually*   (express difficulty)

10. *7:34 p.m. …Khloud: me too*   (express difficulty)

11. *7:34 p.m. …Khloud: it is not easy word*   (express difficulty)

12. *7:34 p.m. … Khloud: *an*

13. *7:35 p.m. …Reem: Yeah it is not clear*   (express difficulty)

14. *7:35 p.m.…Bashayer; Hard one*   (express difficulty)

15. *7:35p.m. …T: Well, let's divide the word into parts.*

J.2.10   Source: LOTM1

1. *7: 40 p.m. …T: What are some of your qualities that makes you a distinctive person?*

2. *7: 40 p.m. … Sara: I can't understand this question*   (express difficulty)

3. *7:40 p.m. … Sara: Two difficult words*   (express difficulty)

4. *7:41 p.m. … Reem: I think distinctive is close to distinguish*

5. *7:41 p.m. … Wejdan: Yes, distinctive adj, distinguish v?*

6. *7:41 p.m. … T: You are right Wejdan*

7. *7:41pm …. Sara: So you are asking about …*   (express difficulty)

8. *7:43 p.m. …T: Hellooooo*

J.3   **Code(Feedback)**

Subcodes: aske for feedback- give feedback- self-correction

J.3.1   **Source: LOTM1**

1. *8:14 p.m. … T: Who is a centenarian?*

2. *8:14 p.m. … Noura: 100 years old person????*   (request feedback)

3. *8:14 p.m. …Afnan: or even more?*   (request feedback)

4. *8:14 p.m. …Reem: Yeah, a very very old person*   (give feedback)

5. *8:17 p.m. …Khloud: is it close to century?*   (request feedback)

6. *8:17 p.m. …Noura: I think yes century is 100 years* (give feedback)

J.3.2   **Source: LOTM1**

1. *T: Would you put it (compliment) in a sentence?*

2. *Reem: My friend always compliment my work*

3. *Reem:^ compliments*   (self-correction)

4. *T: good*

J.3.1   **Source: LOTM1**

1. *8:40 p.m. …Kholoud: The emergent of diseases is the result of unhealthy life style.*

2. *8:40 p.m. …Kholoud: ??*

3. *8:42 p.m. …Afnan: May be …The emergence of diseases…..*

4. *8: 42 p.m. ..Kholoud: or Emergent diseases are due to unhealthy life style*   (self-correction)

J.3.2   **Source: LOTM1**

A number of interlocutors showed burden when confronted to the term *decentralized*.

This required them to pay more cognitive effort to internalize it.

1. *7:25 p.m. …T: Well, would you put it (decentralized) in a full sentence please?*

2. *7:29 p.m. …T: Hello* 😄

3. *7:29 p.m. …Wejdan: I am thinking*   (express difficulty)

4. *7:29 p.m. …T: Waiting for you*

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5. *7:33 p.m....Wejdan: I found this* 👆

6. 7:33 p.m....Reem: Cant find any   (express difficulty)

7. *7: 33 p.m. …Wejdan: She caught me decentralized and without justification....but I could not understand it!*   (express difficulty)

J.3.3   Source: LOTM1

1. *8: 16 p.m. …T: Can you put collaboration in a sentence?*

2. *8:16 p.m. ...Bushra: The collaboration between the members of the team was amazing.*

3. *8: 17 p.m. … Bushra:* 👀   (feedback request)

4. *8:17p.m. … T: good sentence Bushra*

5. *8:17 p.m. … T: More sentences pl.*

6. *8: 17 p.m.… Khadijah:* 👍*Bushra*   (give feedback)

7. *8:17 p.m. …Bushra:* ☺

Appendix K   **Full chat sessions**

K.1   **Chat Session 2,**

[8:31 AM …T: Good morning every body

[8:31 AM, …Esraa: Good morning ✿

[8:33 AM, …T: Today we'll go over five words:

Irresistible

Excluded

Unintelligible

Definitive

Complementary

[8:35 AM, …T: Please try to look for their meaning, derivatives, and use before we meet at 7:00 p.m. 🌷

[8:36 AM, …T: During the day I will send you reminders

[10:06 AM, …Afnan: Good morning😊❤

[10:07AM, …Afnan: Inshallah we will do our best 👍

[11:05 AM, …T: Irresistible (adj)   ,

11:05AM, …T: Picture of a boy enjoying eating pasta

[11:07 AM, …Afnan: This dish has an irresistible taste

[11:08 AM,…Afnan: Right?😊

[1:00 PM, …T: Excluded

1:28 PM, …T: Women have been excluded from many scientific societies.

[1:30 PM, …T: What do you think excluded mean?

[4:00 PM, …T: Unintelligible: incomprehensible

[6:00 PM,…T: Definitive

[6:00 PM, ….T: We can say :

definitive answer

definitive evidence

definitive conclusion

[6:30 PM, …T: Let's talk about Complementary
[6:30…Pm,.. T: Complementary: Adj/something that completes the whole (set the theory)
[6:30PM,..T: Picture of a steak and sauce, with a caption "The sauce complements the steak"
[6:30 PM, …T: Can you tell the difference between complement and compliment?

[6:35 PM, …Wejdan: Yup

[6:35 PM,…Wejdan: The picture make it clear to understand

6:30PM,..T: Picture of a steak and sauce, with a caption "The sauce complements the steak"

[6:30 PM, …T: Can you recognize the difference between complement and compliment?

[6:35 PM, …Wejdan: Yup

[6:35 PM,…Wejdan: The picture make it clear to understand

[6:36 PM, …Reem: 👍

[6:48 PM, …T: Let's talk at in 20 mins

[7:02 PM, ….Dareen: Does "complement" and "complete" the same?

[7:04 PM,…Nadoo: Yes

7:05 PM, ..Reem: No. I think they are different

7:05PM,..Nada: ???

7:05 PM, ..Reem: ok give me a sec

7:08PM…Reem: complete /to finish

: complement/to make it whole

7:09 PM…Nada: can't understand the difference

7:10PM…Dareen: me too. Difficult one 😕

7:10PM,…Reem: Complete يخلص ,

Complement يكمل بعضه like steak and sauce

7:10 PM,.. Nada: thank you Reem, I got it

7:11PM,..Dareen: me too, thank you

7:11 PM,..T: Great explanation. Good job 👍

7:11 PM, …T: Are you ready to move on to another word?

[7:12 PM, …T: Good afternoon every body

[7:13 PM,…T: Are you ready for quick chat?

[7:13 PM, …Sara: Good afternoon

[7:13 PM,…Afnan: Yeah 👍

[7:14 PM,…Noura: Good afternoon 😊

[7:14 PM, …Sara: Yes

[7:14 PM, …Dareen: Yes

[7:14 PM, Noura: Yes

[7:14 PM, …T: Great

[7:14 PM, …T: which words we will talk about today?

 [7:15 PM,…Esraa: Yes

[7:15 PM…Afnan: Irresistible

[7:15 PM, Dareen: Complementary

[7:15 PM, …Afnan: Excluded

[7:15 PM, …Reem: Definitive

[7:15 PM, …Afnan: Unintelligible

[7:16 PM, …T: Yeh, let's start by irresistible

[7:16 PM,…T: Do you know what does it mean?

 [7:16 PM, ….Dina: Attractive

[7:17 PM, …Afnan: So good

[7:17 PM, …Wed: Can't stop about it

[7:17 PM,…Dina: Or tempting

[7:17 PM, …667: 😊

[7:17 PM, …Sara: impossible to oppose

[7:17 PM, …Afnan: Something cannot resist it

[7:17 PM, …Reem: Cant stop looking at it

[7:18 PM, …T: Right, it's so good that you cannot stop yourself from thinking about it or having it

[7:19 PM, …T: The word irresistible divided into part could you do that?

