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Idiomobile for Learners of English: A Study of Learners' Usage of a Mobile Learning Application for Learning Idioms and Collocations

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IDIOMOBILE FOR LEARNERS OF ENGLISH: A STUDY OF LEARNERS' USAGE OF A MOBILE LEARNING APPLICATION FOR LEARNING IDIOMS AND COLLOCATIONS

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Title: *Idiomobile* for Learners of English: A Study of Learners' Usage of a Mobile Learning Application for Learning Idioms and Collocations

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This study explored how four groups of English learners used a mobile software application developed by the researcher for learning idiomatic expressions and collocations. A total of 45 learners in the study used the application for a period of one week. Data for this study was collected from a questionnaire, the application, and follow-up interviews.

Findings in the study show that idiomatic expressions and collocations are particularly difficult for English language learners. All learners in this study averaged less than 70 percent on the quizzes they took during the study, which echoes reported findings in the field regarding the difficulty of idiomatic expressions and collocations for English language learners. In addition, findings show that learners' usage of the application correlated with their average scores on the quizzes. The more learners used the application, the higher they scored on the quizzes in the application. Learners' usage focused mainly on the *quiz* and *game* sections of the application. In a week, learners in all groups answered 8,654 quiz questions with an average of 60 questions for each learner. In addition, findings show that usage of mobile devices in general can predict how English learners used the application.

Findings also underscore the importance of providing language learners with resources to help them learn idiomatic expressions and collocation. Learners strongly indicated that even within a short period of time, they felt they knew more idioms and collocations since they started using the application. Data from the application show that learners had difficulty understanding idiomatic expressions relating to feelings, such as *a chip on your shoulder*, or *hot under the collar*. Findings also show that learners in this study seem to recognize longer idiomatic expressions than shorter idiomatic expressions. Findings also show that learners' have strong positive opinions toward the use of mobile technology in language learning.

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CHAPTER ONE: PURPOSE OF THE STUDY

This study seeks to explore the process of using a mobile language learning application called *Idiomobile* that the researcher developed using *Macromedia Flash* to learn idiomatic expressions and collocations by four groups of English language learners. *Idiomobile* was designed to assist second language learners with understanding idiomatic expressions and collocations in general, an important aspect in language learning (Sinclair, 1991; Zhang, 1993; Farghal, and Obiedat, 1995; Al-Zahrani, 1998; Pain & C.C., 2000; Sung, 2003; Nesselhauf, 2003, 2005; Boers, Eyckmans, Kappel, Stengers, & Demecheleer , 2006). And despite the importance of learning idiomatic expressions and collocations and the potential mobile devices offer in addressing this need, there are virtually no studies that have examined this potential that mobile devices offer in this area of language learning. In addition, *Idiomobile* is the first non-commercial mobile software application targeting idiomatic expressions and collocations, a need that has been evident (Nesselhauf & Tschichold, 2002), and opportunity that remains to be tapped.

In the following section, I explain the rationale for this study, and then define the major terms in the research. After that, I state the research questions, and the hypotheses of the study.

Statement of the Problem

Idiomatic expressions (formulaic expressions, and lexical expressions) and collocations (ready-made chunks, and multi-word phrases that usually co-occur together) are an important aspect of language learning (Firth, 1957; Halliday 1966; Richards, 1970; Arnaud, & Savignon, 1997; Granger, 1998; Sung, 2003). The importance of knowledge of collocations (Gairns & Redman, 1986; Zhang, 1993; Sung, 2003; Nesselhauf, 2005) in

helping learners develop adequate levels of fluency is well documented in the literature. Zhang (1993) found that more proficient second language writers use far more collocations correctly than less proficient writers. He found that Saudi students' knowledge of collocation correlated to an extent with their proficiency in English in general. According to Boers et al (2006), there are three psycholinguistic reasons why idiomatic expressions are beneficial for learners: First, they help them achieve perceived native-like performance; second, they are retrieved from memory in chunks which helps learners produce fewer hesitations, and third, they facilitate fluent language production under real-time conditions. According to Trescases (1981), learning idioms is an inherent part of learning a second language. It assists learners in part in acquiring a cultural competence, which according to Trescases is "the ability to relate a second language to the psycho-socio-cultural reality in which it functions" (Hammerly, 1986, p. 513), which in turn facilitates socio-cultural interaction. In addition, there have been many studies that have shown that learners are more likely to be engaged while they interact in the target language when they interact with an authentic audience (Pica, Young & Doughty, 1987; Webb, 1985). Speakers of English use idiomatic expressions frequently, and therefore, it is important for second language learners of English to be able to understand them, for their understanding of idiomatic expressions may likely facilitate communication with speakers of English.

Nesslhauf and Tschicold (2002) argue that teaching collocations suits computer applications best in terms of its importance in learning a second language, its noted difficulty for L2 learners, and its possible implementation in computer applications. Therefore, deploying learning applications that focus on collocations has the potential to

assist students in learning. Nesselhauf and Tschichold argue that

> Vocabulary is one of the fields that can relatively easily be practiced outside the classroom. All the possibilities offered by multimedia CALL can be put to a useful purpose: pictures can illustrate vocabulary items; sounds can accompany the written words and expressions and give a model pronunciation for the examples; and sound can also be used to give acoustic feedback to the learner. (p. 251)

However, despite their importance and ease of implementation in computer applications, mobile language learning applications that aim at helping second language learners with idiomatic expressions and collocations are almost non-existent, with the exception of pocket dictionary applications that present idioms in list format, like the *Oxford Pocket Dictionary of Idioms*.

To address this problem, I developed *Idiomobile* to assist second language learners with learning idiomatic expressions and collocations. The application contains roughly three thousand of the most popular and frequently used idiomatic expressions and collocations. These idiomatic expressions and collocations are categorized according to the context in which they are used. In addition, the application contains a game to help learners apply these idiomatic expressions and collocations in simulated real-life situations. The application also contains self-customized quizzes that users can take to assess their knowledge of idiomatic expressions and collocations. The application is built with the Flash-Lite Player which is available on 800 million devices worldwide.

Flash-Lite is the Flash player software for mobile devices (Table 1). While the PC-based Flash Player is the most downloaded software in the history of the web

(Pucknell, Hogg, and Swain, 2004)-more than 436 million users have Flash player installed on their computer (ibid), and while it has been widely used in education, no published research studies examined the potential of its mobile based player, Flash-Lite.

Table 1

Flash Player Platform Availablity

Flash Player Version Operating System	Flash Player	Flash Lite Player
Windows	Yes	No
Mac	Yes	No
Linux	Yes	No
Symbian	No	Yes
Windows Mobile	No	Yes
iPhone, iPod Touch, iPad	No	No*

*It is possible to package some Flash content for the iPhone, and iPod Touch using the new Adobe CS5 Creative Suite)

It is also important to realize that the Flash Lite player is available to a new generation of computing devices, smart phones, PDA's, multimedia gaming devices, and portable mini PCs. These devices are becoming more mainstream than ever and are accessible by virtue of what they are designed to do. To begin with, they are mostly phone-enabled devices. In other words, owners of these devices are likely to carry the device around at almost all times. These devices are also compact, unlike desktops or even laptops, and run on industry recognized platforms that allow the integration of software applications. For example, mobile devices that run *Windows Mobile* have access to many applications that can be used on desktop computers that run Windows. More

importantly, they are generally affordable. Comparing the range price for a new laptop to a new handheld device, a new laptop will roughly cost somewhere between 500 to 2,500 US dollars. A large number of smart phones, handheld devices, and multimedia gaming devices start at 199 US dollars, which is more than 60 percent less than new laptops. To illustrate, the Nokia 3250 smart phone, which is Flash Lite enabled, cost during the summer of 2008 between 40 to 65 US dollars. A Flash-Lite smart phone that I bought in October of 2008 cost only 39 US dollars!

Flash content can be deployed to smart phones and devices via the Flash-Lite player, which is widely supported around the world. The following companies all support the Flash-Lite player: Fujitsu, Hitachi, Kyocera, LG, Microsoft, Mitsubishi, Motorola, NEC, Nokia, Panasonic, Samsung, Sanyo, Sendo, Sharp, Siemens, Sony, Sony-Ericsson, and Toshiba; it is also available and on the new open-source Droid platform (Adobe, 2010). However, Flash is not officially supported on Apple products. Steve Jobs, CEO of Apple Inc announced in 2010 that due to technical challenges, Flash may not be officially supported on an increasing list of popular devices manufactured by Apple, including one of the most popular and revolutionary phone of its time: The iPhone. Flash is not supported on the iPod Touch and the iPad either, two increasingly popular additions to the arena of smart phones and multimedia mobile devices that have debuted in the last ten years at the turn of the millennium. However, Flash content can be made available to the iPhone via the Adobe Creative Suite 5.

What makes Flash so popular is its ability to integrate audio, video, and rich graphic applications for a relatively small file size. The Flash-Lite Player exists as a stand-alone player on the majority of handsets. This means that learning material can be

stored on the device locally and the player will still be able to access it. Therefore, users' access to language learning material would require access to the internet. This is a critical point to address since a large number of learning applications rely on the availability of internet access (Houser and Thornton, 2001; Shu, 2006), or cell phone coverage (Levy and Kennedy, 2005) to receive or be able to access language learning materials.

Thus, the rationale for this study stands mainly on two main points: Idioms and collocations are difficult for second language learners, and learning idioms and collocations can be implemented in mobile devices, which are becoming increasingly available, affordable, and capable.

Definition of Terms

Idiomatic Expressions and Collocations

Granger and Paquot (2008) argue that because of the richness of the field and the diversity of approaches to the study of phraseology, researchers in the field often use different terms to refer to the same thing, and similar terms to refer to different things. In general, however, there are four main characteristics that are present in every discussion of the definition of Multi Word Units (MWUs), a term that generally refers to both idiomatic expressions and collocations in the literature: The non-literal meaning characteristic, frequency of occurrence of the parts making up the expression, level of restriction, and the number, semantic, and syntactic location of words making up the expression. Idioms are generally defined in the literature as phrases that are characterized by one main aspect: The meaning of each word in the phrase is irrelevant to the meaning of the phrase as a whole. Thus, the meaning of the idiom *water under the bridge* has nothing to do with the surface meaning of *water*, the *bridge*, or the adverb of place *under*.

It means “it is history. Time to move on”. *Kick the bucket* is another example of an idiom. The meaning of the expression has nothing to do with the meaning of the words in the phrase separately, *kick* and *bucket*. In addition to the non-literal meaning element, idioms enjoy a high level of restriction regarding elements that can be substituted in the expression. For example, substituting the word *tunnel* for *bridge* in *water under the bridge* completely alters the meaning of the expression.

Collocations, on the other hand, are words or combinations of words that frequently occur together. One main difference between idioms and collocations is that unlike idiomatic expressions, the meaning of a collocation can to a certain extent be based on the meaning of the individual words making it up. For example, *seek medical attention* is a collocation. The words *Seek, medical,* and *attention* do frequently occur together. In addition, collocations do not have the same level of restriction that idioms have. For example, there are roughly 1,240,000 hits for the combination *Seek medical attention* using *Google’s* search engine. The number of hits dramatically decreases when the element *attention* is replaced with *advice* as can be see in Table 2.

Table 2

Frequency of Occurence of the Combination ‘Seek Medical+Noun’

Verb	Adj	Noun	Hits (2009-Google search)
Seek	Medical	Attention	1,520,000
Seek	Medical	Advice	665,000
Seek	Medical	Counseling	449
Seek	Medical	Love	4

However, the meaning of the phrase is not altered, and the phrase is still acceptable. For example, the combination *Seek medical advice* results in 665,000 hits. Yet, collocations do have a level of restriction as to what elements can be substituted. For example, the phrase *Seek medical love* results in 4 hits only. But the differences between them are not always clear-cut. For example, collocations can have the non-literal meaning characteristic present in all idiomatic expressions, like *cut me a deal*, in which a person is not likely to use a knife or a cutting device, but rather *offer* or *make a deal*. In addition, idioms do have a high frequency of co-occurrence. The parts making up the Idiomatic expressions *kick the bucket* and *water under the bridge* always occur together. On the other hand, one can still think of idioms that have their meaning based on the literal meaning of its parts. For example, *not all that shines/glitters is gold* is an idiomatic expression. It means that what we see is not necessarily to be the truth, or the best state of a thing. While its meaning is not usually based on the meaning of the parts separately, in some cases it can. For example, a person may look at a piece of gold that seems to shine/glitter, and still question its authenticity by using the phrase *not all that shines/glitters is gold.*

There is a consensus among SLA specialists that collocations are combinations of words ("syntagmatically" significant, Nesselhauf, 2005) that are likely to occur frequently together (Firth, 1957; Halliday 1966; Sinclair, 1991; Pain & C.C., 2000; Nesselhauf, 2005). Sinclair (1991) defines collocations as "the occurrence of two or more words within a short space of each other in a text" (p.170). Other linguists use terms as occurrence or recurrence as the basis for considering a combination of words a collocation. In particular, there are two aspects that are taken into consideration when

classifying collocations: Frequency of occurrence (thus the frequency based approach) and the lexical significance (thus, the significance-oriented approach).

According to the frequency based approach, collocations are the combinations of phrases that frequently occur together. The statistics of these occurrences are taken into consideration when defining collocations, also referred to as the *statistically-oriented approach* (Herbst, 1996) or *frequency-oriented approach* (Nesselhauf, 2005). There is also the *significance-oriented approach*, or the *phraselogical* approach, which considers collocations a relatively fixed combination of words.

Boers et al (2006) use the term 'formulaic expressions' which in their definition includes "standardized phrases such as collocations and idiomatic expressions" to refer to collocations and idiomatic expressions (p. 245).

Cowie (1981) distinguishes four types of MWUs. These types are based on the level of arbitrariness, restriction, and literal meaning vs. non-literal meaning characteristic. However, these categories are not fixed in any sense, and, according to Nesselhauf (2005) should be seen as a continuum. The expressions that will be examined in this study belong to the categories of collocations (akin to Cowie's restricted collocations, words that have a high frequency of occurrence and maintain a degree of restriction in substitution, i.e., *report a problem, seek medical attention*), idioms (both figurative and pure, and whose meaning is not based on the literal meaning of the words (i.e., *kick the bucket*, *kick the habit*), phrasal verbs (*give up*, *go off*), slang expressions (*pep talk*), and proverbs (*Better late than never*). Cowie's categorization of MWUs is presented in Table 3. I refer to them collectively as idiomatic expressions and collocations. This categorization is convenient for the sake of this study for a variety of

reasons.

Table 3

Criteria for Defining Multi Word Units (MWU) from Cowie (1981)

Free combinations (e.g. drink tea):
- The restriction on substitution can be specified on semantic grounds
- All elements of the word combination are used in a literal sense
Restricted collocations (e.g. perform a task):
- some substitution is possible, but there are arbitrary limitations on - substitution
- at least one element has a non-literal meaning, and at least one element is - used in its literal sense; the whole combination is transparent
Figurative idioms (e.g. *do a U turn,* in the sense of 'completely change one's policy or behavior'):
- substitution of the element is seldom possible
- the combination has a figurative meaning, but preserves a current literal - interpretation
Pure idioms (e.g. *blow the gaff*) :
- substitution of the elements is impossible
- the combination has a figurative meaning and does not preserve a current - literal interpretation

First, these groups of expressions all occur in real life, day-to-day language use. I argue that all of them are important in terms of how essential for learners to acquire them,

because if learned, they do facilitate L2 communication. Second, making them available for learners in the mobile application may provide insights on which of them learners would find the most important, or have the most difficulty with. Furthermore, their realization in the mobile application is both seamless and beneficial. Learners can review them any time they wish. *Idiomobile* provides standard exercises that help learners review them as frequently as they wish.

Mobile Learning

According to Kukulska-Hulme (2005), mobile learning is "concerned with learner mobility, in the sense that learners should be able to engage in educational activities without the constraints of having to do so in tightly delimited physical location" (p. 1). Mobile learning can also be defined as taking place when learning opportunities are offered via mobile devices (O'Malley, Vavoula, Glew, Taylor, Sharples, & Lefrere, 2003). This latter definition suggests that learners' mobility, being able to learn virtually anywhere as long as they carry a mobile device, is the main characteristic of mobile learning. Mobile learning is also defined based on the physical dimensions of the device in question. Trifanova, Knapp, and Ronchetti (2004) define mobile devices as "any device that is small, autonomous, and unobtrusive enough to accompany us in every moment" (p. 3). This latter definition, however, does not account for new ultra small laptops that can almost fit in the palm of a hand. On the technical level, there is quite a difference between ultra small laptops and the general category of handheld devices, namely processing power and memory capabilities.

To clarify what mobile devices mean in my study, my definition of mobile devices will include three aspects: physical dimensions of the device, technical capacity

of the device, and the activity of learning, whether it is formal or informal. This definition will include Personal Digital Assistants (PDAs) which run *Windows Mobile*, a Windows-based operating system made to fit the processing capabilities of the PDAs and similar mobile devices. A large number of smart phones also run a version of the *Symbian* operating system made for mobile devices, published by Nokia. Therefore, any handheld device that runs the *Symbian* or *Windows Mobile* operating systems, and is Flash-enabled that qualifies as a handheld device in terms of its physical dimensions (fitting the palm of a hand) will be considered a mobile device in my study. This differentiates them from handheld devices that run a *full operating system* like Windows (Vista, XP, 2000, 98, 95), Mac, or Linux, which some small form factor handheld devices like the Vaio SX505PCG do run. Therefore, this definition will include a category of computing devices native to smart phones, multimedia capable devices, and pocket PPCs, which are forming part of a growing field of scholarship in Mobile Assisted Language Learning (MALL). In this study, mobile learning will refer to learning that occurs when the learner interacts with a device meeting the standards above. The kind of learning that can take place could be formal, as within the context of a classroom, or informal, as when the learner chooses when and what to learn (Kukulska-Hulme and Shield, 2007).

Flash Lite and Mobile Learning

Flash-Lite is the player version of Flash for mobile devices. It provides the same capabilities Flash does in terms of delivering rich experiences through use of audio, video, text, and animation. According to Warschauer, “Audiovisual texts are potentially a very powerful representational mode because they combine the illustrative power of the visual with the interpretive and analytic power of the written word” (2003, p. 27).

While Flash has been utilized extensively in a variety of educational settings, no studies have investigated the potential of Flash-Lite in providing learning experiences for second language learners.

Flash Capabilities

Flash's power as an authoring tool can be summarized by looking at two main aspects of language learning it supports: Interactivity and Control.

Interactivity. Flash as a multimedia authoring package provides interactivity, an aspect of multimedia tools in general. Interactivity includes aspects such as navigation from one lesson to the next, and choosing a different level to work with in a given lesson. It also supports student input, lesson architecture, and includes help support systems and recordkeeping (Bush, 1997). In *Idiomobile*, interactivity is essential. *Idiomobile* interacts with users in a variety of ways. For example, it provides instant data about the session. It relays information to users about their performance during a given session. It helps users interact with *Idiomobile* by providing a visual representation of what options and keypad shortcuts are available at any given point.

Control. Flash-created applications provide many aspects for users to control lessons, learning materials, feedback access records, timing of learning segments, input options, and multilingual support. It allows learners to be in control of their learning. For example, *Idiomobile* users can control what category of idiomatic expressions and collocations they choose to learn, review, or be tested on. They have control of the amount of time to be spent on any given interaction session.

Motivation

Research studies on the role of motivation on second language learning and

acquisition have consistently shown that highly motivated second language learners tend to do better overall in their language learning (Rueda and Chen 2005; Baker, 1992; Gardner, 1985; McGroarty, 1996; Oxford, 1996; Oxford & Shearin, 1994; Samimy & Tabuse, 1992; Segalowitz & Freed, 2004; Spolsky, 1989). Highly motivated learners tend to spend more time in their learning process, are attentive during a given learning task, and tend to be highly risk-takers in their learning, which enables them to use failure and success to their benefit in their learning process. Masgoret and Gardner (2003) argue that motivation correlates with achievement in second language learning. Gardner (1985) found that there is a strong relationship between motivation and success in language learning. Masgoret and Gardner highlight key characteristics of motivated individuals. They argue that motivated individuals spend more time and effort during the learning task, and tend to be more attentive to the learning situations. In addition, they get affected by failures and success in their language learning process.

According to Masgoret and Gardner (2003), motivation refers to "goal directed-behavior" (p. 128). They argue that there are certain characteristics that are found in motivated individuals: They spend effort, they are persistent, they focus on the task at hand, they enjoy the activity, experience reinforcement from successes and are upset when they fail, and they make use of learning strategies to aid them in learning. *Idiomobile* targets a learning aspect that intrinsically motivated students in particular will find rewarding. Learning the idioms of a language is greatly associated with being perceived as a member of that language speaking community (Trescases, 1981). Brown (2000) distinguishes two types of motivation: Intrinsic, and extrinsic. Intrinsically motivated learners tend to focus on long-term learning (Brown, 2000). Learners in this

sense have a more personal reason for learning a language, which can be for a variety of reasons, mainly in the field of language learning, to blend with the speakers of the same language, and to be recognized as a member of the larger speaking community (Brown, 2000). Extrinsic motivation, on the other hand, refers to the kind of motivation associated with learning to gain more concrete rewards, like getting a better job, or getting admission into a specific program.

Dörnyei (2000) considers motivation one of the two key components (aptitude being the second component) that determines to a certain extent the rate and success of foreign language learning. According to Dörnyei , not only does motivation provide the necessary impetus for learning, but it also sustains the effort for long term learning. Dörnyei argues

> It is generally accepted that [motivation] has both a qualitative and a quantitative dimension. The former concerns the goal or the direction of learning, the latter the intensity of the effort invested. Thus, to provide the basic definition, motivation to learn a foreign language involves all those affects and cognitions that initiate language learning, determine language choice, and energize the language learning process" (p. 425)

Nevertheless, it is problematic to determine how each individual is motivated in their language learning process. It is equally difficult to argue that certain language learners would be equally motivated in the same ways. In this study, there are four groups of learners who share similar characteristics to be motivated in their language learning process. The assumption is that while each participant in each group would not be motivated in the same way as other members, the group as a whole will be used as a

representative of the kind of motivation that is shared by the whole group. In addition, one of the ways users exhibit motivation will be in the amount of time and effort they will spend using *Idiomobile.* This will be measured by calculating the time users spend using with the available sections in *Idiomobile.*

Goals

Understanding goals with relation to second language learning is critical, since they do provide information regarding the success of the learning process (Brown, 2000; Nunan, 1999). Learners' goals and motivation do influence each other (Nunan, 1999). Highly motivated students tend to set specific goals and set realistic amount of time and effort to achieve them. Schunk (1991) argues that goals affect learning behavior in a variety of ways. Schunk argues that specific goals help a student determine the amount of effort and time required to spend on a given task, and are very likely to help the learner succeed in achieving these goals. Shunck also argues that "proximal goals, rather than more distant goals, convey more reliable information about one's capabilities. And the difficulty of a goal or the difficulty of a task, influences the amount of effort a learner believes is necessary to complete the task." (Cited in Rueba 2005).

To investigate how learning goals might affect how learners use *Idiomobile,* it is important to include learners with different goals for learning English. Obviously, learners who will eventually become teachers of English have different goals for learning English, and that will affect how they use *Idiomobile*. On the other hand, learners who are learning English mainly to be able to communicate with other people who speak English will likely use *Idiomobile* in a variety of ways.

The design of *Idiomobile* offers a variety of experiences for learning idiomatic

expressions and collocations for users with varying goals. The balanced design of self-customized multiple-choice format quizzes and the games included offer a balanced approach to attempt to address a wide range of goals for learners. For example, learners who would like to mainly consult *Idiomobile* to determine how an idiomatic expression is being used can instantly access the idiomatic expressions and collocations list available in *Idiomobile*. Learners who like to be able to use idiomatic expressions and collocations in real life situations may benefit from the situational use of idiomatic expressions and collocations available in the game mode in *Idiomobile* that allows for such learning to take place. Learners who would like to assess their knowledge of idiomatic expressions and collocations can use the built-in quizzes that *Idiomobile* can administer.

Games

Research emphasized the importance of engaging learners with the activity at hand, and using games has consistently been proven effective for that purpose (Gee, 2003, 2004). Kroenhert (1993) in *100 Training Games* provided a list of games that could be used by educators to teach and train. According to Gee (2005), "Games always situate the meanings of words in terms of the actions, images, and dialogues they relate to, and show how they vary across different actions, images and dialogues" (p. 8). In addition, games create a laid-back learning environment where learners are willing to take risks, become motivated, and provide meaningful language learning material (students respond to the game, i.e., become happy, angry, amused, excited). Language learning can be frustrating at certain points; therefore, games allow learners to have renewed interest in learning provide a break from repetitive classroom tasks.

Level of Proficiency

Language learners' proficiency level is not a readily defined variable. To help clarify the meaning of proficiency level, researchers recommend operationalizing the variable; in other words, researchers should add more dimensions to the variable so it is clearly defined. This is one of the most problematic issues in second language research, since there is a multitude of factors that contribute to a language learner's proficiency level. Mackey and Gass (2005) argue that language proficiency level "is one of the most difficult areas to control for when conducting second language research" (p. 110). This is due to the fact that in second language learning environment, learning may still be taking place even after learners leave the classroom. In addition, learners established proficiency levels reported by standardized tests, like the TOEFL, may not clearly indicate to what degree the score reported indicates the participant's knowledge specific language skills, like for example knowledge of idiomatic expressions and collocations. In this study, two dimensions of language learners' proficiency will be used to characterize and put proficiency level in context. The first is length of residence. Length of residence is the amount of time a participant has spent in the L2 context. The second dimension is their recent English proficiency test score. The TOEFL test is a widely used measure of students' proficiency levels (Mackey and Gass, 2005). TOEFL test scores (iBT, CBT, ITP) will be used in determining learners' proficiency levels. TOEFL test scores in this study are self-reported, since the research did not test any of the learners. I describe the learners' background in detail in chapter three.

Research Questions

This study will address the following research questions and hypotheses:

I. To what extent do learners of English use *Idiomobile* to learn idiomatic expressions and collocations?

1. Hypothesis: The *quiz* and *game* sections will be the most used sections of the application by the four groups of learners of English.

II. In what ways do the four groups of English learners use *Idiomobile* to learn idiomatic expressions and collocations?

2. Hypothesis: There is a significant difference among English language learners' usage of *Idiomobile*.

III. To what extent does usage of *Idiomobile* correlate with scores on the built-in quizzes in *Idiomobile*?

3. Hypothesis: There is a significant positive correlation between usage of *Idiomobile* and the scores on the built-in quizzes in *Idiomobile*.

IV. To what extent do self-reported TOEFL scores correlate with English learners' scores on the quizzes in *Idiomobile*?

4. Hypothesis: There is a significant positive correlation between English learners' self-reported TOEFL scores and their scores on the quizzes in *Idiomobile*.

V. To what extent does English language learners' average daily usage of mobile phones correlate with usage of *Idiomobile*?

5. Hypothesis: There is a positive significant correlation between learners' average usage of mobile phones and usage of *Idiomobile*.

VI. What are learners' opinions towards the use of *Idiomobile* in particular and mobile technology in general to facilitate learning idiomatic expressions and collocations?

6. Hypothesis: Learners will have positive views of *Idiomobile*, and of using mobile technology in language learning in general.

Findings showed that the *quiz* and *game* sections were the most used sections of *Idiomobile* by all groups. The other most used sections were the *travel*, *shopping*, *food*, and *sports* sections. In terms of the groups' usage of Idiomobile, the CT group used *Idiomobile* the most, followed by the EFL group, the BUS group, and the ALI group. While the groups' usage of *Idiomobile* differed, the only significant difference was between the ALI group and the other groups. In addition, English learners who had the highest average self-reported TOEFL score had the highest average score on the quizzes in *Idiomobile*. While the self-reported TOEFL scores correlated positively with average scores on the quizzes when taken separately, there was not a significant correlation in the presences of the usage of *Idiomobile* variable. This indicates that usage of *Idiomobile* and not the self-reported TOEFL scores predicts the learners' average scores on the quizzes. In other words, the self-reported TOEFL scores were not a significant predictor of learners' scores on the quizzes in *Idiomobile*. In addition, the more learners used the application, the better their scores were on the quizzes in the application.

Furthermore, with each day of the study, learners' scores on the quizzes improved. In terms of average daily phone usage and usage of Idiomobile, learners in the CT group who reported the lowest average daily usage of mobile phones used *Idiomobile* the most, while ALI Learners who reported the highest usage of mobile phones used *Idiomobile* the least.

In the next chapter, I review the literature on how importance of knowledge of idiomatic expressions and collocations, motivation, learning goals, and technical

difficulties affect how learners interact with learning mobile applications. In addition, discuss how this study contributes to the existing literature on mobile learning applications.

CHAPTER TWO: LITERATURE REVIEW

In this section, I review the literature on the variables affecting how learners use mobile applications in language learning. I will map out how idiomatic expressions and collocations being an important and difficult to learn aspect of the language learning process, learners' motivation, the use of games, and learning goals affect how learners use learning applications. I intend to conclude the chapter by explaining how this study contributes to the existing literature on learning idiomatic expressions and collocations and mobile learning applications.

Authentic Language Learning Material

My use of the term authentic language learning material refers to three dimensions. The first dimension pertains to material that language learners have unusual difficulty with. Because of the seemingly arbitrary nature of the way idiomatic expressions are composed, and because learners have difficulty in using collocations, idiomatic expressions and collocations are unusually difficult for learners of English. The second dimension pertains to material that is important to their success in the learning process whether it is a formal context, or an informal one. Idiomatic expressions and collocations are widely used in English in real life situations. The third dimension has to do with language learners are exposed to in real life situations. Learners are more likely to be engaged in a learning task while they interact in the target language with an authentic materials (Chapelle, 2003; Pica, Young & Doughty, 1987; Webb, 1985). I argue that these factors influence how users perceive the importance of learning material, and in particular, I argue that these reasons will influence how users interact with *Idiomobile*.

Idiomatic Expressions and Collocations

The importance of knowledge of idiomatic expressions (Boers et al 2006) and collocation (Farghal, and Obiedat, 1995; Nesselhauf, 2005; Nation, 2001) in second language learning as well in helping learners develop adequate levels of fluency is well documented in the literature. Shei and Pain (2000) consider collocations one of the most difficult aspects in the process of second language learning. In their study of Chinese learners' knowledge of collocation, they found that their knowledge is inferior to their native speaker cohorts. They say:

> Collocation is one of the most difficult aspects in second language learning, but has been largely neglected by researchers and practitioners. A questionnaire survey shows advanced Chinese learners' collocational ability in English to be significantly inferior to that of native speakers. (p. 167)

Stockdale (2000) compiled a collocation-based dictionary that aimed at assisting Saudi second language learners with learning collocations. He argues that teaching collocations usually helps learners use language in real daily life situations, and it could mean the difference between merely knowing the meaning of the word, and using it in real life situations.

Boers et al (2006) identified three reasons why idiomatic expressions are beneficial for learners: It helps them achieve perceived native-like performance, they are retrieved from memory in chunks which helps learners produce fewer hesitations, and they facilitate fluent language production under real-time conditions.