[7:20 PM, …332: Ir and resistible

[7:21 PM, …667: Irre sistible

[7:21 PM, …Afnan: Ir resist ible

[7:21 PM,…Dareen: Ir-resisti-ble

[7:21 PM, ..Sara: + afnan

[7:21 PM, …Reem: Ir-resist-ible

[7:22 PM, …T: What does the prefix (ir) mean?

[7:23 PM, …Drareen: Not

[7:23 PM, …Reem: Cant

[7:23 PM, …Dina: Not

[7:23 PM, …T: Yes

[7:23 PM, …Esraa: Un

[7:23 PM, …T: What does the suffix tell you?

[7:24 PM,…T: -ble

[7:24 PM,…332: That it's an adj

[7:24 PM, …Dareen: Adjective ?

[7:24 PM, …T: 👍

[7:24 PM, …Esraa: Yeea

[7:25 PM, …T: Would you use it in a sentence?

[7:25 PM,…Sara: Yes pkease

[7:25 PM, …Noura: That cake is irresistible

[7:25 PM, …T: Yummy

[7:25 PM, …Esrraa: The smell of this dinner is irresistible

[7:25 PM, …Dina My mother make the most irresistible pasta.

[7:26 PM, …Wed The food in Shizan restaurant was irresistible

[7:26 PM,..T: I like Indian food too

[7:26 PM, …Reem: Your eyes are irresistible   😊

[7:26 PM, ….T: Naughty

[7:26 PM,…Noura: 😊😊

[7:26 PM, ….Esraa: 😊

[7:26 PM, …Reem: 😊

[7:27 PM, …T: My mother makes the most irresistible pasta.

[7:27 PM, …T: Great let's talk about excluded

[7:27 PM, …T: What does it mean?

[7:28 PM, Esraa: Away of a rule

[7:28 PM,…Reem: Something off the table

[7:28 PM, …667: Out the list

[7:28 PM, …Afnan: Leave out

[7:28 PM, …T: You are close

[7:28 PM, … 1332: Eliminate?

[7:29 PM, …T: yeeeh

[7:29 PM, …T: or to prevent from being included, to keep out,

[7:30 PM, …T: So what is the opposite then?

[7:30 PM,…Noura: Included

[7:30 PM,…Wed: Including

[7:30 PM,…Afnan: Included

[7:30 PM, ..T: Yessss 👍

[7:30 PM, ….T: What is the verb?

[7:31 PM, …Afnan: Exclude

[7:31 PM, …Dareen: Exclude

[7:31 PM,…Noura: Exclude

[7:31 PM, …Reem: Exclude

[7:32 PM,…T: Which food should be excluded from your diet if you want to lose weight?

[7:32 PM, …Reem: Fast food

[7:32 PM, …Dareen: Chocolate

[7:32 PM,…Esraa: Fast food

[7:32 PM, …Noura: Burger

[7:32 PM, …Dina: Carbs

[7:32 PM, …Esraa: Ice cream

[7:32 PM, …Afnan: Chips

[7:32 PM, …Maram: Cake

[7:32 PM, …Reem: Cola

[7:32 PM,…Noura: Pepsi

[7:32 PM, …T: All delicious food🍰🍦🍜🍩🍟🍱🍢🍤

[7:33 PM, …Maram: 😂😂😂

[7:33 PM, …Noura: 😌💔💔

[7:33 PM, …Reem: Yeah

[7:33 PM, …Afnan: Yes😄

[7:33 PM,…Sara: 😂😂😂

[7:33 PM,…Maram: Sure

[7:33 PM, …: Yeah, pretty much

[7:33 PM, …Esraa: 😄💔

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[7:33 PM, …T: What foods should you include instead?

[7:33 PM, …Sara: Healthy food

[7:33 PM, … Dina: A lot of vegetables

[7:33 PM, …Dareen: Fruits

[7:33 PM, …Afnan: Water

[7:33 PM, …Reem: Salad

[7:33 PM, …Esraa: Vegetables and fruits

[7:33 PM,…Mram: Lemon

[7:34 PM, ….T: Actually you should eat NOTHING 🍎🍏🍊🍅🍋🍎🍉🍉

[7:35 PM, …Maram: 😂😂😂😥

[7:35 PM, Noura: 😂😂🖤

[7:35 PM, …T: 😂😂😂😂😂

[7:35 PM, ….Reem: 😂😂

[7:35 PM, Esraa: Indeed 😂

[7:36 PM, …T: What about definitive?

[7:36 PM, …Esraa: Last

[7:36 PM, …Afnan: Final

[7:36 PM, …Mram: Finally

[7:36 PM, …T: Not really

[7:36 PM, …Reem: Last thing

[7:37 PM, Dina: Final or ultimate

[7:37 PM, …Esraa: Final is closer

[7:37 PM, …Afnan: Not able to be argued about

[7:37 PM,…T: Yes

[7:37 PM, …Esraa: U won't change it

[7:38 PM, …T: Yes, confirmed and you cannot argue a bout

[7:39 PM, …T: Can you give me an Arabic word for it

[7:39 PM, …Esraa: نهائي

[7:39 PM, ….Sara: حاسم

[7:39 PM, …Maram: crucial

[7:40 PM, …T: نهائي. حاسم. محدد قاطع.

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[7:41 PM,…T: What does it collocate wih?

[7:42 PM, …T: What collocations come with definitive?

[7:42 PM,…Noura: Whad does collocations mean ☺?

[7:42PM,…Maram: New word

[7:42PM, …Sara:don't know

[7:43PM,…T: Words usually come with

7:43 PM,…Afnan: You mean worda come with definitive?

[7:43,…T: Yes

[7:43 PM, …Afnan: Definitive law

[7:43 PM, …Dareen: Definitive answer

[7:44 PM, …Reem: Definitive decision

[7:44 PM, …Noura: Defnitive choice

[7:44 PM, …T: Yes

[7:45 PM, …T: Would you put it in a sentence?

[7:46 PM, …Maram: I take definitive decision

7:46 PM…Maram: ^took

[7:46 PM, …Afnan: My dad said I cannot go to the mall today and that his definitive answer

[7:46 PM, …Reem: Stop arguing its definitive

[7:47 PM, …T: Like your sentences

[7:47 PM, …T: 👍👍👍👍👍

[[7:48 PM, …T: Finally let's talk about complementary and complimentary. Can you tell the difference?

[7:49 PM, …T: Is it confusing?

[7:49 PM, …Noura: Complementary is something complete something else

[7:50 PM, …Reem: Say something nice

[7:50 PM, …Reem: Oh it is ^complimentary

[7:50 PM, …T: Exactly

[7:50 PM, …Afnan: Complimentary is to say good things about someone

[7:50 PM, …Afnan: Or praise

[7:51 PM, …T: Right

[7:51 PM, …T: Would you put it in a sentence?

[7:52 PM,… Reem: My friend always compliment my work

[7:52 PM, …Afnan: Compliment?

[7:52 PM,… Reem: Compliments

[7:52 PM,…T: Good

[7:53 PM, …Maram: I and my friend are complementary for us

[7:53 PM, ….Maram: ?

[7:54 PM, …Afnan: I think there is something wrong

[7:54PM.. Maram: Ok, let me try fix it

{7:54 PM,…Maram: Don't know

[7:55PM,…Afnan: My friend and I complement each other. Is it what you mean Maram

[7:55 PM,…Maram: Yes, thank you

[7:55PM, …Afnan: Its ok, We all make mistake

[7:55 PM, …T: 👍

[7:55 PM, …Afnan: The wall paper is a perfect complement to the room decoration

[7:58 PM, …T: Nice sentence   👍

[8:01 PM, …T: Ladies, I enjoyed having this conversation with you ladies, talk to you soon with new group of words 💐

[8:01 PM, …Esraa: Me too

[8:01 PM,…Reem: Thank you 🖤

[8:01 PM,…Esraa: Thank you 🖤

[8:01 PM, …Afnan: Me too

[8:01 PM, …Maram: Thank you 🌸🌸

[8:01 PM, …Noura: Thank u

K.2   **Chat session 3,**

[7: 16 PM,…T: Hello girls

[7:16 PM, …T: How are you today?