Obeidat et al. (1995) found that teachers of English as a foreign language in selected Jordanian public schools lack significant collocational knowledge, and that lack

of collocational knowledge may have negative impact on their English language teaching.

Liu (1999) examined Chinese students papers and exams for errors in using collocation. Liu found that learners had most difficulty with V-N collocation types. Liu (1999) and Tseng (2002) also found that explicit collocation teaching does have positive effects on learners.

Tun-pei & Hsien-Chin (2005) found that learners who used web-based practice units on collocations made significant improvements in their knowledge of collocations immediately after the tests. However, researchers do note that the learners knowledge of collocations was reduced after the treatment was removed.

Nesslhauf and Tschicold (2002) argue that teaching collocations suits learning applications best considering its importance in language, its eminent difficulty for L2 learners, and its ease of implementation in mobile learning applications. Therefore, deploying learning applications that focus on collocations has the potential to assist students in their L2 development. Nesslhauf and Tschicold argue that

> Vocabulary is one of the fields that can relatively easily be practiced outside the classroom. All the possibilities offered by multimedia CALL can be put to a useful purpose: pictures can illustrate vocabulary items; sounds can accompany the written words and expressions and give a model pronunciation for the examples; and sound can also be used to give acoustic feedback to the learner. (p. 251)

Thus, because they can be practiced easily on mobile devices, and because of their noted difficulty to second language learners, learners will likely spend the time and effort in interacting with *Idiomobile* because it provides a solution to a very specific problem in

the literature.

Motivation

As I stated earlier, motivation correlates with achievement in the second language. Therefore, motivated individuals will spend more time on the learning task, and are likely to learn than individuals who are less motivated. In using mobile applications, learners' motivation is also a key factor in how learners use mobile applications. There are many factors that affect learners' motivation in using mobile applications. According to Jones & Issroff (2007), there are six factors that motivate users to use their mobile applications: Control (of their learning process and the goals for their learning), ownership, support for collaborative learning, learning in context, continuity, and the fun and communication factor. Users of mobile applications have complete control of their learning in the sense that there no constraints that would impede the learning process. In general, users have access to their devices all the time. Unlike other digital media like laptops and PC, the fact that mobile devices can be carried around all the time gives users great amount of control over how and when they access their mobile devices.

In addition, mobile devices offer users a sense of privacy that is not necessarily available to other computing devices. Users feel motivated because in technicality, no one else can invade their private virtual world, a feature that mobile applications provide. For example, users may not necessarily be able to view personal photos on a public PC or even a laptop in a public place, when it is completely safe for a user to do so with their mobile device. These factors provide many reasons for users to interact with the device, and motivate them to do so.

Continuity is another important factor affecting how users may be motivated to use their mobile applications. Users' access to information and learning material does not necessarily stop because of the location of the learner. Users can access and interact with information on the bus, in the car, while walking, and/or in a variety of other situations.

Furthermore, because of their accessibility, mobile devices allow for more opportunities for participation, a key aspect of the learning process. Researchers and educators are advocating uses of technology that maximize learners' inclusion in the learning process. Selfe (1999), Selfe & Hawisher (1999), Warschauer (2003), Phipps, Sutherland, and Seale (2002), and Rainger (2005) assert that accessibility is a pivotal aspect in learning. Rainger (2005) state that accessibility is the "key to strategies to support inclusion, participation, and diversity within education and training" (p. 57). Warschauer (2003) considers the ability to access information technology 'critical' to social inclusion. Selfe (1999) argues that technological innovations should take into consideration the importance of allowing learners opportunities to interact and take control of their learning process. Selfe (1999) also takes a similar approach to Warschauer's vis-à-vis investing in technology. She argues that access to technology is key to empowering students. She argues that educators pay particular attention to issues of access especially when championing a technological innovation.

Therefore, providing mobile learning applications to users on their mobile devices will provide them access to language learning material, and will likely influence how they use their mobile devices.

Use of Games

Research shows that interactive media like games play an important role in

mobile application usage behavior. In a study by Sharples, Corlett, Bull, Chan, and Rudman (2005) that investigated whether university students needed a learning organizer to help them manage their learning and studies, the most installed applications according to the findings were games and music applications. The seventeen learners who were students at the university were introduced to using the mobile device and were encouraged to install whatever applications they wanted on their devices. According to Sharples et al (2005) "Not surprisingly, amongst the most popular downloads were various games and an additional media player" (p. 142). Trinder, Magill, and Roy's (2005) investigation of the use of PDA in teaching and learning showed that students who did use the PDAs installed at least one game on it.

It is no surprise that games are considered an important factor affecting usage of mobile applications. They create a laid-back learning environment where learners are willing to take risks, become motivated, and provide meaningful language learning material (students respond to the game, i.e., become happy, angry, amused, excited). Language learning can be frustrating at certain points; therefore, games allow learners to have renewed interest in learning and provide a break from repetitive classroom tasks.

Prensky (2007) argues that digital games are not just for fun, or for basic review of school subjects. Prensky argues that digital gaming can be used solely for learning. The example Prensky provides is a case study of the *Money Wrench Conspiracy*. Prensky uses this case to illustrate how gaming can be used as the main source of learning, where users play the game, and in doing so, learn all the skills that are embedded in each of the levels in the game. Prensky argues that this is serious learning, because first, the learners are motivated, since the game is a context that is very familiar and fun to them. Second,

the learners are motivated to play the game without realizing that they are in fact learning. And third, Prensky argues that as learners play the game, they feel a rush and engagement they do not normally feel while 'learning' in school. According to Prensky (2007), there's a world of learning where everything students and trainees learn is old-fashioned, and simply boring. The new generation has realized the potential in technology and is expecting those in charge to use it to its full potential. Prensky argues that the world of gaming to which millions of people have made pilgrimage is presenting them with opportunities that have not been presented elsewhere in the academic and corporate world. According to Prensky, learning in school is boring. It is very unengaging. Thus, despite the immense technology the world has witnessed, it has not made its way into schools as it did into kids' minds and hearts. Prensky argues that

> "The forces bringing these two worlds inexorably together, in Ogilvys words, " like tributaries of a river" are first, *technological change and generational discontinuity*, causing learners today to be different than in the past, and second, *the need for training and education to catch up* to be efficient and effective" pps. 15-16 (emphasis in the original)

Prensky believes there is a divide between two disconnected worlds: Those who want to teach and train, and those on the other end who will receive this learning and training. On the one hand, there is the world of multi-billion dollar budgets focusing on the "most serious" kind of learning. On the other, there is the world of entertainment and what it brings from music and TV, to video games. Prensky uses a more illustrative term to describe these two worlds and their population: The 'Digital Natives' and the 'Digital Immigrants'. The 'Digital Natives' is the generation of learners who grew up during the

massive technological advancements, who spent all their lives playing videogames, listening to music on their digital players, smart phones, and many more gadgets made possible by this technological revolution. Prensky argues:

> Today's students – K through college – represent the first generations to grow up with this new technology. They have spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age. Today's average college grads have spent less than 5,000 hours of their lives reading, but over 10,000 hours playing video games (not to mention 20,000 hours watching TV). Computer games, email, the Internet, cell phones and instant messaging are integral parts of their lives. (p. 1)

On the other end of the spectrum is the 'Digital Immigrants', those who had to come to terms with learning these technologies. Prensky argues that opportunities exist for both the Digital Natives and the Digital Immigrants to capitalize on the kind of learning that is engaging, meaningful, and serious: Using digital games as embedded learning experiences.

There are several key characteristics of games that influence the amount of time and effort users spend in playing the game. I discuss them below.

Risk-Taking

Gee (2005) considers risk-taking an important principle of good video game designs in promoting learning since they invite users to take risks.

> Good video games lower the consequences of failure; players can start from the last saved game when they fail. Players are thereby encouraged to take risks, explore, and try new things. In fact, in a game, failure is a good thing. Facing a

> boss, the player uses initial failures as ways to find the boss's pattern and to gain feedback about the progress being made. School too often allows much less space for risk, exploration, and failure. (p. 6)

One of the several reasons learning experiences involving interaction between humans and the machine are valued is because they allow for more risk-taking (Gee, 2005; Pennington, 1996; Spears and Lea, 1992; Skehan, 1998). Unlike face-to-face communication, interaction with the machine is normally less risky than interaction with humans. During face-to-face communication, learners are often under the impression that if they make a mistake in using language, listeners may make fun of them. Pennington (1996) argues that risk taking is one of aspects of the power of computer assisted learning. Pennington (1996) argues that language learners are likely to produce more language through the activities made available by the computer, and in turn produce more comprehensible input and comprehensible output (Swain, 1985). Because of the amount and the variety of learning modes in computer applications, students often have more opportunities to increase their risk-taking behavior while interacting and experimenting with the language material in *Idiomobile*. Skehan's (1998) states that readiness in taking risks in language learning helps learners develop their language performance in L2 tasks.

Learners' Autonomy

Games provide learners the opportunities to be in control of their learning experience. Learners are likely to attend to learning experiences if they are encouraged to take a more active role in their learning. Researchers in the field of SLA have stressed the importance of allowing learners to exercise more control over their learning (Watts, 1997; Wenden, 1991). It has also been shown that learners will contribute to their own

development if they can be engaged with a game. “A certain degree of metacognitive guidance …may facilitate learning and promote metacognitive engagement” (Vygotsky, 1978). One way learners can be engaged is by allowing them control over their learning process, a key characteristic of games. When learners are actively engaged with the task, they are more likely to develop learning strategies that will aid their language development. This metacognitive guidance is present in *Idiomobile* through on-screen guidance, directing users to what they should be paying attention to. This aspect is also related to another key factor in successful learning that has been examined earlier: motivation. Engaging learning experiences can contribute to learners’ motivation.

Negotiation of Meaning

In addition to risk-taking and learner’s autonomy, games provide ample opportunities for negotiation of meaning. Learning is essentially the result of interaction between learners and others, and that learners attend better to learning when they have opportunities to interact and negotiate meaning (Vygotsky, 1978; Levin & Boruta, 1983; Ahmad, Corbett, Rogers & Sussex, 1985; Kelman, 1990; Pica, 1994; Skehan, 1998; Healey, 1999; Egbert, Chao, and Hanson-Smith, 1999; Chapelle, 2001, 2003). This negotiation of meaning takes place in *Idiomobile* in a variety of ways. First, users are allowed to make selections, and be given feedback before an incorrect answer is recorded. For example, if users are asked to provide an answer to a question, and they provide an incorrect one, *Idiomobile* will relay that information back to users, and asks them to try a different answer. This allows users to make another selection, a possibly correct one before a credit is assigned or withdrawn. In addition, *Idiomobile* presents idiomatic expressions and collocations with varying degrees of formality, and structure

difficulty. For example, when users roll over an item in a given category, an idiomatic expression linked to the item is displayed. If users roll over the item again, *Idiomobile* will display another idiomatic expression linked to that item, with varying degree of formality and structure difficulty (see Figure 1).

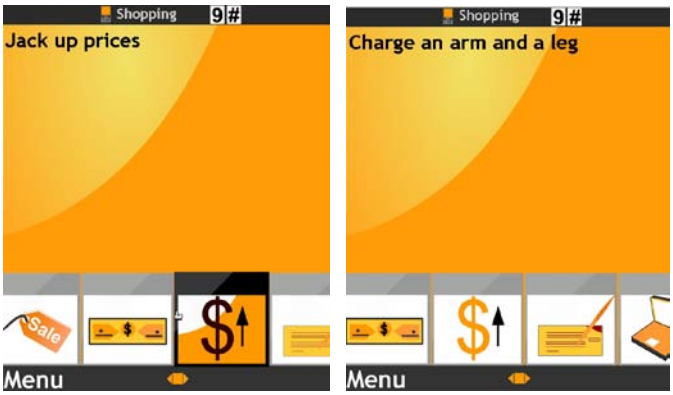


Figure 1. An example of negotiation of meaning in *Idiomobile*.

Developing Learning Strategies

To be successful in any game, a user must learn strategies that would allow them to win and move on to another level. Games provide learners with unlimited opportunities to build their own learning strategies. Watts (1997), Chapelle (2003), and Hémard (1997) argue that applications should invite and encourage users to develop their own learning strategies. Applications that encourage users to develop their own learning strategies are vital since learners are expected to develop their own learning strategies as they take control of their learning experiences.

Ease of Use/Technical Difficulties

Another factor that can affect users' behavior with a mobile application is the presence of a technical difficulty that may frustrate the learner, and therefore prevent them from using *Idiomobile*. Although mobile devices offer exciting new opportunities

on the go, mobile devices have still have limitations in a variety of dimensions. The most obvious of these for example are screen size and processor power. These two aspects affect how mobile devices handle complex tasks simultaneously in a limited amount of space. Kukulska-Hulme (2005) documents this downsize to mobile devices arguing that

> [C]urrent mobile devices are designed for specific uses that typically focus on allowing users to enter and access fairly structured data like contacts, lists, dates, financial information, and memos, to send and receive messages, to view documents and pictures, or to access the web.. (p. 46)

Kukulska-Hulme and Traxler (2005) unraveled issues related to mobile usability that were classified as cognitive, ergonomic, and affective issues. They argue that cognitive issues could pose challenges for users as they use mobile devices. Cognitive issues are conceptions of differences between using PCs and mobile devices, print material and electronic small size depictions of large texts, and ergonomic challenges such as the fear of deleting diary entries from the device, can also pose challenges for mobile users. In general, researchers are encouraged to pay attention to issues pertaining the usability of mobile devices. As Kukulska-Hulme (2005) argues “the key point to note is that educators and trainers have a crucial role in asking the following question: if a mobile device has been tested for usability, what contexts of use were taken into account?” (p. 53).

Nielsen (2003) also argues that even the latest mobile devices can use lots of usability enhancements when it comes to mainstream use of these devices. These features include issues of connectivity in certain places, and issues of intuitive integration between the hardware and the software of the device (i.e., the mouse wheel, soft keys,

etc).

Weiss (2002) comments on the "general lack of usability on most handheld devices" (p. xiii). According to Weiss, this is largely due to lack of a consistent design scheme. One of the examples of this lack of unfriendliness in design is the lack of a 'back' button on most mobile browsers, which inconveniences users who are already used to working with desktop browsers that utilize it. The conclusion to be drawn, according to Kukulska-Hulme (2005) is that "each manufacturer develops a unique user interface, so there is also little consistency between devices" (p. 46).

Issues of usability, however, do not only pertain to the technical aspects of software or a system model. According to Muir, Sheild, and Kukulska-Hulme (2003), usability can be described in four levels: technical, general, academic, and context-specific. Technical and general aspects refer to issues of software and hardware, while academic and context specific refer to how sound the applications are in terms of their oversight of pedagogical and learning content issues. Kukulska-Hulme and Shield (2007) use the term *pedagogical usability* to refer to the collective interplay of all these aspects together. The research suggests that educators and content developers extend these terms to issues that could also be relevant to specific and given situations. The recommendation is to identify what usability issues become important depending on the task to be implemented.

Trinder, Magill, and Roy (2005) findings in a study about the benefits of using a PDA for learning purposes are consistent with previous research regarding how technical difficulties affect how learners use mobile devices. While their learners reported reading problems to due to poor screen display, they still praised other aspects of *Idiomobile* that

were functional.

Smørdal-Smørdal and Gregory (2005) investigated the development and evaluation of a net-based and mobile solutions to providing medical students with immediate information in job training settings. Findings indicate that medical students did not find PDAs useful for information gathering. Problems that students encountered are screen size problems, and slow transmission of information. Findings also indicate that e-book material made available was not useful, nor was the use of messaging services for collaborative learning. Students also experienced problems working across different applications.

Kukulska-Hulme (2005) maintains that although years of desktop innovation have driven the computer evolution process, thereby providing key features of what constitutes good design, user friendliness when it comes to mobile software is still lacking in many of the available programs. Thus, developers and educators need to always ask themselves key questions, as Weiss (2002) suggests, that pertain to the rationale of an application, and the target audience of *Idiomobile*. Developers should also be aware of the limitations on mobile devices, and how excellent design should attempt to work around those limitations.

Accessibility and Participation

The number of people carrying mobile devices is incredible. These devices have become so ubiquitous that we no longer seem to take notice of them. These devices include, but certainly are not limited to, PDA's, Tablet PCs, smartphones, palmtops, laptop computers, recent iPod Touch generations, and media players. Mobile device makers have also been competing for market share of their devices by trying to provide

“the” device, the mobile device that can do it all. Recent versions of smart phones, like the *iPhone*, and the *Nokia N95*, and the Nokia's *NSeries* in general, all have capabilities that are unheard of on a mobile device. For the sake of illustration, I will highlight the features of a *Nokia N95* cell phone, which appeared first in Europe in the summer of 2007. As of this writing, its successor, the *N95 8GB* is now available almost everywhere across the globe. It boosts a 5.0 mega pixel Digital Flash-enabled camera. It connects to the internet via Wi-Fi capability. It can connect to other Bluetooth devices and devices that have infrared connectivity capabilities. It has a built-in FM player, music player, blogging-enabled, and smart browser that allows for displaying real web content that could be scaled by users on the device. It has a 2.8” screen display and 16 million colors, and it is also GPS-enabled.

Because they are accessible and they are becoming an important aspect of our daily lives, users prefer to use this medium for learning purposes. Thornton and Houser (2001) conducted a study to investigate the potential for mobile phones to assist Japanese language learners with English vocabulary. Vocabulary lessons were emailed at timed intervals to the mobile phones of 44 Japanese university students. Thornton and Houser found that students receiving the emails regularly learned more than those students who were only urged to learn vocabulary. In addition, 71 percent of learners preferred the mobile phone medium of learning in this study compared to the PC.

Contribution to Existing Literature

As I explained earlier, idiomatic expressions and collocations are difficult to learn, but can be implemented in mobile learning. Therefore, because of their noted difficulty, and their possible implementation in mobile devices as mobile learning

applications, *Idiomobile* provides ample learning opportunities for learners to learn idiomatic expressions and collocations.

However, despite their importance and ease of implementation in computer applications, mobile language learning applications that aim at helping second language learners with idiomatic expressions and collocations are almost non-existent, with the exception of pocket dictionary applications that present idioms in list format, like the Oxford pocket dictionary of idioms.

It is certainly unknown how much more technology is going to evolve in the future, but what is certainly known is that newer devices can do more and have better and improved capabilities while becoming more affordable. Kukulska-Hulme (2005) also stresses how this medium offers many opportunities that must be tapped into. Kukulska-Hulme claims that mobile learning "is rapidly becoming a credible and cost-effective component of online and distance learning, and anyone developing courses in companies, universities and colleges must consider carefully what it has to offer" (p. 2).

Despite all these capabilities in mobile devices, and the potential for mobile learning, there is a lack of research on how mobile learning applications are actually used by learners. We know that users are relying heavily on their devices to listen to music, and send text messages (Pape, 2006). We also know that users like to play games on their mobile devices, but we are not sure how educational games like the ones in *Idiomobile* might be used. Mobile applications that aim to provide learners with resources to learn idiomatic expressions and collocations are almost non-existent, and because *Idiomobile* is the first application of its kind, it is not known how users use learning application like *Idiomobile*. Which factors determine how the learners use *Idiomobile*? How will users

interact with the available sections in *Idiomobile*? What does the way learners use *Idiomobile* indicate about the role of mobile learning in second language learning?

Technically, *Idiomobile* is the first project that utilizes the ubiquitous Flash Lite Player for creating applications for second language learning purposes. As I mentioned earlier, Flash is the world's most used authorware application for creating and deploying rich media applications. *Idiomobile* allows users to save their session information details to the mobile device. It allows users to add new idiomatic expressions and collocations that are not available in *Idiomobile*. *Idiomobile* has an intelligent assessment administrator that is capable of administering, saving, and picking quizzes and tests in a variety of formats. Not only can users customize the time the test or quiz lasts, but they can also customize the number of questions, the time to spend on the quiz, and the category of idiomatic expressions and collocations to be included in the quiz. All the technical functionalities and features available have been researched and recommended by experts in a variety of interdisciplinary fields, from the position of menus and help screens, to the wording of commands, and the language used in helping learners with idiomatic expressions and collocations.

Idiomobile is also a smart application in the sense that it is lightweight. The application size at the time of writing this chapter is roughly 742Kbs, which loads instantly on most of the devices it was tested on. *Idiomobile* is also unique in offering idiomatic expressions and collocations for learners regardless of the availability of internet access or network service. This is because the Flash Lite Player is hosted locally on the device.

On the linguistic level, *Idiomobile* has a variety of innovations. First, it contains

roughly three thousand widely used idiomatic expressions and collocations. The number of expressions that can be stored in *Idiomobile* depends on the amount of space available on the target device. This means that *Idiomobile* would run fine with one hundred thousand expressions stored in *Idiomobile* if, for example, the target device has one megabyte of space available. The expressions are selected from a variety of contexts to help learners become familiar with idiomatic expressions and collocations across a variety of topics. In addition, *Idiomobile*'s assessment capabilities are integrated with *Idiomobile*. The capabilities provide immediate feedback to users regarding their performance during any given session. Learners are also in charge of the learning process in *Idiomobile*. The functionalities built in allow users to 1) review idiomatic expressions and collocations in a specific context 2) play a variety of games with idiomatic expressions and collocations, 3) take tests and quizzes and be allowed to save the results, 4) view all the idiomatic expressions and collocations in *Idiomobile* that are available in alphabetized list format, and 5) add idiomatic expressions and collocations that application does not contain.

In the next chapter, I discuss the research methodology employed in this study, learners' backgrounds and selection, and discuss the methods of analysis to be used in interpreting the results of the study.

CHAPTER THREE: METHODOLOGY

This study seeks to explore the process of how English language learners use *Idiomobile,* a mobile language learning application created by the researcher for learning idiomatic expressions and collocations. In doing so, the study will address the following research questions:

I. To what extent do learners of English use *Idiomobile* to learn idiomatic expressions and collocations?

1. Hypothesis: Learners of English will use the *game* and *quiz* sections of *Idiomobile* significantly more than other sections to learn idiomatic expressions and collocations.

II. In what ways do the four groups of English learners use *Idiomobile* to learn idiomatic expressions and collocations?

2. Hypothesis: There is a significant difference among English language learners' usage of *Idiomobile*.

III. To what extent does usage of the sections in *Idiomobile* correlate with scores on the built-in quizzes in *Idiomobile*?

3. Hypothesis: There is a significant positive correlation between usage of the sections in *Idiomobile* and the scores on the built-in quizzes in *Idiomobile*.

IV. To what extent do self-reported TOEFL scores correlate with English learners' scores on the quizzes in *Idiomobile*?

4. Hypothesis: There is a significant positive correlation between English learners' self-reported TOEFL scores and their scores on the quizzes in *Idiomobile*.

V. To what extent does English language learners' average daily usage of mobile

phones predict usage of *Idiomobile*?

5. Hypothesis: Average daily usage of mobile phones will predict usage of *Idiomobile*.

VI. What are learners' opinions towards the use of *Idiomobile* in particular and mobile technology in general to facilitate learning idiomatic expressions and collocations?

6. Hypothesis: Learners will have positive views of *Idiomobile*, and of using mobile technology in language learning in general.

Research Design

Mackey and Gass (2005) and Brown and Rodgers (2002) discuss the variety of research designs that particularly pertain to studies in second language acquisition. They argue that each research design has its particular issues that must be taken into consideration prior to research. They argue that the nature of research questions and data collected to a certain extent dictate the research design. Since the vast majority of data collected in this study is quantitative, and since the research questions in this study aim to examine the correlations (associations) between variables, this study utilizes a correlational research design. Mackey and Gass (2005) argue that

> Correlation can be used in different ways; for example, to test a relationship between or among variables, and to make predictions. Predictions are dependent on the outcome of a strong relationship between or among variables. That is, if variables are strongly related, we can often predict the likelihood of the presence of one from the presence of the other(s). (145)

According to Mackey and Gass (2005), in quantitative research studies utilizing a

correlational design, a researcher's goal is to determine the relationship between variables and how strong the relationship is.

> Quantitative research can be conceptually divided into two types: Associational and experimental. What is common in both types is that researchers are attempting to determine a relationship between or within variables. The goal of associational research is to determine whether a relationship exists between variables and, if so, the strength of that relationship. This is often tested statistically through correlations, which allow a researcher to determine how closely two variables are related in a given population. Associational research is not concerned with causation, only with co-occurrence (p.137).

Because the research questions in this study aim to examine the relationship between *variables* in this study, I discuss in the following section the variables to be examined and how they are operationalized.

Variables in the Study

Independent Variables

English Learners' Average Daily Usage of Mobile Phones. This independent variable is reported on the preliminary questionnaire, and measured in minutes. English learners reported their average daily usage of mobile phones where they indicated roughly how many minutes per day they spend using their mobile devices.

Self-Reported TOEFL score. Each English language learner reported their most recent TOEFL test score on the preliminary questionnaire. This independent variable is measured in PPT scores format where 310 is the lowest TOEFL score and 677 is the highest TOEFL score.

Dependent Variables

Scores on the quizzes. *Idiomobile* contains a quiz section where English learners can take as many quizzes as they can. The number of questions they answer on these quizzes and the scores on these quizzes are saved in *Idiomobile*. The questions that appear on the quizzes are randomly selected from a pool of over three thousand question items created by the researcher for this application. This means that each quiz English learners take can include questions that have not appeared on previous quizzes. The quiz questions are a multiple-choice question format where the English learner is provided an idiomatic expression and asked to select the meaning of that expression from three choices.

Usage of Idiomobile. *Idiomobile* is programmed to count how many times English learners use each of the available sections in *Idiomobile*. Usage here refers to accessing each section of *Idiomobile*. For example, when an English learner selects the *health* section of *Idiomobile*, a usage count will be assigned to that section, and so on for all the sections in *Idiomobile*.

Participants

The researcher recruited participants at the American Language Institute (ALI) at Indiana University of Pennsylvania (IUP) and English language learners from the Composition and TESOL (C&T) graduate program. There are a number of advanced English language learners pursuing their graduate degrees at IUP. I use the term ESL to refer to students whose first language is not English, and who are currently residing in an English speaking environment. To address the research questions in this study, the sample must include participants to represent learners with varying goals in learning

English and varying proficiency levels. Such is the case because *Idiomobile* targets English language learners, who enjoy varying proficiency levels in English, and learn English for a variety of purposes. To provide a representing sample, the researcher will recruit participants to cover a variety of backgrounds, proficiency levels, and goals for learning English. Thus, the participants the researcher recruited fell into four groups: Advanced C&T students, ALI students, EFL learners of English, and ESL students who are not English majors. These groups can be distinguished from one another in several characteristics: Self-Reported TOEFL score, length of residence in an English-speaking community, and specific content knowledge of English as in the case of C&T students who have been, not only learning, but studying the English language. In the next section, I provide background information regarding the participants in this study.

ALI Participants

The ALI at IUP is an institute that offers intensive language programs for students of English as a Second Language (ESL). Students who are admitted to the ALI are usually granted a provisional admission at IUP. This means that they have scored below the minimum TOEFL score of 500 required by the University to be admitted into their respective program of study. Students admitted provisionally take classes in the ALI based on their proficiency level which is based on their TOEFL score. Students who do not have a TOEFL test score sit for the institutional Paper Based Test (PBT) TOEFL test which is administered at the ALI at the beginning of the semester to determine if they have met the required TOEFL score for their program of study. Those who score within a specific range are grouped into the same level, hence the levels green, white, yellow, orange, blue, and bridge levels. Students in the blue and bridge levels have the highest

proficiency level in English as measured by the TOEFL test. Each level has pre-defined set of required classes, and some elective classes students in that level must take. At the end of the semester, all students in all levels take the institutional TOEFL test. If they score equal to or higher than the required score for their respective program of study, they leave the ALI. Students who do not reach the score set by their program of study move on to a higher level of classes within the ALI. Learners in this group will have an average TOEFL score below 500. ALI students' placement score ranges are presented in Table 4.

Table 4

ALI Student Placement Score Ranges

Group	TOEFL Score
Green (beginner)	Below 400 or self-placed if no test taken
White (high beginner)	401-425
Orange (low intermediate)	426-450
Yellow (high intermediate)	451-475
Blue (low advanced)	475+
Bridge (advanced)	480+

Participants from the Composition and TESOL Program

The Composition and TESOL (C&T) graduate program at IUP has a number of advanced English language learners. C&T students are pursuing their graduate degrees for both the MA and the PhD degrees. To be admitted into the graduate program, students in these programs must at least have the equivalent to a minimum TOEFL Paper Based Test score of 550. Participants in this group have a strong background knowledge of English. Participants in this group are expected to have the highest number of years of

English language learning. Many of them are expected to teach English language courses when they graduate. Thus, they are expected to be able to teach and use the language, which includes usage of idiomatic expressions and collocations. In addition, participants in this group have at least two years of language exposure with native English speakers since they reside in an English-speaking community.

EFL Learners of English

EFL participants in this study are students in a language center in Amman, Jordan. Participants in this group represent a variety of learners. Some of these learners are employees who are looking to advance in their respective careers. Some are college students. There is also a number of high school students taking general English classes. The language center provides general English language courses for its students based on an in-house placement test. The courses in this center range from basic to advanced courses in English. The majority of courses focus on the four skills, although they offer other classes based on registration such as TOEFL test preparation, business writing, and English conversation. Participants in this study were enrolled in a TOEFL preparation class. The participants in this study have already taken the TOEFL test, and are trying to prepare by taking the course in hopes they will score higher next time they take the TOEFL. Participants in this group have not been exposed to native-speakers nor lived in an English-speaking community.

ESL Students not Majoring in English

In addition to learners from the ALI, C&T program, and EFL learners, the researcher will recruit ESL learners who are not studying mainly English classes.

Learners from the Business program who are English language learners will be also be recruited. Participants from the business program are also pursuing their graduate degrees, but their goals in learning English are different from the previous groups. They are not learning English to become teachers of English, but rather to be able to use and study in English. Participants in this group have at least one year of language exposure with native speakers in an English speaking community.

Participants' Confidentiality

The researcher requested permission from the Director of the American Language Institute (ALI) to solicit ALI students' participation in the study. Prior to soliciting participants' permission to become part of the study, the researcher supplied all participants in the four groups with information regarding the study to help them make an informed decision as to whether to participate or not. All participants were given information regarding the purpose of the experiment. They were informed of the methods that will be used to collect the data, the length of the experiment, and information regarding who should be contacted if any questions arise during the experiment. Participants were also informed that their participation is voluntary, meaning that they can opt out of the experiment at any given time without affecting their relationship with the university, their institution, or the researcher. In addition, participants were informed that all data collected will be used for research purposes only, and that the researcher will take all the necessary measures to ensure that any identifying elements of the data will be held confidential.

Procedure

Prior to participating in this study, participants were provided with information

regarding the study to allow them to make an informed decision as to whether participate or not. Institutional Review Board (IRB) approval for this study has been obtained, and all participants were provided this information before they participated in the study.