[7:17 PM, ….Reem: Good 👍

[7:17PM, …Esraa: Fine

[7:17PM,…Noura: Fine , thank u

[7:18 PM, …Afnan: Fine

[7:18 PM, ….T: Alhamdulella🙏

[7:17 PM, ….Reem: yes 👍

[7:17PM, …Esraa: Fine

[7:17PM,…Noura: Ready

[7:18 PM, …Afnan: Sure

[7:21 PM,.…T: Well, let's start by reviewing some already taken words for warming up

[7:22 …T: Collaboration

[7:22 PM…Wejdan: Working as a group

[7:22 p.m…. Hanan: Participating

[7:22 PM…T: Great

[7:23 PM…T: What part of speech is collaboration ؟

[7:23 PM…T: Yes

[7:24 PM… Dina: It's a noun

[7:24 PM… Hanan: I think the words end with tion is noun

*[7:24 PM…Hanan: Are noun^*

[7:24 PM….T:: What suffix

[7:25 PM…Reem: Fix?

[7:25 PM, 4/3/2016] Ghada Batawi: tion

[7:26 …Dina: Suffix means word ending ?

T: Right

[7:26PM… Hanan: Yah we got it 😊

[7:26PM…..T: What is the verb

[7:27 PM, … Hanan: Suffix like the words end with less and ness

[7:28 PM,…Hanan: Is it true teacher ?

[7:28 PM,….T: Yes

[7:28 PM, …Wejdan: She means the end of the words for example some words ends with tion, ing …etc.

[7:28 PM, …T: What is the verb from collaboration?

[7:29…Reem: Thankyou wejdan

[7:29 PM,…Reem: Collaborate

[7:29 PM, …Dina: Collaborate

[7:29 PM, …Wejdan: Collaborate

[7:30 PM, …T: Look at the beginning of the word (co-), what does it mean?

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[7:31 PM, ….Wejdan: Joining ?

[7:31 PM, …T: Yes, together

[7:31 PM, ….T: So some parts of the word gives you the meaning of the word

[7:32 PM, …Hanan: Yah

[7:32 PM, …T: Can you put it in a sentence?

[7:33 PM, …Reem: Coworkers?

[7:34 PM,…T: Collaboration

[7:34 PM….Hanan: Students are collaborating in studying ☺

[7:34 PM, ….Hanan: Like this ^ ?

[7:35 PM, ….Esraa: I have been collaborating all the day with my partners to discuss vocabularies synonyms

[7:35 PM, Esraa: Is it right😀?

[7:35 PM, ….T: Excellent Esraa 👍

[7:37 PM,…..T: That's great, would you come up with another word to explore?

[7:37 PM,…Wejdan: It takes two people to collaborate in a marriage.

[7:37 PM,..Esraa: Wife and husband should collaborate in daily life for successful marriage.

[7:38 PM,…Esraa: maybe it is clearer this way

[7:38 PM, …Wejdan: Thank you for your effort

[7:38 PM, ….Hanan: Do u mean another word of collaborate

[7:39 PM, ….T: No, I mean another new word you need to learn

[7:39PM,…Reem: The words you gave us today was kinda new and hard

[7:39 PM,…T: Well, let's continue then

[7:40 PM, …T: What about nostalgic?

[7:40 PM, …T: What does it mean?

[7:41 PM, …Wejdan: Thinking about the past

[7:41 PM,…T: What part of speech is it?

[7:42 PM, …Hanan: Adj ?

[7:42 PM, …T: Yes, what suffix tells you this?

[7:45 PM, …T: What is a noun from nostalgic?

[7:45 PM, …Hanan: Homesickness ?

[7:46 PM, …Wejdan: No,,What about nostalgia?

[7:46 PM,….Afnan: I think, nostalgia /Noun

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[7:46 PM, …Afnan: 😊

[7:47 PM, ….T: Would you put it in a sentence?

[7:48 PM, … Wejdan: She has nostalgia for the past.

[7:49 PM, …Reem: Nostalgia the childhood

[7:49 PM, …Hanan: Students abroad always feel nostalgic for home

[7:49 PM, …Hanan: 😊

[7:50 PM, …T: 👍 👍 👍

[7:51 PM, …Esraa: I was feeling nostalgic for my single life till my husband changed his attitude with me

[7:51 PM, …Esraa: ^ that's hypothetical 😊

[7:52 PM, T: 😂😂😂😂😂

[7:52 PM, …Hanan: Teacher we find difficult to find word derivatives we do not know how to find it if we don't see it in dictionary 😞 *this is maybe our major problem*

[7:52 PM, …T: Nice sentence Esraa

[7:54 PM, …T: You need to make guesses Hanan using your background of some vocabulary strategies like words parts or words parts of speech. You can also search for it or consult a dictionary, a friend, a relative or a teacher. This group is a good chance for us to practice this ☺

[7:55 PM, …Hanan: Ok i will and try inshallah

[7:55 PM, …Esraa: Lucky & grateful ❤

[7:56 PM, …Afnan: I feel nostalgic for my previous house.

[7:56 PM, …T: Any way, I find our chat was enjoyable. I wish you liked it too. Talk to you after tomorrow at the same time.

[7:56 PM, …Ti: Bye 🌷 🌷 🌷 🌷 🌷 🌷
[7:56 PM,…Afnan: Thank you ✿

[7:56 PM, …Reem: Thanks, bye 🧡

[7:56 PM, ….Hanan: Thank you ❤

[7:56 PM, …Esraa: Thank you

[7:57 PM, …Wejdan: Inshallah we had fun too , bye 💕

[8:02 PM, 4/4/2016] +966 56 691 4097: Thank you 🎀😊😊😊

[8:02 PM, 4/4/2016] +966 56 691 4097: ** ❤❤❤   لمMessageAdd to a group

Bashayer Al-ghamdi.MessageAdd to a group

[9:08 AM, 4/5/2016] Ghada Batawi: Good morning everybody⬜

[9:10 AM, 4/5/2016] +966 56 691 4097: Good morning ❤

[9:11 AM, 4/5/2016] Eman : Morning everyone

[9:12 AM, 4/5/2016] Eman : Now all 5 students who just gave me their # are added

[9:16 AM, 4/5/2016] Ghada Batawi: Here are the words for today. Please search for their meaning and usage until we meet today evening.

During the day I will send you mini lesson as a reminder.

Cryptic

Perpetual

Contemporary

Integral

Contrary

Thanks 👍

[11:15 AM, 4/5/2016] +966 53 199 9260: 🙇

[11:16 AM, 4/5/2016] Ghada Batawi: Cryptic (adj)

[11:24 AM, 4/5/2016] +966 56 691 4097: Cryptic = pregnant?

[11:25 AM, 4/5/2016] Ghada Batawi: Oh! Not really

You may need to do more search Noura☺

[11:28 AM, 4/5/2016] +966 56 939 3570: I think it means hidden

[12:05 PM, 4/5/2016] +966 53 486 0078: Thank you Sara

[12:06 PM, 4/5/2016] +966 56 939 3570: No need💓

[2:21 PM, 4/5/2016] Ghada Batawi: Perpetual (adj)

Everlasting

Never-ending

[6:15 PM, 4/5/2016] Ghada Batawi: Con.tem.po.rar.y

[7:00 PM, 4/5/2016] Ghada Batawi: Integral: basic, fundamental

[7:06 PM, 4/5/2016] Ghada Batawi: Good evening everybody,

Do you mind talking a bit?!

[7:07 PM, 4/5/2016] +966 56 756 5667: Good evening, no dear ✿

[7:07 PM, 4/5/2016] +966 55 665 5732: Good evening◻ 🖤

[7:08 PM, 4/5/2016] +966 50 414 9824: Good evening ✿

[7:10 PM, 4/5/2016] Ghada Batawi: Would you remind me of the words for the day?