After participants provided their consent to participate in the study, they were asked to fill out the preliminary questionnaire. The preliminary questionnaire collected information about participants' first and second language, recent TOEFL score, length of residence in an English-speaking community, and activities learners take part in to help them learn English. In addition, the preliminary questionnaire (Appendix A) elicited information regarding learners' usage habits of mobile devices, and their opinions on the importance of using mobile technology in language learning. For participants who have access to a Flash-enabled device, the researcher installed *Idiomobile* for them. For those who did not have access to a Flash Lite-enable device, the researcher provided them with one that has a copy of the application pre-installed. Each learner received a training session on how to use *Idiomobile*, and practice using *Idiomobile* for at least two sessions. The researcher answered any questions learners have during this time. In addition, participants received a quick user-guide sheet to keep that details the functions of *Idiomobile*, and provide step-by-step tutorials on how to use *Idiomobile*. Participants were asked to meet with the researcher one week after they received *Idiomobile*. The researcher conducted phone and online-interviews with learners who were not available to meet with the researcher in person. Learners were informed on the benefits of using *Idiomobile*, and were asked to use it as much as they please.

Data Elicitation Methods

In this section, I explain the kind of data that was collected, and the methods by

which data was collected from the participants.

Questionnaire Design

Dornyei (2003) argues that questionnaires are attractive research tools because they are efficient in terms of researcher's time and effort. They are also attractive since they do not require massive financial resources, and if constructed and used successfully, they can be easily processed. However, questionnaires, like other data collection tools, have their own limitations. In this section, I discuss the limitations that pertain to the questionnaire in this study.

Time considerations. Dornyei (2003) suggests that questionnaires should not require more than half an hour to be completed, since respondents may become fatigued or unmotivated, which could affect how they respond to the questionnaire. The questionnaire in this study was designed to be completed in less than ten minutes.

Acquiescence bias. According to Dornyei (2003), respondents may tend to agree with the researcher when they are unsure about a questionnaire item which could affect the accuracy or truthfulness of their response. To help mitigate this problem, the researcher will explain all questionnaire items to participants prior to filling out the questionnaire, and will encourage participants to ask questions if they are unsure about a questionnaire item.

Preliminary Questionnaire

After participants provided their consent to participate in the study, they were asked to fill out a preliminary questionnaire (Appendix A). Learners who were not available to fill out the questionnaire in person were sent a link to fill out an exact copy of the questionnaire online. Some EFL, and ALI learners had a choice to fill out a

questionnaire version in their native language, Arabic. This questionnaire collected information that pertains to the participants' linguistic background, namely first language, length of residence, self-reported TOEFL score, and current English classes enrolled at. In addition the questionnaire will collect information that pertains to participants' use of mobile devices. Participants were asked on this questionnaire to indicate how often they use mobile devices and the applications that they use most on their device.

Experimental Material: Mobile Data Collected

The mobile application collected data that pertains to the following dependent variables: Application usage, and average scores on the built-in quizzes. Mackey and Gass (2005) claim that "computer-based research can utilize the various tracking possibilities that technology allows, for example, to see the extent to which learners do and do not use look-up sources, and when they do, how and how often" (p. 75). One of the major benefits computers offer in second language acquisition research is tracking capabilities.

Trinder, Magill, and Roy (2005) investigated how quantitative data collected from learners via a mobile device may provide insights about students' learning patterns, and how often they access and use PDAs. They investigated the benefits of PDAs as teaching, learning, and revision tools. They utilized AppLog (Ninelocks, 2002) an application that records data related to the number of times an application was used on the PDA, how long it was used, and a session history for *Idiomobile*. The researchers argue that other studies collect data through questionnaires and interviews; that is why they used AppLog, "an automatic logging system that records time-stamped entries to identify when the PDA was used" for an 'objective' data collection method (p. 93).

Idiomobile is equipped with tracking capabilities that record and calculate information elicited through users' interaction with *Idiomobile*. *Idiomobile* records this information, and saves it to the device. This data can be accessed later to determine a myriad of behaviors. Below I examine in details the kind of data that were collected, and how it was used in answering the research questions.

Time Spent

Idiomobile is programmed to write to a text file on the device information regarding when the session started, when it ended, and then automatically evaluates the time spent on that session. *Idiomobile* recorded time spent in hours/minutes/seconds format.

Sections Used

Idiomobile contains 13 sections that English learners can use. Eleven of these sections include idiomatic expressions and collocations that are categorized thematically, and two of these sections are multiple-choice type quiz, and games where English learners use idiomatic expressions and collocations to help the character of the game use idioms and collocations in a variety of scenarios. For example, if a user starts *Idiomobile*, and clicks on the idiomatic expressions in the *sports* section, *Idiomobile* records that this section was used an x number of times during that session, and calculates the number of idioms reviewed per that session. An example of the data that *Idiomobile* records is presented in Table 5. The data presented is based on data from the pilot study which was conducted prior to the main study. Each section of the eleven sections contains a specific pre-determined number of idiomatic expressions and collocations that thematically

belong to that category. *Idiomobile* tracked data as to which of these sections was used and recorded it to the device.

Table 5

Total Number of Times Sections Used (Based on data from the pilot study)

ID	academic	finance	health	shopping	animals	colors	feelings	Body	sports	travel	food	quiz	game
1	1	0	1	1	1	0	1	0	0	1	2	0	1
2	0	0	0	1	0	1	0	0	0	3	0	12	1
3	1	0	0	0	2	1	2	0	0	1	3	19	3
4	1	0	0	0	0	0	0	0	0	1	3	21	0
5	0	0	0	1	0	0	0	0	2	0	0	23	5
6	0	0	0	0	0	0	0	0	0	0	0	26	3
Total	3	0	1	3	3	2	3	0	2	6	8	101	13

Games and Quizzes

Idiomobile contains a game and quizzes that users can customize. The data recorded for these sections included the number of times learners used these sections, and the wrong answers learners made identifying the correct idiomatic expressions and collocation. For example, a learner took the multiple-choice format quiz, and got wrong answers on the quiz, *Idiomobile* saved the wrong answers to the text file. In addition, *Idiomobile* provided information on how many times learners took the quiz, the number of questions that were to be asked on the quiz, and the correct and incorrect answers they made. Each time learners used *Idiomobile*, the following information was recorded and saved: The amount of time they spent during the session, the number of idiomatic expressions and collocations they reviewed, the number of sections they covered, the number of questions they answered, the number of times they took the built-in quizzes

and the scores on these quizzes, the number of correct and incorrect answers on the quizzes, and the idiomatic expressions they answered correctly and incorrectly. Table 6 provides an example of this data collected.

Table 6

Number of Quizzes Taken and Number of Questions Asked and Average Score

Participant	No of quizzes	N of Qs	Self-reported TOEFL score	average score
1	0	0	600	0
2	12	89	600	58.42696629
3	19	158	593	61.39240506
4	21	216	647	62.5
5	23	204	610	74.50980392
6	56	858	580	73.65967366
7	26	440	637	75.45454545

The tracking capabilities in *Idiomobile* provided information about participants' behavior in using *Idiomobile*. However, there were a number of limitations to these capabilities. First, despite the fact that *Idiomobile* tracked the aforementioned details of the session, it was not able to determine whether the participant in the study was actually the one using *Idiomobile*. Mobile devices may contain personal information, i.e., images, notes, etc), so one can assume that users were not likely to share the device with others. Yet, the likelihood that a participant may share *Idiomobile* with another person who may have used it still existed. In that case, the data that was recorded to the device was not reflective of the actual participant usage of *Idiomobile*. Therefore, prior to participation in the experiment, participants were instructed to use *Idiomobile* individually.

Second, the time learners spent during each session did not necessarily represent the actual amount of time they really spent using the device. Many times users would start *Idiomobile*, and then leave it on without actually using it. This was inferred from the data that was saved to the device. For example, if a learner had a time spent value of ten hours, and a value of zero for usage of the application, it was safe to assume that the session represented an incident in which the learner started *Idiomobile*, and for whatever reason did not actually use it.

One other concern needs to be mentioned regarding the data collected by the application. *Idiomobile* is capable of recording data and saving it to the device. This will normally happen if users exit *Idiomobile* from the exit command. However, if a user, for example, was using *Idiomobile*, and a sudden loss of battery power in the application occurred, the data for that session was most likely lost. Thus, despite usage of the application, the data would not be recorded, and therefore would not be available for analysis. There might have been occasions where learners would receive a call while they were using the application. This did not necessarily cause loss of data, but if the learner closed the call, and accidentally closed all running applications, the data may not have been saved.

Follow-up Interviews

In addition to data collected from the questionnaire and *Idiomobile*, I conducted follow-up interviews with the participants to gain a better understanding of how they used *Idiomobile*. Rubin and Rubin (2005) argue that interviews provide rich, detailed accounts of information of participants' experiences. They allow the researcher to get information that cannot be obtained from questionnaires. In addition, they allow the

researcher to build themes from the participants' responses as they relate to their experiences with *Idiomobile*.

Rubin and Rubin (2005) argue that interviews are "structured conversations" (p. 129). They argue that an interview must contain main questions to cover the main parts of the research questions, follow-up questions that allow the researcher to request explanation of ideas, and probes to maintain the central focus of the interview and keep it on topic. My interview was organized by including main questions, follow-up questions, and probes that attempt to gather information to help answer the questions of this study. I asked the following questions during the follow-up interview:

1. Could you please tell me about your experience with this application?
2. What did you like about it? What did you not like about it? Why/Why not?
3. Did the game of *Idiomobile* make you use *Idiomobile* more?
4. During what times did you use *Idiomobile*? Why?
5. Did you try to use any of the idioms in *Idiomobile* in real life? Why/Why not?
6. Did *Idiomobile* make you want to learn more idioms? Why/Why not?
7. Do you think you now know more idioms because of *Idiomobile*?
8. Which idioms do you think you have most difficulty with?
9. Did you have any trouble using *Idiomobile*? Do you think these problems affected how often and how you used *Idiomobile*? Please explain.
10. Would you recommend this application to a friend? Why/Why not?
11. What would you like to see in you the future version of this application? Why/Why not?

Since I looked at common themes in learners' responses during the interviews, I did not

emphasize linguistic factors, such as pitch, pauses, turns, nor tone in my transcription. In addition, since some of the learners in this study were not fluent in English, I edited their responses for grammatical errors, and or pauses. I also translated responses in Arabic to English.

Pilot Study

Mackey and Gass (2005) state that "a pilot study is a small-scale trial of the proposed procedures, materials, and methods, and sometimes also includes coding sheets and analytic choices" (p. 43). They argue that a pilot study helps researchers revise and test the feasibility of the proposed methods, and also help them uncover problems and address them in the main trial. A pilot study was conducted to help eliminate problems that may occur in the main study. The pilot study consisted of 6 participants. After the participants provided their consent to participate in the study, they were asked to fill out the preliminary questionnaire, and then were given a user manual for *Idiomobile*. The participants interacted with *Idiomobile* for a week. Three participants used the phones provided by the researcher, while the remaining three participants had *Idiomobile* downloaded to their device. After a week, the researcher met with the participants, and collected the data from the mobile devices.

Initial Results

In this section, I describe the data collected from the participants in the pilot study. This section will be descriptive in nature, since the main goal of the pilot study is a trial of the feasibility of the main study. I will discuss the problems that I encountered during the pilot study, and how I plan to eliminate them in the main study.

Preliminary Questionnaire Data

The purpose of the preliminary questionnaire was to elicit information regarding participants' use of mobile devices, motivation, and language proficiency. Participants' self-reported information regarding their motivation for learning English, and how much time (in minutes) they spend outside of class to learn English is presented in Table 7.

Table 7

Amount of Time Spent on Activities for Learning English

Activity	Never	15	30	60	120	180	240
Watch TV shows in English to help you understand spoken English	22.2%	33.3%	0.0%	22.2%	0.0%	22.2%	0.0%
Listen to Podcasts to help you learn English	50.0%	12.5%	12.5%	25.0%	0.0%	0.0%	0.0%
Interact with English native speakers to help you learn English	22.2%	11.1%	33.3%	0.0%	22.2%	0.0%	11.1%
Participate in activities where English is practiced and/or spoken to help you improve your English	44.4%	0.0%	11.1%	22.2%	11.1%	0.0%	11.1%
Read books in English other than your class books to help you learn English	22.2%	0.0%	33.3%	22.2%	11.1%	0.0%	11.1%
Go online and surf the web to learn English	22.2%	11.1%	0.0%	33.3%	22.2%	0.0%	11.1%
Play games online to learn English	77.8%	11.1%	11.1%	0.0%	0.0%	0.0%	0.0%
Use your laptop to access exercises online to learn English	66.7%	11.1%	0.0%	11.1%	11.1%	0.0%	0.0%
Read the news/blogs online to improve your English	33.3%	11.1%	22.2%	22.2%	11.1%	0.0%	0.0%
Chat online with others to help me practice my English	33.3%	44.4%	0.0%	22.2%	0.0%	0.0%	0.0%

The second part of the questionnaire elicits information regarding participants' use of mobile devices for a variety of purposes. Items on this questionnaire elicit learners' frequency of usage of applications on their mobile devices such as the amount of time they spend checking their email, surfing the internet, playing games, listening to music, chatting with friends, sending text messages, and reading the news. All of functions and applications are available on a variety of mobile devices. Based on the data,

most learners utilize their mobile devices for two main purposes: Sending text messages, and listening to music. Few learners play games on their mobile devices based on the data reported by learners on this questionnaire item. Information on learners' usage of these functions is presented in Table 8.

Table 8

Use of Mobile Devices for a Variety of Purposes

Activity	Never	15<	15-30	45-60	60-120	180-240	>300
Check your email	87.5%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Surf the internet	87.5%	0.0%	0.0%	0.0%	0.0%	12.5%	0.0%
Play games	62.5%	37.5%	0.0%	0.0%	0.0%	0.0%	0.0%
Listen to music	50.0%	25.0%	12.5%	12.5%	0.0%	0.0%	0.0%
Chat with friends	62.5%	25.0%	12.5%	0.0%	0.0%	0.0%	0.0%
Send Text Messages	12.5%	75.0%	12.5%	0.0%	0.0%	0.0%	0.0%
Read the news	87.5%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%

In addition to eliciting information regarding learners' use of applications, the questionnaire elicited information regarding learners' usage of other mobile devices, such as iPods, PDA's, portable games, mini-laptops, regular laptops, and regarding their use of PCs. Data show the while learners usage of mobile and portable devices vary, the devices they use the most were PCs, laptops, and mobile phones. Data elicited indicate that the majority of learners' used their mobile devices on average between 1-2 hours a day, compared to 3-4 hours a day of PC and laptop use. Learners reported no usage of portable gaming devices, and only 12.5 percent of learners reported that they used PDAs

between 1-2 hours a day. Learners' reported usage of iPods on average was between 1-2 hours a day. Learners reported no usage of other mobile devices that were not listed on the questionnaire. Detailed usage of these devices is presented in Table 9.

Table 9

Usage of Mobile Devices

Activity	Never	15<	15-30	45-60	60-120	180-240	>300
Mobile Phone	0.0%	37.5%	37.5%	12.5%	12.5%	0.0%	0.0%
iPod(MP3)	37.5%	37.5%	0.0%	0.0%	12.5%	12.5%	0.0%
PDA (Personal Digital Assistant)	87.5%	0.0%	0.0%	12.5%	0.0%	0.0%	0.0%
Portable Game	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Mini-Laptop	85.7%	14.3%	0.0%	0.0%	0.0%	0.0%	0.0%
Laptop	25.0%	0.0%	0.0%	0.0%	12.5%	25.0%	37.5%
PC	22.2%	0.0%	11.1%	0.0%	11.1%	33.3%	22.2%
Other Mobile Devices	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

The data in Table 9 is helpful in answering research question (6), with regard to how mobile technology in particular may be used to in second language learning. This information can provide educators insights into mobile usage behavior, and therefore, examine the usefulness of utilizing these devices for providing language learning material.

The questionnaire included a section to elicit information regarding participants' opinions towards using mobile technology in English language learning. The statements were meant to elicit learners' views regarding usage of mobile devices in helping language learners, whether or not mobile devices should be used in the classroom for language learning purposes, whether or not dictionaries are viewed as helpful by language learners, and statements about learners' reported motivation in learning English.

Learners overwhelmingly answered most of these statements in similar ways. For example, all learners agreed that mobile devices can be used to aid learners in their language learning experience. However, learners were split on whether or not using mobile devices can be a good idea in the classroom. Learners' views towards using mobile technology to enhance second language learning are presented in Table 10.

Table 10

Importance of Mobile Technology in Second Language Learning

Statement	Strongly Agree	Agree	No Answer	Disagree	Strongly Disagree	Rating
Mobile devices can be used to help second language learners in their language learning	33.3%	66.7%	0.0%	0.0%	0.0%	1.67
Teachers should allow students to use mobile devices during class for language learning purposes	11.1%	22.2%	22.2%	22.2%	22.2%	3.22
Dictionaries on mobile device help me in learning English	55.6%	33.3%	0.0%	0.0%	11.1%	1.78
Mobile games are a good way for me to learn English	0.0%	55.6%	11.1%	22.2%	11.1%	2.89
I consider myself to be a motivated second language learner	55.6%	33.3%	0.0%	0.0%	11.1%	1.78
My main goal of learning English is to be able to communicate with other people	11.1%	55.6%	11.1%	11.1%	11.1%	2.56
My main goal of learning English is to succeed in school	22.2%	55.6%	0.0%	11.1%	11.1%	2.33
My main goal of learning English is to succeed in my work	66.7%	11.1%	0.0%	11.1%	11.1%	1.89

Data from Idiomobile

The data from *Idiomobile* presents the frequency of how learners used each section in *Idiomobile*. It provides information on how many quizzes the learners took, the

number of correct and incorrect selections they made on these quizzes, and their avergae score. The data shown in Table 11 summarizes learners' behavior in using *Idiomobile*. It provides information on learners' usage of *Idiomobile* and their proficiency level as measured by their self-reported TOEFL score. It also lists the *Average Score* for the total number of quizzes taken during the study for each participant. The data for all learners who participated in the pilot study is presented in Table 11.

Table 11

Learners'' Scores on Quizzes

Participant	Quiz	Qs	Self-reported TOEFL score	Average score
1	0	0	600	0
2	12	89	600	58.42696629
3	19	158	593	61.39240506
4	21	216	647	62.5
5	23	204	610	74.50980392
6	56	858	580	73.65967366
7	26	440	637	75.45454545

Data show that learners in the pilot study averaged less than 70 percent on the quizzes in the application. This initial finding underscores the difficulty of idiomatic expressions and collocations as I argued earlier in the study. To further explain the data in Table 11, I examine the findings for learner with ID 7. The learner took 26 quizzes during the study, and answered 440 questions on all these quizzes. The average score on these quizzes was 75. 45 percent. The learner's self-reported TOEFL score is 637. In addition

to the aforementioned data, findings also provide information regarding learners' usage of *Idiomobile* in general. Data show how many times each learner in the pilot study used the *academic*, *finance*, *health*,, *shopping*, *animals*, *colors*, *feelings*, *body parts*, *sports*, *travel*, *food*, and the *game* sections. It provides information how many times each of these sections was accessed by each participant during the study, and how many idiomatic expressions and collocations were reviewed. The data in Table 12 summarizes how learners used these sections in *Idiomobile*.

Table 12

Sections Used by Learners

Id	Academic	Finance	Health	Shopping	Animals	Colors	Feelings	Body	Sports	Travel	Food	Quiz	Game
1	1	0	1	1	1	0	1	0	0	1	2	0	1
2	0	0	0	1	0	1	0	0	0	3	0	12	1
3	1	0	0	0	2	1	2	0	0	1	3	19	3
4	1	0	0	0	0	0	0	0	0	1	3	21	0
5	0	0	0	1	0	0	0	0	2	0	0	23	5
6	0	0	1	3	0	0	0	0	0	1	3	56	3
7	0	0	0	0	0	0	0	0	0	0	0	26	3
T	3	0	1	3	3	2	3	0	2	6	8	101	13

T=Total

During the pilot study, one of the problems the researcher ran into was how a participant in the study misunderstood how to use one of the sections on *Idiomobile*. For example, the participant thought that the quizzes in *Idiomobile* should not be used, and therefore limited their interaction to the other sections of *Idiomobile*. Another participant was not sure how to calculate length of residence since he left the US for a certain amount of years, and then came back. He did not know whether pervious living experience in the US counted towards their length of residence. In addition, the researcher's interaction

with the learners helped add two questions on the preliminary questionnaire that pertain to motivation and mobile usage.

Data from the Interviews

All learners praised *Idiomobile* for allowing them to learn idiomatic expressions and collocations. Learners reported no major problems using *Idiomobile*. However, there were minor issues that they thought were annoying but did not affect their use of *Idiomobile*. These problems have to do with certain images in *Idiomobile* that did not include any idiomatic expressions nor collocations. Other minor problems were accessing the quizzes in *Idiomobile.* All learners agreed that technical issues did not affect the way they used *Idiomobile*. While all learners reported that they actually learned new idioms and collocations from *Idiomobile*, only one of them reported using some of the idioms in real life. Learners, however, indicated that they expect to use the idioms and collocations in the future if they continue to have *Idiomobile* on their mobile devices. Learners strongly pointed to the fact that they would recommend *Idiomobile* especially to ESL students studying English.

Data Analysis

In this section, I explain the statistical methods used in analyzing the data collected in the study. I intend to explain how each of the measures will be used to analyze the data and provide answers for the research questions in the study.

Descriptive Statistics

Measures of Frequency

Measures of frequency are used to find the frequency of a certain behavior during

a study, i.e., how many times users interacted with a specific category, time spent on a single section, and the like. Mackey and Gass (2005) claim that measures of frequency can be used in second language research studies even when they are not directly related to the questions of the study.

> Measures of frequency are often presented in second language studies even when the do not relate directly to the research questions. This is because frequency measures provide succinct summary of the basic characteristics of the data, allowing readers to understand the nature of the data with minimum space expenditure. Also, frequencies and measure of central tendency can help researcher s determine which sorts of statistical analyses are appropriate for the data. (p. 251)

Measures of frequency will be used in this study to address the research questions that seek to answer in what ways users interact with the available sections in *Idiomobile*. For example, measures of frequency will be able to provide an starting answer for how often learners accessed the games, the quizzes, or the other sections in *Idiomobile*.

The mean. The mean is the arithmetic average of all the scores of learners in the group. The mean will be used in analyzing the results of the study since it is the basis for more advanced statistical methods. (Mackey and Gass, 2005).

The mean will be used in the study to compare scores of learners in each group for the games and the quizzes. Mackey and Gass (2005) warn, however, that the mean is sensitive to extreme scores especially in studies where the number of learners is small.

Outliers. Outliers are used to represent data that is atypical of the rest of the data that was collected (Mackey and Gass, 2005). These are especially important to utilize in

this study to determine participants' pattern of use of *Idiomobile*. Outliers will help determine the atypical behaviors, so that they can be examined closely. Outliers will be helpful in determining atypical usage of *Idiomobile*. For example, if a the average participant spent 15 minutes per day interacting with *Idiomobile*, and one of the learners spent an average of an hour a day using *Idiomobile*, outliers will determine what atypical behaviors are taking place.

Measures of Dispersion

The standard deviation. The standard deviation is used to measure the variability among participants' scores. The use of standard deviation is particularly helpful when determining whether a group was homogenous in terms of a certain behavior. The smaller the standard deviation is, the more indication that the group was homogenous in terms of that behavior. This measure will be able to provide answers for research question 1b, 1c, 1d, and 1e. It will indicate how participants' usage of *Idiomobile* and its available sections is in terms of that behavior.

Probability

Probability tests are used to provide confidence about the claims being made with regard to the data analyzed in the study. The probability value (*p-value)* is used to determine the likelihood of a behavior happening by chance, and not a result of the manipulation of the independent variable to the dependent variable. A higher *p-value* raises concerns about the claims made in the study. For example, a *p-value* of 0.05 indicates that there is a 5 percent chance that the results of the research are due to chance, rather than an actual relationship among in the variables in the study. This value is selected by convention to determine significance in educational research.

Inferential Statistics

Parametric Tests

T-test. The *t*-test can be used to determine if the means of two groups are significantly different from one another. For example, a researcher may use to determine if the scores of learners in two groups were significantly different. There is another type of *t*-test, a paired *t*-test which is used to compare the results of learners within the group to determine if their scores are significantly different.

Multiple Regression

Multiple regression is a correlation coefficient that is used when more than two independent variables are being examined to determine if they can predict a dependent variable. In addition, usage will be made of graphical elements and tests for normality since many of the tests to be used in this study depend largely on the assumption that the data is normally distributed. The Histogram and the Normal P-Plot will be used to help determine the normality of the distribution of the data. The Shapiro-Wilk test will also be used. This test will be used to assess whether the sample in the study follows a normally distributed sample. The Shapiro-Wilk test assumes a null hypothesis that the data does not come from a normal distribution. It produces two values, a correlation coefficient, and a *p* value. If the *p* value is less than (0.05), then the null hypothesis will be accepted and it follows that the data does not come from a normal distributed population. In this study, the *p*-value for the Shapiro-Wilk test must be larger than p (0.05) for the data to be considered representative of a normally distributed sample. There are two tests that are used for this purpose: The Shapiro-Wilk and the Smirnov test. The Shapiro-Wilk is used

for studies with a sample of less than 50. The Smirnov is used for larger data samples. Since the number of learners in this study is below 50, the Shapiro-Wilk test will be used.

Analysis of Variance (ANOVA)

This test is used when researchers want to run a comparison between more than one group. The ANOVA test produces an *F*-value, which measures the variation between the groups to the variation within the groups. It tests the null hypothesis that the means of all groups are equal. A large *F* value is evidence against the null hypothesis. In this study, ANOVA may be administered to determine the variation between the performances between group to the performance within the group. While ANOVA tests for differences between more than two groups, it does not indicate the source of difference or which groups are different from one another. To determine which group is different from one another, researchers use post-hoc tests like the Tukey test (Mackey and Gass, 2005).

In this chapter, I have discussed the research design, the participants' background, and methods for collecting data. In addition, I provided an overview of data analysis methods that I will use in analyzing my data.

CHAPTER FOUR: RESULTS

This study seeks to explore the process of how four groups of English language learners use *Idiomobile*, a mobile language learning application created by the researcher, for learning idiomatic expressions and collocations. In this section, I present the findings as they pertain to each research question. I describe the data collected and explain how it will be used to address each research question.

Data elicitation methods for this study consisted of a preliminary questionnaire (Appendix A), data collected by *Idiomobile* as learners used the application for a week, and face-to-face, email, and phone interviews after learners used *Idiomobile*. Data from learners who did not complete all of these sections were not included in the final analysis of this study. Table 13 lists the number of learners in all groups who participated in the study, those who completed all the components of the study, and those who missed any one of those components.

Table 13

Distribution of Learners' Data Collected in the Study (N=64)

Group	Data from all learners	Incomplete data	Data included in the analysis
ALI	12	3	9
EFL	23	11	12
CT	16	1	15
BUS	13	4	9
Total	64	19	45

Sixty-four learners participated in the study. Nineteen learners did not complete all the

components of the study (the questionnaire, using *Idiomobile* for a week, and/or the follow-up interviews). Data for these learners were not included in the final analysis. Some learners either did not return the data from *Idiomobile*, or did not complete the preliminary questionnaire. Some of the learners did not use *Idiomobile* at all, and therefore these cases were not included.

The average usage of sections by all groups is 28.0444 (Mean= 28.0444). The lowest amount of usage is 7 whereas the highest amount of usage is 71. The participants in all groups (N=45) combined used the available section in *Idiomobile* 1262 times over a span of a week. The learners were given a week to use *Idiomobile*, and after that, they returned the mobile devices for the researcher to analyze the data collected by the devices. Table 14 provides a summary of descriptive statistics for usage of all the sections in *Idiomobile* by the four groups.

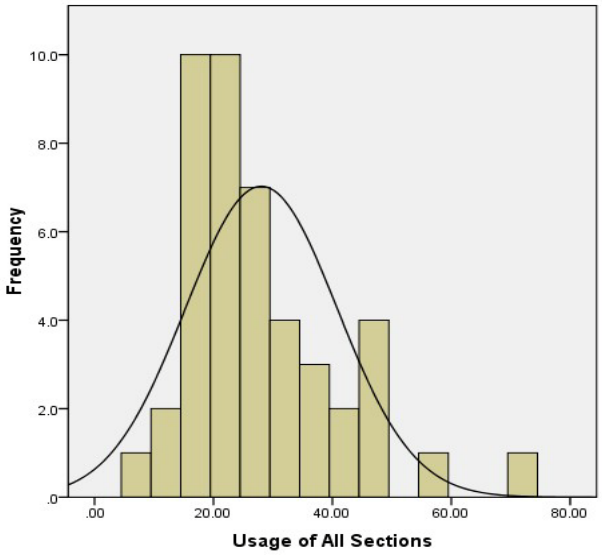
Table 14

Descriptive Statistics for Usage of Idiomobile by Groups

Name	N	Mean	Median	Std. Deviation	Std. Error of Mean	Sum	Variance
ALI	9	15.4444	17.0000	4.66667	1.55556	139.00	21.778
EFL	12	31.5833	30.5000	9.90370	2.85895	379.00	98.083
BUS	9	26.8889	23.0000	9.91772	3.30591	242.00	98.361
CT	15	33.4667	29.0000	14.50057	3.74403	502.00	210.267
Total	45	28.0444	24.0000	12.62745	1.88239	1262.00	159.453

For most of the statistical analyses to be used in this study, some of the variables must be

normally distributed. I discuss the normality assumption for each variable pertaining to each research question. One of the variables that must be normally distributed is English learners' usage of *Idiomobile*. The histogram (Figure 2) shows that for the most part, participants' usage of *Idiomobile* followed a normal distribution. The skewness and kurtosis for this histogram are 1.214, and 1.979 respectively.



Mean=28.004; N=45; Std. Deviation=12.62745

Figure 2. Histogram of groups' usage of the all the sections in *Idiomobile*.

Figure 2 shows that a portion of the data falls outside the normal distribution range. There are data points that lie outside, in the late 40s, 50s and 70s range. These are considered outliers since they lie outside of the normal distribution range, and are atypical of the rest of the data. Some researchers remove the outliers when analyzing the data. In this study, I compared the results of the statistical tests with and without the presence of outliers. Including or excluding the outliers did not significantly change the results of the statistical analyses. Therefore, I decided to include the outliers in analyzing the data.

To further test whether the usage of *Idiomobile* variable is normally distributed, a

Shapiro-Wilk test was administered. Shapiro-Wilk tests the null hypothesis that the data does not come from a normally distributed sample. It produces two values, a correlation coefficient, and a p value. If the p value is equal to or less than (0.05), then the null hypothesis will be rejected, meaning that the data does not come from a normally distributed population. In this study, the p-value for the Shapiro-Wilk test must be larger than p (0.05) for the data to be considered representative of a normally distributed usage of *Idiomobile*. Table 15 provides the Shapiro-Wilk test of normality results. According to the table, p (0.676) is larger than 0.05, which means that the data for this variable is normally distributed.