[7:10 PM, 4/5/2016] +966 56 756 5667: Contemporary

[7:10 PM, 4/5/2016] +966 55 665 5732: Cryptic

[7:10 PM, 4/5/2016] +966 55 665 5732: Integral

[7:11 PM, 4/5/2016] +966 55 665 5732: Contrary

[7:11 PM, 4/5/2016] +966 50 414 9824: Cryptic

Perpetual

Contemporary

Integral

Contrary

[7:11 PM, 4/5/2016] Ghada Batawi: Yes

[7:11 PM, 4/5/2016] Ghada Batawi: Which one would you like to start with?

[7:12 PM, 4/5/2016] +966 56 756 5667: Cryptic

[7:13 PM, 4/5/2016] Ghada Batawi: Well, let's talk about the picture I sent you earlier,

What is cryptic in the lady?

[7:13 PM, 4/5/2016] +966 56 756 5667: Baby

[7:13 PM, 4/5/2016] +966 50 414 9824: The baby

[7:13 PM, 4/5/2016] +966 58 096 6420: Her baby

[7:14 PM, 4/5/2016] Ghada Batawi: Yep, so cryptic mainly means.....

[7:14 PM, 4/5/2016] +966 53 150 1332: Hidden

[7:14 PM, 4/5/2016] +966 50 414 9824: Hidden

[7:14 PM, 4/5/2016] +966 58 096 6420: Something you cannot see

[7:14 PM, 4/5/2016] +966 58 096 6420: Yeah hidden

[7:14 PM, 4/5/2016] +966 50 414 9824: Mysterious

[7:15 PM, 4/5/2016] Ghada Batawi: The prefix crypt means ......

[7:15 PM, 4/5/2016] +966 58 096 6420: خفي

[7:16 PM, 4/5/2016] Ghada Batawi: And the suffix ic tells you that the word is ....

[7:16 PM, 4/5/2016] +966 55 665 5732: Adj

[7:16 PM, 4/5/2016] +966 50 414 9824: Adj

[7:16 PM, 4/5/2016] Ghada Batawi: Great 👍

[7:17 PM, 4/5/2016] Ghada Batawi: Would you put cryptic in a sentence?

[7:18 PM, 4/5/2016] +966 55 665 5732: System files are usually cryptic

[7:19 PM, 4/5/2016] +966 55 665 5732: In any operating system

[7:19 PM, 4/5/2016] +966 50 414 9824: The players use cryptic singles with each other.

[7:19 PM, 4/5/2016] Ghada Batawi: Do you mean signals?

[7:20 PM, 4/5/2016] +966 50 414 9824: Yes, sorry

[7:20 PM, 4/5/2016] Ghada Batawi: 👍 👍 👍

[7:21 PM, 4/5/2016] Ghada Batawi: Since cryptic is an adj , can you transform it adv?

[7:21 PM, 4/5/2016] +966 56 756 5667: Crypticly

[7:22 PM, 4/5/2016] +966 55 665 5732: Cryptically

[7:22 PM, 4/5/2016] +966 50 414 9824: Cryptically

[7:23 PM, 4/5/2016] Ghada Batawi: Does the pregnant woman suffer from perpetual pain?

[7:24 PM, 4/5/2016] +966 55 665 5732: No I don't think so

[7:24 PM, 4/5/2016] +966 56 442 9876: Yes

[7:24 PM, 4/5/2016] +966 53 150 1332: No

[7:24 PM, 4/5/2016] Ghada Batawi: So what is the opposite of perpetual then ?

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[7:24 PM, 4/5/2016] +966 53 150 1332: It's a temporary

[7:24 PM, 4/5/2016] Ghada Batawi: 👍👍👍👍👍👍

[7:25 PM, 4/5/2016] Ghada Batawi: Can you pronounce perpetual?

[7:25 PM, 4/5/2016] Ghada Batawi: Record your voice please

[7:27 PM, 4/5/2016] Ghada Batawi: Perfect Afnan

[7:29 PM, 4/5/2016] Ghada Batawi: Would you use it in a sentence please

[7:32 PM, 4/5/2016] +966 50 414 9824: Perpetual love is not exist.

[7:32 PM, 4/5/2016] Ghada Batawi: Doesn't exist you mean?

[7:33 PM, 4/5/2016] +966 50 414 9824: Yes

[7:33 PM, 4/5/2016] Ghada Batawi: So pessimistic 😳

[7:34 PM, 4/5/2016] +966 50 414 9824: No, it is just a sentence.😁

[7:34 PM, 4/5/2016] Ghada Batawi: Ok, good

[7:36 PM, 4/5/2016] Ghada Batawi: But, what is integral with unsuccessful relationships?

[7:36 PM, 4/5/2016] +966 58 096 6420: Faithfulness ؟

[7:37 PM, 4/5/2016] +966 58 096 6420: I did not understand the question clearly

[7:39 PM, 4/5/2016] Ghada Batawi: I mean when somebody had an unsuccessful experience, what do you think he or she must feel?

[7:39 PM, 4/5/2016] Ghada Batawi: I mean marriage or so

[7:40 PM, 4/5/2016] +966 56 756 5667: Sad

[7:40 PM, 4/5/2016] +966 50 414 9824: Depressed ?

[7:40 PM, 4/5/2016] +966 58 096 6420: Depressed

[7:41 PM, 4/5/2016] +966 58 096 6420: Uncomfortable

[7:41 PM, 4/5/2016] Ghada Batawi: Yes, broken heart, pain, depression

[7:42 PM, 4/5/2016] Ghada Batawi: These feelings are integral in any broken relashionship

[7:42 PM, 4/5/2016] Ghada Batawi: Do you get what integral mean?

[7:43 PM, 4/5/2016] +966 55 665 5732: Yeah

[7:43 PM, 4/5/2016] +966 55 665 5732: Very important

[7:43 PM, 4/5/2016] +966 55 665 5732: Very important for something to be completed

[7:44 PM, 4/5/2016] +966 55 665 5732: Main part of something

[7:45 PM, 4/5/2016] +966 50 414 9824: Basic

[7:45 PM, 4/5/2016] Ghada Batawi: Essential, basic, fundamental

[7:46 PM, 4/5/2016] +966 58 096 6420: Relating ,belong ?

[7:46 PM, 4/5/2016] Ghada Batawi: Can you give me an Arabic word?

[7:46 PM, 4/5/2016] +966 58 096 6420: رئيسي

[7:47 PM, 4/5/2016] +966 50 414 9824: أساسي

[7:47 PM, 4/5/2016] +966 58 096 6420: جوهري

[7:47 PM, 4/5/2016] Ghada Batawi: Exactly 👍

[7:47 PM, 4/5/2016] +966 55 665 5732: Con I say" the bed is an integral part of a bedroom" ?

[7:47 PM, 4/5/2016] +966 55 665 5732: Can*

[7:47 PM, 4/5/2016] Ghada Batawi: Yes

[7:48 PM, 4/5/2016] Ghada Batawi: What about contemporary?

[7:48 PM, 4/5/2016] +966 55 665 5732: Happening at the same period

[7:49 PM, 4/5/2016] Ghada Batawi: Which type of songs do you prefer? Old or new?

[7:49 PM, 4/5/2016] +966 58 096 6420: Of about in the same age or date

[7:49 PM, 4/5/2016] +966 58 096 6420: New

[7:49 PM, 4/5/2016] +966 55 665 5732: New😁

[7:50 PM, 4/5/2016] Ghada Batawi: So you can say new songs, or modern songs are contemporary

[7:51 PM, 4/5/2016] Ghada Batawi: While old songs are classic

[7:51 PM, 4/5/2016] Ghada Batawi: So the opposite of contemporary is ....

[7:51 PM, 4/5/2016] +966 55 665 5732: Classic

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[7:52 PM, 4/5/2016] +966 58 096 6420: Old fashioned

[7:52 PM, 4/5/2016] +966 58 096 6420: Past

[7:52 PM, 4/5/2016] Ghada Batawi: Yes this is actually one meaning of contemporary

[7:53 PM, 4/5/2016] Ghada Batawi: Another meaning could be what you have just said, would you repeat it?

[7:54 PM, 4/5/2016] +966 58 096 6420: Of about in the same age or date ?

[7:54 PM, 4/5/2016] +966 50 414 9824: Living or occurring at the same time

[7:55 PM, 4/5/2016] Ghada Batawi: Exactly

[7:55 PM, 4/5/2016] Ghada Batawi: Would you use it in a sentence?

[7:56 PM, 4/5/2016] +966 50 414 9824: Contemporary novels are easier to read than classic ones.

[7:57 PM, 4/5/2016] Ghada Batawi: Great, you got it. 👍

[7:57 PM, 4/5/2016] Ghada Batawi: What about the another meaning?

[7:58 PM, 4/5/2016] +966 55 665 5732: The actor Matthew Perry contemporary with Jennifer Aniston

[7:58 PM, 4/5/2016] +966 55 665 5732: Is*

[7:59 PM, 4/5/2016] Ghada Batawi: Yessss Afnan

Appendix L   **Target vocabulary**

L.1   **Target vocabulary by week**

Week 1: 12 target words /Unit 5: Working Together

Collaboration, Precisely, Simulation, Unpredictable, Complementary Complimentary, Coordinate, Consensus, Decentralized, Emergent, Vanish/disappear, Acceleration

Week 2: 17 words/ Unit 6: Language and Culture

Nostalgic, Irresistible, Irregular, Irreplaceable, Bite, Unintelligible, Definitive, Straightforward, On the contrary, Contemporaries, Consensus, Convene, Cryptic, Excluded, Integral, Perpetual, Monotonous,

Week 3: 18 words/ Unit 8:   Living Longer

 Protagonist, Expectation , Contradictory, Conversely, Implications, Restrictions, Construct, Reconstruct, Destructive, Distinctions, Intact, Outnumber, Ratio, Unification, Centenarian, Bleed, Captive, Enigmatic.

Week 4: 14 words/Unit 8:   Living Longer (cont.,)

Prodigiously, Breed, Impish, Undermine, Breath-taking, Chaos, Meticulously, Longevity, Definitive, Paradox, Interfere, Relevant, Manipulate, Defence

Week 5: 15 words/Unit 10   Imagining the Future

 Figure out/ figure, Dwindle, Flee, Literary, In proportion, Resemble, Destiny, Priority, Intrinsic/extrinsic, Include /exclude, Authorities, Resolve, Devout, Undermine, Unplugged

L.2 Classifying words according to their features (part of speech/ word parts/degree of concreteness

a) Part of speech

Noun	Verb	Adjectives	Adverb
Collaboration Simulation Decentralization Consensus Acceleration Contemporaries, Protagonist Expectation Implications Restrictions Intact Ratio Unification, Centenarian Chaos Longevity Breath-taking Paradox Defence Authorities Destiny Priority	Coordinate Emerge Vanish Disappear Construct, Reconstruct, Distinctions Outnumber Bleed, Breed, Undermine Interfere Dwindle, Flee, Resemble Include exclude Undermine Resolve	Unpredictable Complementary Complimentary Decentralized Nostalgic Irresistible Irregular Irreplaceable Definitive Unintelligible Unplugged Straightforward Perpetual, Monotonous, Integral, Contradictory Destructive Impish Definitive Captive Relevant Intrinsic Extrinsic Enigmatic Nostalgic Cryptic,	Presicely Conversely Prodigiously Meticulously

b) Affixes (Teachable words)

Prefix	Suffix
(Un-) Unpredictable Unintelligible Unplugged (De-) Decentralized	(-tion) Collaboration Simulation Acceleration Expectation Implication, Restriction Unification Decentralization

(Ir-)	(-ble)
Irresistible	Unpredictable
Irregular	Irresistible
Irresistible	Irreplaceable
Irreplaceable	Unintelligible
	(-al)
	Perpetual
	Integral
	(-ous)
	Monotonous
	(-ive)
	Definitive
	Destructive
	Captive
	(-ry)
	Contradictory
	Complementary
	Complimentary

C) Concrete/ abstract words

Words with a degree of concreteness (more learnable when negotiation combined with visual aids/pictures)	Abstract Words (need negotiation of meaning)
Collaboration Decentralization Restrictions Intact Ratio Irregular Outnumber Centenarian Chaos Longevity Unplugged- Monotonous breath-taking Authorities Simulation Contemporaries	Consensus –Acceleration – Protagonist -Expectation – Implications – Intact-Unification - Breath-taking – Paradox-Defence – Destiny – Priority – Coordinate-Emerge – Vanish – Disappear – Reconstruct Distinctions – Unpredictable Complimentary –Nostalgic - Irreplaceable -Definitive Unintelligible –Straightforward – Perpetual - Integral –Contradictory Destructive- Impish –Definitive-Captive Relevant-Intrinsic-Extrinsic Enigmatic-Nostalgic- Breed-Undermine-Interfere- Dwindle, Flee-Resemble-Include-exclude Undermine-Resolve Unpredictable Complimentary –Decentralized-Nostalgic Irregular-Irreplaceable-Definitive Unintelligible-Unplugged- Straightforward Perpetual –Monotonous-Integral-

	Contradictory-Destructive-Impish Definitive-Captive-Relevant-Intrinsic-Extrinsic-Enigmatic-Nostalgic - Precisely Conversely-Prodigiously

D) Classifying words according to their familiarity

Familiar	Non-familiar
Decentralization-Expectation-Chaos - Breath-taking – Disappear- Reconstruct - Bleed- Breed- Include - Unpredictable Irresistible- Irregular-Irreplaceable Unplugged-Straightforward – Destiny - unpredictable	Consensus -Acceleration – Protagonist - Implications – Intact-Unification – Paradox-Defence – Destiny – Priority – Coordinate-Emerge – Vanish – Distinctions – Complimentary –Nostalgic -Definitive-Unintelligible – Perpetual -Integral –Contradictory Destructive-Impish –Definitive-Captive Relevant-Intrinsic-Extrinsic Enigmatic-Nostalgic-Undermine-Interfere- Dwindle, Flee-Resemble-exclude Undermine-Resolve-Complimentary -Nostalgic -Definitive -Unintelligible-Perpetual –Monotonous-Integral-Contradictory-Destructive-Impish Definitive-Captive-Relevant--Enigmatic-Nostalgic - Precisely Conversely-Prodigiously- Collaboration Decentralization-Restrictions Intact -Ratio –Outnumber-Centenarian Longevity-Monotonous-Authorities Simulation-Contemporaries

Appendix M **Vocabulary lessons**

Participants were introduced to the procedure of the Lessons listed below before the commencement of the intervention. During Week 1, the teacher keeps reminding students how to respond to vocabulary lessons by being a role model (see 4.7.1.1)

Vocabulary messages in Week 1			Time
Working together			
Day 1	Message1	Collaboration The act of working together on a joint project.	9:00 a.m.
	Message 2	Disappear / Vanish	11:00 a.m.
	Message 3	Simulation Imitation of behaviours or processes	1:00 p.m.
	Message 4	Unpredictable (adi) Un predict able	4:00 p.m.
	Message 5	Precisely Accurately and exactly	6:00 p.m.
	Message 6	A picture of colleagues in a meeting working together or having a discussion	7: 00 p.m.
Day 2	Message 1	Coordinate (v) To coordinate with others is to work together efficiently.	9:00 a.m.
	Message 2	Dis – appear	11:00 a.m.
	Message 3	Unpredictable Not able to be known in advance	1:00 p.m.
	Message 4	Emergent Coming into existence	4:00 p.m.
	Message 5	Col –lab – o – ra – tion noun	6:00 p.m.
Day 3	Message 1	Complementary Describes things that go together well or that make something good even better	9:00 a.m.
	Message 2	De - centralized	11:00 a.m.
	Message 3	Simulation/ model	1:00 p.m.
	Message 4	Declare verb	4:00 p.m.
	Message 5	Simulation Imitation of behaviours or processes	6:00 p.m.
	Message 6	A picture showing the meaning of the word (complementary)—with a caption (Sauce complementing steak)	7:00 p.m.
Day 4	Message 1	Appear vs. Disappear	9:00 a.m.
	Message 2	Precisely (Adv)	11:00 a.m.
	Message 3	.What are some emergent technologies	1:00 p.m.