Table 15

Shapiro-Wilk Test of Normality for Usage of Idiomobile

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Usage of *Idiomobile*	.081	45	.200*	.981	45	.676

According to data from the questionnaire, English learners' average daily usage of mobile phones also follows a normal distribution. Based on the data in Figure 3, roughly 15 percent of learners indicated that they use their phones on average between 15 minutes and half an hour a day, 18 percent between 3-5 hours a day, and 67 percent between 1-2 hours a day. Thus, the majority of learners indicated using their mobile phones between 1-2 hours a day on average, with roughly half the remaining learners using their phone far more and the other half using their phone far less. Learners' average daily usage of their

mobile phone as reported on the questionnaire is presented in Figure 3.

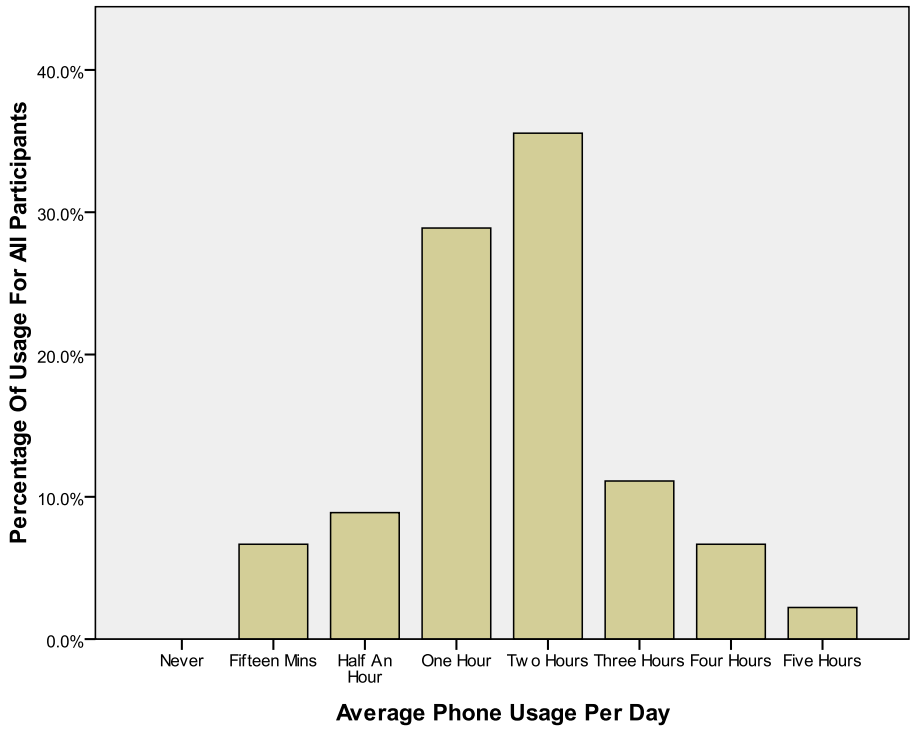


Figure 3. Average phone usage per day for learners as reported on the questionnaire.

The data presented in Figure 3 is based on the learners' reported usage of their phones prior to participating in the study. As can be seen from the figure, few learners are either heavy users and few are light users, with the majority of learners using their phone on average between 1-2 hours a day.

Results

In this section, I analyze the data and I discuss the methods of analysis that pertain to each research question. I begin by stating each research question and the hypothesis, and describe how I arrive at the findings for each research question.

Research Question 1

I. To what extent do learners of English use *Idiomobile* to learn idiomatic expressions and collocations?

1. Hypothesis: The *quiz* and *game* sections will be the most used sections of the application by the four groups of learners of English.

Application usage data obtained from *Idiomobile* are used to address this research question. Data show that learners used the *quiz* and *game* sections the most. Figure 4 shows the *quiz* and *game* sections were used the most.

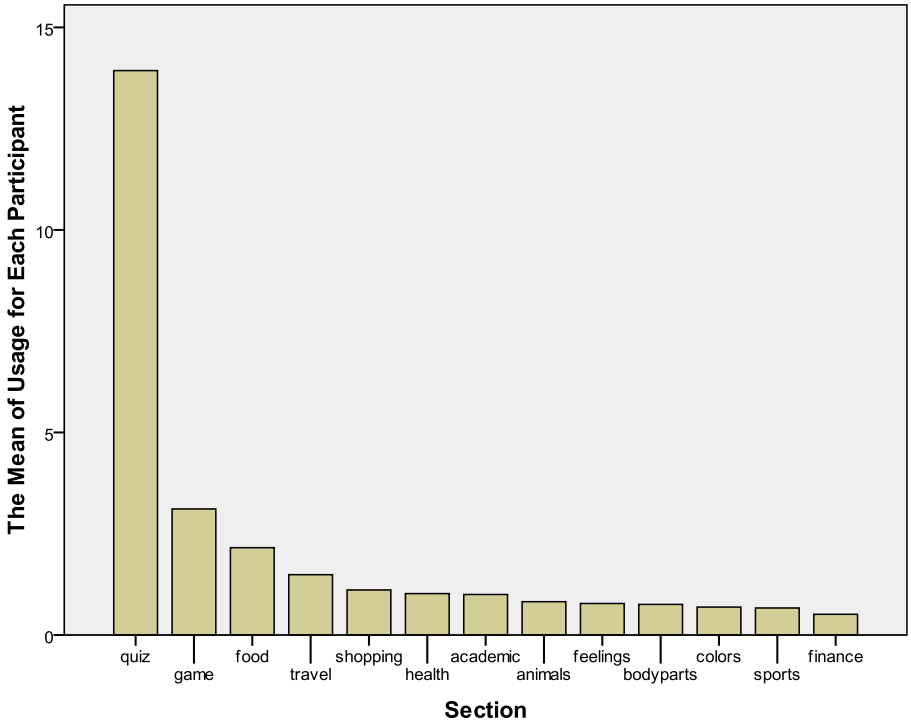


Figure 4. The mean of usage of each section in *Idiomobile*.

The *quiz* section was also the most used section by all groups, followed by the *game*, *food*, *travel*, and *shopping* sections respectively.

In what follows, I focus on how the groups used the *quiz* and *game* sections in

Idiomobile since they were the most used sections by all groups. I focus on explaining usage of these two sections mainly because the hypothesis states that learners will use these two sections the most in *Idiomobile*.

Usage of the Quiz Section

The *quiz* section was the most used section of *Idiomobile*. It was used 627 times which accounted for almost 50 percent of all application usage by all groups. The total number of questions that appeared on these quizzes was 8,659 questions by all learners, with an average of 192 questions per participant, or 27 questions for each day of the study for each learner. Figure 5 shows usage of the *quiz* section by all groups.

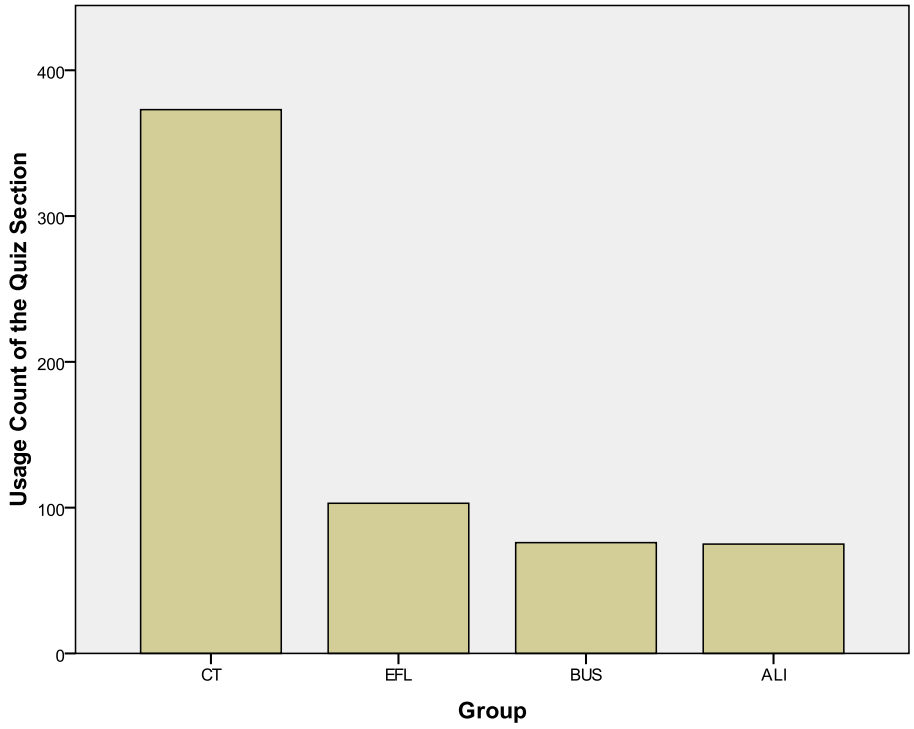


Figure 5. Groups' usage of the quiz section.

The CT group by far used *Idiomobile* the most, almost 60 percent of usage compared to 12 percent for the ALI group, 16.4 percent for EFL group, and 12 percent for the BUS

group.

Usage of the Game Section

The *game* section of *Idiomobile* was the second most used section in the study by all groups (Figure 6). Accounting for 11 percent of all application usage by all groups, it was accessed 140 times, with an average of 4 times per learner.

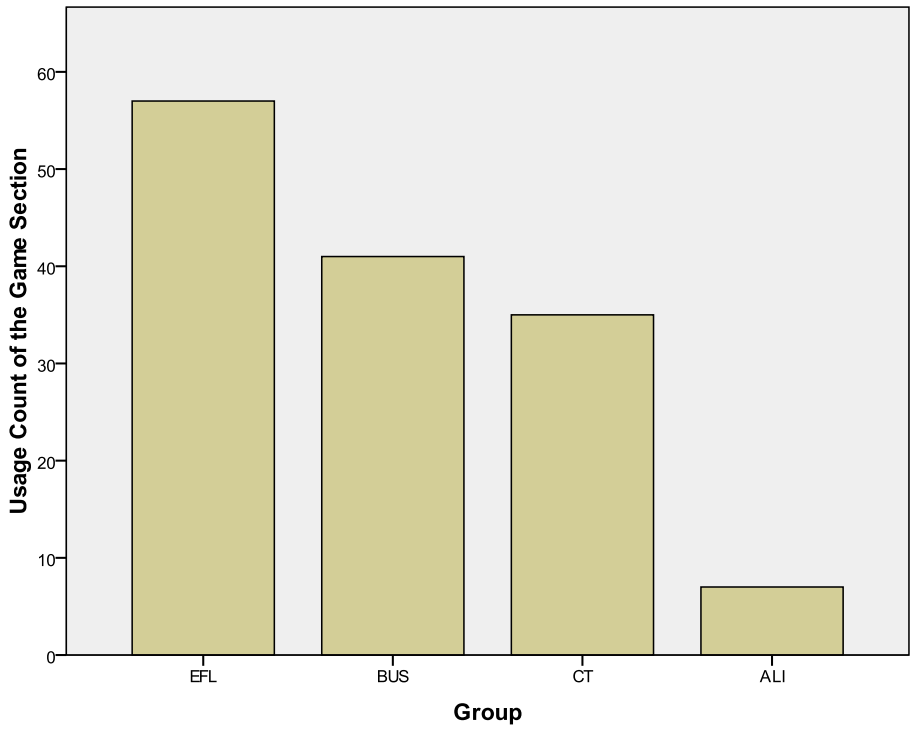


Figure 6. Groups' usage of the game section.

The EFL group used the *game* section the most. Usage of the *game* section by the EFL group accounted for 40 percent of the overall *game* usage compared to the other groups. The BUS group usage was 29 percent, the CT group 25 percent, and the ALI group 6 percent.

Learners reported on the questionnaire (Appendix A) their average daily usage of games on their mobile devices. For example, learners in the four groups indicated that

they mostly spent about 15 minutes a day playing games on their phones. In other words, learners spent roughly the same amount of time playing the games in *Idiomobile* as they noted on the questionnaire. The *game* section was used 140 times by all groups, which means on average, each participant played the game once a day. On average, it took between 7-15 minutes to play the game in *Idiomobile*. Learners' average daily usage of games on their mobile devices is presented in Table 16.

Table 16

Groups' Daily Usage of Games on Mobile Phone as Reported on the Questionnaire

GROUP	Never	About 15 minutes	Half an hour	An hour	Two hours	Three hours	Four or more hours
EFL	80.00%	13.30%	6.70%	0.00%	0.00%	0.00%	0.00%
CT	68.80%	31.30%	0.00%	0.00%	0.00%	0.00%	0.00%
BUS	83.30%	16.70%	0.00%	0.00%	0.00%	0.00%	0.00%
ALI	77.78%	22.22%	0.00%	0.00%	0.00%	0.00%	0.00%

Usage of Idiomobile over the Course of the Study

Learners' usage of *Idiomobile* earlier in the study was significantly higher than usage towards the end of the study. English learners used *Idiomobile* 28 times on average on the first day of the study, and 2 times on average on the last day of the study. Usage of *Idiomobile* declined consistently after the first day of the study till day 4 where it increased on average but continued to decline afterwards. One explanation for the decline of using *Idiomobile* by learners may have to do with their excitement at the beginning of the study about using the application, and the inevitable decline of interest afterwards.

English learners in all groups used *Idiomobile* daily. Learners' usage of *Idiomobile* over the course of the study is displayed in Figure 7.

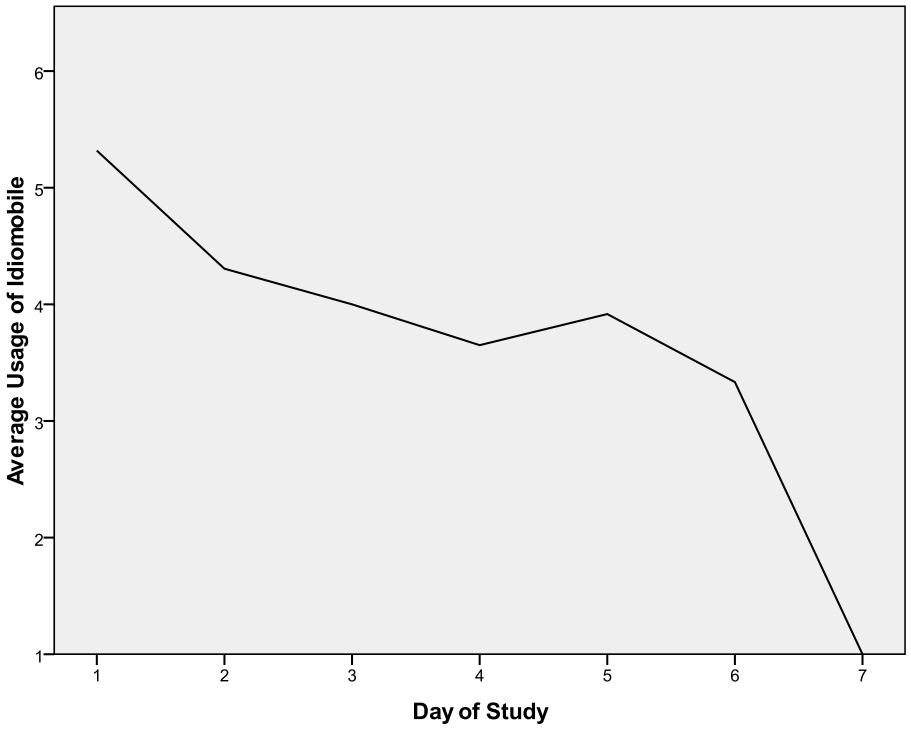


Figure 7. Average usage of *Idiomobile* over the course of the study.

To summarize, English learners in all groups used mostly the *quiz* and *game* sections of *Idiomobile*. The *quiz* section was the most used section of *Idiomobile* by all groups of English learners. The *game* section was the second most used section of *Idiomobile*. The other most used sections were the *travel*, *shopping*, *food*, and *sports* sections.