		today? How might they be useful?	
	Message 4	Insects can fly in and land precisely on a tiny surface, and then flap their wings to fly off with amazing speed.	4:00 p.m.
	Message 5	An image explaining the concept of decentralization	6:00 p.m.
Day 5	Message 1	Disappear/ Appear	9:00 a.m.
	Message 2	If people declare something, they formally announce it.	11:00 a.m.
	Message 3	Complementary things are different from each other, but they make a good combination.	1:00 p.m.
	Message 4	Collaborate (V) Collaboration among construction workers enables them to carry supplies to the top of a building site.	4:00 p.m.
	Message 5	A decentralized system is one in which power is is not in one place or individual, but spread out.	6:00 p.m.

	Vocabulary messages in Week 2 **Language and Culture**		Time
Day 1	Message1	Good morning everybody, Today we will discuss the following words: Nostalgic Irresistible Irregular Irreplaceable Unintelligible	9:00 a.m.
	Message 2	Nostalgic (adj) Emotional about the past	11:00 a.m.
	Message 3	Ir/resist/able Difficult to resist	1:00 p.m.
	Message 4	Unintelligible adj: impossible to understand Unintelligible= incomprehensible	4:00 p.m.
	Message 5	Irregular / (ir)regular	6:00 p.m.
Day 2	Message 1	Good morning ladies, Words of the day: implication contradictory Irreplaceable Definitive	9:00 a.m.
	Message 2	Implication: the conclusion that can be drawn from something although it is not explicitly stated	11:00 a.m.

		Implicat(tion) N	
	Message 3	Ir/replace/able (adj)	1:00 p.m.
	Message 4	This strawberry cake is irresistible.	4:00 p.m.
	Message 5	Definitive (adj) A conclusion reached with authority	6:00 p.m.
	Message 6	An image explaining the meaning of the word (irresistible) (A boy looking at a piece of cake)	7:00 p.m.
Day 3	Message 1	Good morning every body Today we will looks at the followings: cryptic Monotonous Perpetual Excluded Contemporary	9:00 a.m.
	Message 2	He remained nostalgic about the old good days	11:00 a.m.
	Message 3	What are some emergent technologies today?	1:00 p.m.
	Message 4	Image with a caption "I feel trapped in a cycle of monotonous activity and want something to give change to my life. What does monotonous mean?	4:00 p.m.
	Message 5	Exclude (v)	6:00 p.m.
	Message 6	An image explaining the meaning of the word Cryptic A pregnant lady- the embryo is cryptic	7:00 p.m.
Day 4	Message 1	Good morning every ladies Words of the day: Contemporary Enigmatic Captive Protagonist Reconstruct	9:00 a.m.
	Message 2	Monotonous adj/ boring/ dull/ uninteresting Nostalgic adj /homesick	11:00 a.m.
	Message 3	Contemporary: Living or occurring at the same time.	1:00 p.m.
	Message 4	Enigmatic: difficult to interpret or difficult to understand He took the money with an enigmatic smile.	4:00 p.m.
	Message 5	Perpetual love does not exist	6:00 p.m.
	Message 6	An image explaining the meaning of monotonous	7:00 p.m.
Day 5	Message 1	Good morning, Today we will learn these words: Protagonist Expectation Distinction Intact	9:00 a.m.

	Message 2	Women are excluded from any political events. What do you think excluded means?	11:00 a.m.
	Message 3	Protagonist n A leading character	1:00 p.m.
	Message 4	The novel's main protagonist is an American intelligence officer"	4:00 p.m.
	Message 5	A definitive decision	6:00 p.m.

Vocabulary messages in Week 3 Living Longer			Time
Day 1	Message1	Good morning ladies, Today we will learn these words: Conversely Gain insight into Distinction Intact Outnumbers Cryptic	9:00 a.m.
	Message 2	You say "conversely" to indicate that the situation you are about to describe is the opposite or reverse of the one you have just described.	11:00 a.m.
	Message 3	Cryptic/ hidden/ ambiguous	1:00 p.m.
	Message 4	If you gain insight into a complex situation or problem, you gain an accurate and deep understanding of it.	4:00 p.m.
	Message 5	If one group outnumbers another, the first group has more people or things in it.	6:00 p.m.
Day 2	Message 1	Good morning every one : Today's words are the followings: restrictions Cryptic Intact Outnumbers	9:00 a.m.
	Message 2	If you want to lose weight, you need to embrace some dietary restrictions. What do you think the word restrictions means?	11:00 a.m.
	Message 3	An image of a pregnant woman, referring to the embryo as cryptic	1:00 p.m.
	Message 4	.Something that is intact is complete and has not been damaged or changed.	4:00 p.m.
	Message 5	The members of a team should have complementary skills	6:00 p.m.
Day 3	Message 1	Good morning Today's words are: Meticulously	9:00 a.m.

		Centenarian Chaos Restrictions Intact Longevity prodigiously	
	Message 2	Meticulously: very carefully and with great attention to details	11:00 a.m.
	Message 3	Restrict – tion noun Restrict verb	1:00 p.m.
	Message 4	Chaos: a state of complete disorder and confusion	4:00 p.m.
	Message 5	You can refer to things that limit what you can do as …………….	6:00 p.m.
	Message 6	A picture showing the meaning of the word contrarian (an old lady)	7:00 p.m.
Day 4	Message 1	Good morning every body Today we will have the following words: Chaos Longevity Restrictions Prodigiously Meticulously Collaboration	9:00 a.m.
	Message 2	An image of a room with a big choas	11:00 a.m.
	Message 3	.Yoga exercise is believed to be one contributing factor to longevity	1:00 p.m.
	Message 4	Images showing Yoga exercise	4:00 p.m.
	Message 5	What are some dietary restrictions that people have?	6:00 p.m.
Day 5	Message 1	Good morning Today we will look at the following words; Prodigiously Meticulously Cryptic collaboration	9:00 a.m.
	Message 2	Prodigiously: largely, impressively	11:00 a.m.
	Message 3	A picture of a farmer cropping the grass in a meticulous manner.	1:00 p.m.
	Message 4	Cryptic/ hidden/ ambiguous	4:00 p.m.
	Message 5	In recent years, collaboration has been greatly enhanced by the development of the internet.	6:00 p.m.

Vocabulary messages in Week 4 Living longer			Time
Day 1	Message1	Hello dears Let's look at these words	9:00 a.m.

		Impish Paradox Prodigious Unpredictable Centenarian	
	Message 2	Impish: disrespectful or naughty in a playful way	11:00 a.m.
	Message 3	The weather in London is mostly unpredictable What does unpredictable mean?	1:00 p.m.
	Message 4	Image of a centenarian lady	4:00 p.m.
	Message 5	Prodigiously (adv)	6:00 p.m.
Day 2	Message 1	Good morning These are the words of the day: Collaborate Complementary Undermine, Breath-taking,	9:00 a.m.
	Message 2	Breath-taking: extremely beautiful or amazing	11:00 a.m.
	Message 3	How does the internet allow people to collaborate easier?	1:00 p.m.
	Message 4	.complementary things are different from each other's, but they make a good combination	4:00 p.m.
	Message 5	A picture of a sauce complementing a piece of stake.	6:00 p.m.
Day 3	Message 1	Good morning everybody: undermine Definitive Paradox Interfere Relevant Manipulate Defence	9:00 a.m.
	Message 2	Several recent studies have undermined the link between longevity and caloric restriction. Can you explain this sentence?	11:00 a.m.
	Message 3	Undermine: to make something less strong, or less secure	1:00 p.m.
	Message 4	Paradox: a statement that seems difficult to understand because it contains two opposite facts	4:00 p.m.
	Message 5	Manipulate: to control something or someone to your advantage, often unfairly	6:00 p.m.
Day 4	Message 1	Good morning ladies Today we will go over the followings: Manipulate Definitive	9:00 a.m.

		Defence	
	Message 2	Definitive Not able to be changed or improved	11:00 a.m.
	Message 3	.Definitive answer solution decision proof evidence	1:00 p.m.
	Message 4	Throughout her career, she has very successfully manipulated the media.	4:00 p.m.
	Message 5	Criticism just undermines our confidence.	6:00 p.m.
Day 5	Message 1	Good morning ladies Today we will review the following words:	9:00 a.m.
	Message 2	Defence: the ability to protect against attack or harm	11:00 a.m.
	Message 3	Undermine: to make something less confident	1:00 p.m.
	Message 4	Paradox: تناقض	4:00 p.m.
	Message 5	The vaccine strengthens the body's defences against infection.	6:00 p.m.

Vocabulary messages in Week 5 **Imagining the Future**			Time
Day 1	Message1	Good morning ladies Today we are reviewing these words: Resembles Dwindle Definitive Paradox	9:00 a.m.
	Message 2	If one thing or person resembles another, the two things or people are very similar to each other	11:00 a.m.
	Message 3	Dwindle: to become smaller in size or amount, or fewer in number	1:00 p.m.
	Message 4	Definitive: firm, final, not to be questioned or changed	4:00 p.m.
	Message 5	It is a curious paradox that drinking a lot of water can often make you feel thirsty	6:00 p.m.
Day 2	Message 1	Good morning very body, Today we will discuss the following: Figure out/ figure, Include	9:00 a.m.
	Message 2	Resemble; to look or to be like someone or something	11:00 a.m.
	Message 3	Figure out : to understand or solve something	1:00 p.m.

	Message 4	.to include: to contain something as a part of something else	4:00 p.m.
	Message 5	Her hope in success in the race dwindled last night as the weather became worse.	6:00 p.m.
Day 3	Message 1	Good morning everybody: Today we will review the followings Flee Include Literary, Destiny Resemble Priority, Intrinsic/extrinsic	9:00 a.m.
	Message 2	The bill includes tax and service	11:00 a.m.
	Message 3	The twins resembled each other more strongly when they were young.	1:00 p.m.
	Message 4	Flee To escape by running away, especially because of danger or fear	4:00 p.m.
	Message 5	Destiny n Things that will happen in the future (and outside human control)	6:00 p.m.
Day 4	Message 1	Good morning girls Today we will go over these words: Flee Figure out Literally	9:00 a.m.
	Message 2	Literally Using the original meaning of a word or phrase	11:00 a.m.
	Message 3	. Include vs. exclude	1:00 p.m.
	Message 4	Flee (present) Fled (past)	4:00 p.m.
	Message 5	If they know the cause of the problem, they might be able to figure out how to prevent it happening again.	6:00 p.m.
Day 5	Message 1	Good morning every body Today we will review these words Destiny Flee Definitive Literally	9:00 a.m.
	Message 2	What do you think the destiny of our own planet?	11:00 a.m.
	Message 3	She fled from the room in fear	1:00 p.m.
	Message 4	There is no definitive scientific evidence that coffee is harmful	4:00 p.m.
	Message 5	We live literally just round the corner from here**.**	6:00 p.m.

Appendix N   Cronbach Alphas analysis

N.1   Pre study questionnaire reliability

Reliability Statistics

Cronbach's Alpha	N of Items
.712	17

Table 1

(Cronbach's Coefficient for part 2A of pre- intervention survey)

Reliability Statistics

Cronbach's Alpha	N of Items
.802	4

Table 2

(Cronbach's Coefficient for section 3B of pre- intervention survey)

Reliability Statistics

Cronbach's Alpha	N of Items
.689	4

Table 3

(Cronbach's Coefficient for section 4 of pre- intervention survey)

Reliability Statistics

Cronbach's Alpha	N of Items
.710	9

Table 4

(Cronbach's Coefficient for section 5 of pre- intervention survey)

N.2   Post- intervention questionnaire reliability

Reliability Statistics

Cronbach's Alpha	N of Items
.864	17

(Cronbach's Coefficient for part 2A of post- intervention survey)

Reliability Statistics

Cronbach's Alpha	N of Items
.733	9

(Cronbach's Coefficient for part 3 of post- intervention survey)

Reliability Statistics

Cronbach's Alpha	N of Items
.969	10

(Cronbach's Coefficient for part 4A of post- intervention survey)

Reliability Statistics

Cronbach's Alpha	N of Items
.969	21

(Cronbach's Coefficient for part 4B of post- intervention survey)

Reliability Statistics

Cronbach's Alpha	N of Items
.952	4

(Cronbach's Coefficient for part 5 of post-intervention survey

Appendix O Changes in vocabulary learning beliefs

O.1 paired sample t-test /pre-and post-vocabulary learning beliefs

	Mean	Std. Deviation	Sig. (2-tailed)
Pair 1: I believe that learning vocabulary is important when learning English language. - I believe that learning vocabulary is important when learning English language.	.276	1.461	.318
Pair 2: I think that learning grammar is more important than learning vocabulary. - I think that learning grammar is more important than learning vocabulary.	-1.097	1.921	.003
Pair 3: I do not always have enough words to freely express my thought in English in real life. - I do not always have enough words to freely express my thought in English in real life.	-.226	1.117	.269
Pair 4: I think that knowing a word is all about knowing its meaning. - I think that knowing a word is all about knowing its meaning	-1.032	1.683	.002
Pair 5: I think new vocabulary could not be easily picked and learned while reading. - I think new vocabulary could not be easily picked and learned while reading.	-.129	1.088	.514

Pair 6: I think teachers should teach new vocabulary in class. - I think teachers should teach new vocabulary in class.	-.548	1.091	.009
Pair 7: I think that it is the role of students to always notice new words and learn them. - I think that it is the role of students to always notice new words and learn them.	.258	1.125	.211
Pair 8: I find vocabulary memorization difficult and boring. - I find vocabulary memorization difficult and boring.	-.226	1.203	.304
Pair 9: Several times, I recognize the form and the meaning of newly learned words without being able to reuse them in other situations. - Several times, I recognize the form and the meaning of newly learned words without being able to reuse them in other situations	-.161	1.369	.517
Pair 10: In my writing or speaking, I prefer to use words that I have already mastered rather than newly learned words. - In my writing or speaking, I prefer to use words that I have already mastered rather than newly learned words.	.065	1.153	.758
Pair 11: The task of vocabulary memorization is mostly left for us to be done at home. - The task of vocabulary memorization is mostly left for us to be done at home.	-.103	1.319	.676

Pair 12: I think it is possible to delay the task of vocabulary memorization to be done immediately before exam. - I think it is possible to delay the task of vocabulary memorization to be done immediately before exam.	.000	1.509	1.000
Pair 13: I find that words with pronunciation difficulties can easily be forgotten. - I find that words with pronunciation difficulties can easily be forgotten.	-.742	1.264	.003
Pair 14: I find that long words are more difficult to be remembered than short ones. - I find that long words are more difficult to be remembered than short ones	-.290	1.160	.174
Pair 15: I find that words with irregular forms are more difficult to be remembered than words with regular forms. - I find that words with irregular forms are more difficult to be remembered than words with regular forms.	.033	1.520	.905
Pair 16: In class, the teacher does not show us vocabulary learning strategies help us to learn and remember new words. In virtual classes, we use vocabulary learning strategies that help us to learn and remember new words.	.548	1.338	.030

Appendix P   **Changes in strategy use**

P.1   **Pre- and post-questionnaire data pertaining to strategy use**

	Vocabulary learning strategies	Pre-study	Post-study
	Word parts	57.50%	90.90%
	Word types	58%	90.90%
	Guessing from context	69.60%	87.90%
	Group work	24.20%	84.80%
	Discussing for meaning	9.00%	84.70%
	Asking a friend	12.10%	81.80%
	Connect words to images	42.40%	66.60%
	Generative use of words	33.30%	90.90%
	Synonyms and antonym	45.50%	87.80%
	Translation	90.90%	100%
	Repetition	84.80%	100%
	Writing in a list	66.60%	27.20%
	Using mobile phones	18.00%	87.80%
	Using multimedia	24%	81.80%

Appendix Q   **Attitudes to vocabulary lessons**

Q.1   **Impact of vocabulary lessons on learning vocabulary**

Impact of vocabulary lessons	Agree	Neural	Disagree
1. Online vocabulary lessons enable me to study words whenever and wherever I want.	75.8%	9.1%	15.2%
2. I found studying vocabulary lessons by messages easier to memorize than paper based vocabulary lessons.	66.7%	18.2%	15.2%
3. Vocabulary lessons in LOTM improved my	63.6%	21.2%	15.2%

pronunciation of new words.			
4. Vocabulary lessons improved my spelling of new words.	66.7%	18.2%	15.2%
5. Vocabulary lessons helped me to understand different meaning of a word.	75%	9.4%	15.6%
6. Vocabulary lessons helped me to know about words parts of speech.	81.8%	6.1%	12.1%
7. Vocabulary lessons helped me to learn about word affixes.	81.3%	6.3%	12.5%
8. Vocabulary lessons helped me to know about words synonyms and antonyms.	81.3%	6.3%	12.5%
9. Repetition of words in LOTM enabled me to remember words better.	68.8%	9.1%	12.1%
I always open the messages straight away because I could not stop myself to see what the teacher has sent.	48.5%	21.2%	30%

Appendix R   Changes in attitudes to MALL

R.1   Paired Sample test: Attitude to mobile phone learning before and after the intervention

		Mean	Std. Deviation	Sig. (2-tailed)
Pair 1	I think learning English by mobile phone messages would be useful. - Learning English by mobile phone messages is useful.	.194	1.302	.414
Pair 2	I think using smartphone technology to learn English would make learning easier. - Using smartphone technology to learn English makes learning easier.	-.032	1.224	.884
Pair 3	I think that using smartphone technology would help us to access learning quickly. - Using smartphone technology helps me to access learning quickly.	.100	1.398	.698
Pair 4	I would prefer face to face learning than learning online with my mobile phone - I prefer face to face learning than learning online with my mobile phone.	.167	1.487	.544
Pair 5	I think that mobile learning would enable learners to work in a team. - Mobile learning enables learners to work in a team	.500	1.253	.037
Pair 6	I think that learning how to use mobile learning systems will need effort. - Learning how to use mobile learning systems needs effort.	.567	1.331	.027

Pair 7	I think using smart phones in learning is rather a distraction. - Using smart phones in learning is rather a distraction.	-.379	1.399	.155
Pair 8	I think mobile phones are best used for social communication and fun. - Mobile phones should be only used for social communication and fun.	-.233	1.755	.472
Pair 9	I think mobile learning would intrude/interfere with my personal life. - Mobile learning intrudes/interferes with my personal life.	-.100	1.125	.630

Appendix S   **Frequency data**

S.1   **Mobile phone acceptance**

Online chat encouraged me to communicate with teacher and friends.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	12	36.4	37.5	37.5
	Agree	10	30.3	31.3	68.8
	Neutral	8	24.2	25.0	93.8
	Disagree	2	6.1	6.3	100.0
	Total	32	97.0	100.0	
Missing	System	1	3.0		
Total		33	100.0		

Online chat encouraged teacher-students' interaction when discussing new information

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	7	21.2	21.2	21.2
	Agree	20	60.6	60.6	81.8
	Neutral	3	9.1	9.1	90.9
	Disagree	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Online chat helped me to share my ideas with class.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly Agree	10	30.3	31.3	31.3
	Agree	13	39.4	40.6	71.9
	Neutral	5	15.2	15.6	87.5
	Disagree	4	12.1	12.5	100.0
	Total	32	97.0	100.0	
Missing	System	1	3.0		
Total		33	100.0		

S.2   **Future intention to use MALL**

	Agree	Neutral	Diasgree
1. I would like to continue explore mobile learning in the future.	57.6%	21.2%	21.2%
2. I would use m-learning if it was recommended to me by my teachers.	78.8%	9.1%	12.1
3. I will enjoy using m-learning systems.	60.6%	27.3%	12.1%
4. I would recommend others to use m-learning systems.	54.5%	30.3%	15.2%

Appendix T   Chat analysis (Laurillard)

T.1   Analysing WhatsApp chat based on Laurillard's conversational frame work

[6:30 PM, …T: Let's talk about Complementary   (*Open/frame the discussion)*

6:30…Pm,.. T: Complementary : Adj/something that completes the whole (set the theory)

6:30PM,..T: Picture of a steak and sauce , with a caption "The sauce complements the steak" (set the theory)

[6:30 PM, …T: Can you tell the difference between complement and compliment? (promting/Ask a question)

[6:35 PM, …Wejdan: Yup

[6:35 PM,…Wejdan: The picture make it clear to understand   *(*Confirm understanding)

[6:36 PM, …Reem: 👍   (Confirm understanding)

[6:48 PM, …T: Let's talk at in 20 mins

[7:02 PM, ….Dareen: Does "complement" and "complete" the same?   (Ask for explanation)

[7:04 PM,…Nadoo: Yes   *(* Make hypothesis)

[7:05 PM, ..Reem: No. I think they are different (Make hypothesis)

[7:05PM,..Nada: ???   (ask for clarification)

[7:05 PM, ..Reem: ok give me a sec   (Look for another resource)

[7:08PM…Reem: complete /to finish (Give elaboration)

            complement/to make it whole

[7:09 PM…Nada: can't understand the difference (ask for clarification)

[7:10PM…Dareen: me too. Difficult one 😕   (Express Difficulty)

Appendix U   **Evaluating mobile phone learning experience**

The last question in the post-intervention questionnaire requires participants to evaluate MALL experience by asking them to select one of the given rankings; very poor, poor, fair, good, and excellent. For the ease of evaluation I grouped very poor and poor together, and good and excellent together. In responding to this question, 62.5% ranked good, 28.1% found it fair, and 9.4% found it poor.

Experience of learning vocabulary via mobile phone WhatsApp Messenger

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very poor	2	6.1	6.3	6.3
	Poor	1	3.0	3.1	9.4
	Fair	9	27.3	28.1	37.5
	Good	12	36.4	37.5	75.0
	Excellent	8	24.2	25.0	100.0
	Total	32	97.0	100.0	
Missing	System	1	3.0		
Total		33	100.0		

In giving the MALL experience an Overall ranking, mean of students responses was 3.72

Report

Experience of learning vocabulary via mobile phone WhatsApp Messenger

Mean	N	Std. Deviation
3.72	32	1.085

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Glossary of Items

Computer Assisted Language Learning   CALL

Communicative Language Teaching   CLT

Community Of Inquiry   COI

Depth of Processing   DOP

Grade Point Average   GPA

King Abdul Aziz University   KAU

Learning On The Move   LOTM

Mobile Assisted Language learning   MALL

Technology Acceptance Model   TAM

Vocabulary Learning Strategies   VLS

Zone of Proximal Development   ZPD

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