Research Question 2

II. In what ways do the four groups of English learners use *Idiomobile* to learn idiomatic expressions and collocations?

2. Hypothesis: There is a significant difference between English language learners'

usage of *Idiomobile*.

All learners (*n*=45) used the sections of *Idiomobile* 1,262 times. On average, each learner used *Idiomobile* 28 times a day. The CT group used *Idiomobile* more than any other group. The EFL group came in second, the BUS group third, and then the ALI group. Figure 8 presents usage of *Idiomobile* by all groups.

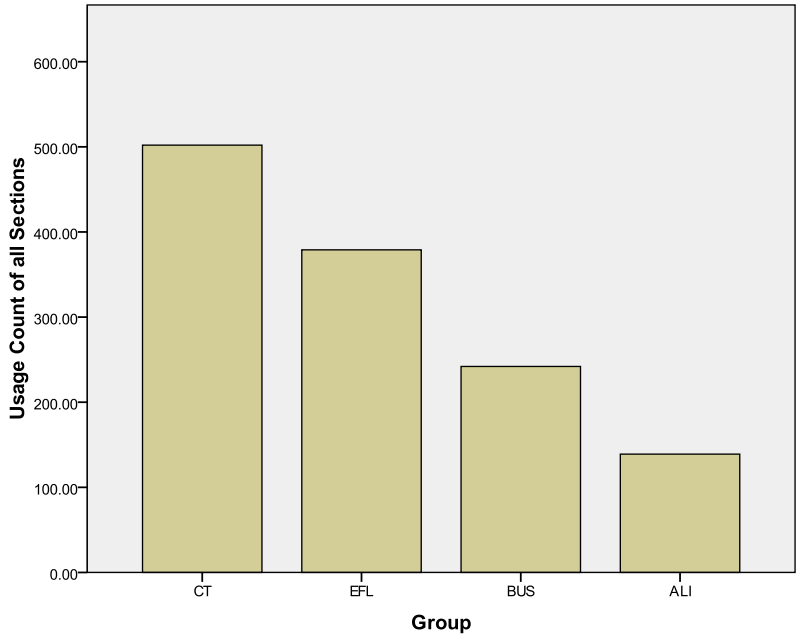


Figure 8. Groups' usage of *Idiomobile* by groups.

The CT group used all the sections in *Idiomobile*. Their usage accounted for 39.7 percent of the total amount of usage by all groups. The EFL group used all the sections as well, and their usage accounted for 30 percent of the total amount by all groups. The BUS group used all the sections with 19.17 percent of usage. The ALI group used all the sections except the *sports*, *health*, *body parts*, and the *finance* sections. Their usage accounted for 11 percent of total application usage. As I mentioned earlier, the *quiz* and *game* sections were the most used sections in the application by all learners in all groups.

Description of usage of *Idiomobile* and the sections within *Idiomobile* by each group is presented in Figure 9.

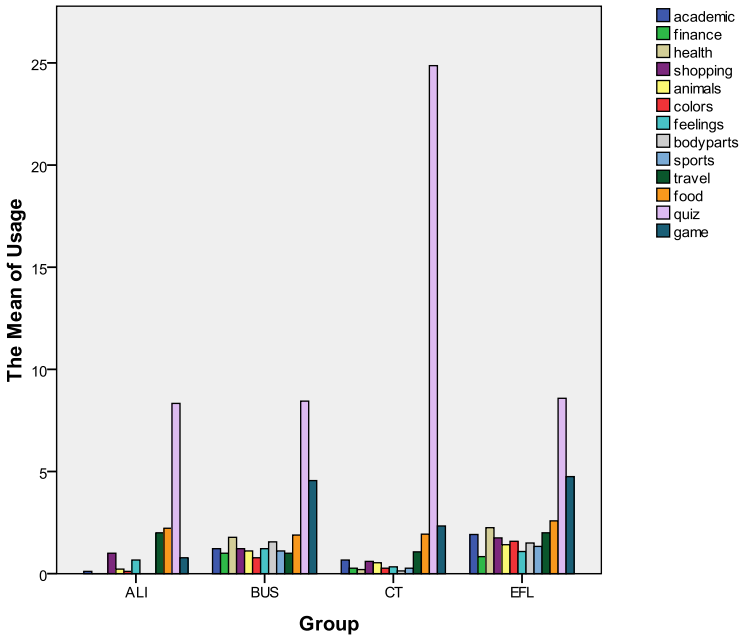


Figure 9. Groups' usage of each section in *Idiomobile*.

Usage of the *academic* section accounted for 3.6 percent of all application usage by all groups. Being used 23 times by all groups, the *finance* section was the least used section in the application. Usage of the *health* section accounted for 3.6 percent, s*hopping* 3.9 percent, *color* 2.5 percent, *feelings* 2.7 percent, *body parts* 2.7 percent, *animals* 2.9 percent, *sports* 2.3 percent, *travel* 5.3 percent, and the *food* section 7.6 percent of all application usage.

Application Usage by the CT Group

The following data represents learners from the CT group. Because the *quiz* and the *game* sections were the most used sections in *Idiomobile*, I include them in a separate table. *ID* refers to the each participant in the group. The most used section of *Idiomobile*

according to this group was the *quiz* section. Fifteen learners in this group took 373 quizzes in a week, with an average of 3.55 quizzes everyday. Each quiz averaged 13.05 questions. Usage of the sections of *Idiomobile* by learners in the CT group is presented in Table 17.

Table 17

A Summary of Application Usage by the CT Group

ID	Food	Travel	Academic	Shopping	Animals	Feelings	Finance	Sports	Colors	Health	Body parts
1	2	1	1	1	1	1	0	0	0	1	0
2	0	2	1	0	2	0	2	0	0	1	0
3	2	0	1	1	1	0	1	0	0	0	0
4	5	1	0	0	0	1	0	1	1	0	1
5	1	3	0	1	0	0	0	0	1	0	0
6	3	1	1	0	2	2	0	0	1	0	0
7	3	0	1	0	0	0	0	0	0	0	0
8	3	1	1	0	0	0	0	0	0	0	0
9	3	1	1	2	2	1	0	1	1	0	1
10	1	1	0	1	0	0	0	2	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0
12	0	1	0	0	0	0	0	0	0	0	0
13	0	2	3	0	0	0	0	0	0	0	0
14	3	1	0	0	0	0	1	0	0	0	0
15	3	1	0	3	0	0	0	0	0	1	0
Total	29	16	10	9	8	5	4	4	4	3	2

The data in Table 17 refers to learners' usage of the sections for the duration of the study. Apart from using the *quiz* section and the *game* section, learners in the CT group used the *food* (29 times), *travel* (16 times), *academic* (10 times) and *shopping* (9 times) sections. This could indicate that learners in this group favored those sections since they have

idiomatic expressions and collocations that have to do with everyday transactions.

Table 18 lists each participant in CT group with the number of quizzes taken for the duration of the study, and the average score of all these quizzes.

Table 18

CT Learners' Usage of the Quiz and the Game and their Quizzes' Average Score

ID	Self-Reported TOEFL	Game	Quiz	Average score/100
1.	647	5	16	69.17293
2.	637	2	61	71.09005
3.	631	0	48	73.65967
4.	629	1	7	64.86486
5.	622	3	26	75.45455
6.	610	1	25	64.28571
7.	605	1	13	65.86826
8.	600	3	14	58.42697
9.	600	4	15	61.39241
10.	600	5	22	74.5098
11.	600	1	39	71.04247
12.	593	2	20	60.44776
13.	587	0	19	62.5
14.	583	2	17	69.04762
15.	580	5	31	70.68404
Group's Average Self-Reported TOEFL= 608		Group's Average Score on Quizzes= 67.49647		

For example, the average score for learner with *ID* 1 according to Table 18 is 71.09. This score is based on the data obtained from *Idiomobile*, which indicates that learner with *ID* 1 took a total of 61 quizzes during the study, on which the learner answered 1055 questions, 305 of them incorrectly. The average score for the quizzes taken by all members of this group is 67.49, which underscores the fact that idiomatic expressions and collocations can be a difficult aspect of English language learning, even for English learners who have been studying English on a graduate level, and have the highest average self-reported TOEFL score of all groups. This also indicates that it is expected that the other groups will not fare any better in terms of their average on the quizzes in the application, since the group with the advanced learners with highest average self-reported TOEFL score only averaged 67.49 on the quizzes. In addition, these findings indicate that idiomatic expressions and collocations can be a challenging aspect of language learning based on how learners in the CT group did. Another pattern that emerged here is the CT group's usage of the *quiz* section and the *game* section. Learners in this study were not instructed to use these sections more than the other sections of the application. They were trained and encouraged to use all the sections in the application. Yet, they used these two sections the most. This pattern was also present with the all the groups. Usage of the *quiz* section and *game* section was the highest among all groups. One way this can be explained is that these two sections offer features that are not present in the other sections: Feedback and control. In the quizzes and the game, the application provides immediate feedback to learners as they answer questions on the quiz and the game. In the other sections, there is no feedback given to the user. They only go over the idiomatic expressions and collocations and review their meaning.

Application Usage by the BUS Group

Learners in the BUS group exhibited similar behaviors in their usage of the other sections of the application like the CT learners did. They used the *food* section of the application the most, aside from the *quiz* section and the *game* section. This also indicates that learners in this group found idiomatic expressions and collocations that have to do with daily interactions to be useful to learn. However, the BUS group used these sections more than the CT group did. Table 19 shows a summary of BUS' group usage of *Idiomobile*. The BUS group was expected to use the *finance* section the most since it contains idiomatic expressions and collocations relating to business and finance, but that section was not the most used by this group. The most used section by this group was the *food* section, similar to the CT group.

Table 19

A Summary of Application Usage by Learners in the BUS group

ID	Food	Health	Body Parts	Shopping	Feelings	Academic	Sports	Animals	Travel	Finance	Colors
1	1	4	1	0	1	1	2	0	0	0	2
2	1	1	2	0	0	2	1	1	1	1	1
3	2	1	1	2	0	1	0	1	1	0	1
4	1	1	3	1	2	0	2	1	2	0	0
5	3	2	1	3	1	3	1	1	0	1	1
6	1	2	2	2	2	0	1	2	2	2	0
7	1	3	1	0	2	2	0	1	0	0	1
8	4	0	2	2	2	1	2	1	1	2	1
9	3	2	1	1	1	1	1	2	2	3	0
Total	17	16	14	11	11	11	10	10	9	9	7

This, again, indicates that learners in this group found idiomatic expressions and collocations relating to everyday situations to be useful.

However, this group still used other sections (not including the *quiz* section and the *game* section) of the application more frequently than the CT group. For example, learners in the BUS group used the other sections more than the CT group with the exception of the *food* section. This may indicate a difference in how each group thought it was best to use the application, and not necessarily related to the content of each section. For example, the BUS group's usage of other sections of the application may have to do with learning strategies that the CT group did not use. For the CT group, usage of the *quiz* and *game* sections were the way the CT group wanted to learn. Data in Table 20 shows more information regarding the number of quizzes each English learner in the BUS group took during the study and their average score on these quizzes. The average score for the quizzes taken by all members of this group is 64.83, which is lower than the average score by members in the CT group (67.49). Again, this underscores the fact that idiomatic expressions and collocations can be a difficult aspect of English language learning. As I mentioned earlier, the *quiz* and *game* sections were the most used sections by the BUS group as well, similar to the CT group. This can be explained by the fact that these two sections offer learners feedback and control over the learning experience. The aspect of control present in these sections includes learners' ability to customize the learning experience. They can customize the length of the quiz, the number of questions they would like to appear on the quiz. They can also control the time that it would take them to answer these quiz questions. In addition, they can manage other technical aspects of the quiz, like showing or hiding their scores as they answer each quiz question. The

same principle applies for the game section, where learners can control the levels that they would like to play, and the when and how feedback is presented. These features of the two sections allow more control and therefore were favored by learners in all groups.

Table 20

BUS Learners' Usage of the Quiz and Average Score Compared with Their Self-Reported TOEFL Score

Id	Self-reported TOEFL	Quiz	Game	Average Score/100
1	550	18	12	75.83333
2	547	14	8	73.92857
3	543	4	5	54.54545
4	532	10	0	60.71429
5	521	5	2	74.6988
6	516	8	1	59.2233
7	513	4	3	59.32203
8	510	6	1	53.7931
9	500	7	9	71.42857
Group's Average Self-Reported TOEFL score=525		Group's Average Score on Quizzes= 64.83		

Application Usage by the EFL Group

The following data represents (Table 21) learners from the EFL group. The table below lists how learners in this group used *Idiomobile*. The data presented is the overall

usage of these sections for English learners in this group over the course of the study. Sections of idiomatic expressions and collocations that have to do with food, travel, and health were more frequently used by this group compared to the other groups. The pattern here suggests that learners found idiomatic expressions and collocations that belong to these categories useful, drawing on the notion that these can be important in language survival situations.

Table 21

A Summary of Application Usage for the EFL Group

ID	Food	Health	Travel	Academic	Shopping	Colors	Body Parts	Animals	Sports	Feelings	Finance
1	3	2	2	1	3	0	1	2	1	1	0
2	4	6	3	1	2	1	2	2	2	2	2
3	6	3	2	2	0	1	1	1	0	2	0
4	4	2	1	4	0	2	1	4	1	1	2
5	1	1	5	0	1	2	3	1	2	2	0
6	2	1	1	0	3	1	1	1	0	0	0
7	1	4	0	1	0	2	1	0	2	1	0
8	3	2	4	3	3	1	1	1	1	1	1
9	1	4	2	0	2	3	2	2	1	2	2
10	3	1	1	6	5	1	1	1	2	1	1
11	2	0	2	3	2	4	2	1	3	0	1
12	1	1	1	2	0	1	2	1	1	0	1
Total	31	27	24	23	21	19	18	17	16	13	10

The EFL group used sections other than the *game* and the *quiz* of *Idiomobile* more than the rest of the groups. For example, the EFL group used the food section of *Idiomobile* 31 times over a week, compared to the CT group who used this section 29 times. In this respect, the EFL group in a way resembled the BUS group, who used the other sections

of the application more frequently the CT group, who used the application in general far more than the rest of the groups. Again, this could be related to learning strategies EFL and BUS learners employed that CT learners did not. Table 22 lists number of quizzes for each EFL learner taken during the study and their average score on all of these quizzes.

Table 22

EFL Learners' Usage of the Quiz and their Average Score

ID	Self-Reported TOEFL score	Quiz	Game	Average Score/100
1.	583	9	5	56.41026
2.	580	18	12	75.83333
3.	550	13	3	73.79679
4.	547	14	8	73.92857
5.	532	10	0	60.71429
6.	521	5	2	74.6988
7.	516	8	1	59.2233
8.	490	4	5	54.54545
9.	477	4	3	59.32203
10.	473	7	9	71.42857
11.	450	5	8	72.95082
12.	410	6	1	53.7931
Group's Average Self-Reported TOEFL score=510		Group's Average Score on Quizzes=65.6		

The EFL group averaged 65.6 on the quizzes taken during the study which is slightly

better than the BUS group's (64.85) despite the latter's higher average self-reported TOEFL score. This slightly higher average can be explained by the fact that this group used the application more than the BUS group, and therefore, were able to score better. I discuss this finding in further detail later in this chapter.

Application Usage by the ALI Group

English learners in the ALI group had the least amount of application usage compared to the other groups. Members in this group did not use the *finance*, *feelings*, *body parts*, and *sports* section of *Idiomobile*. Like other groups, learners in the ALI group used the *quiz* section the most, followed by the *game*, and *food* sections respectively. Data in Table 23 list how each member of this group used *Idiomobile* over the course of the study.

Table 23

A Summary of Application Usage by the ALI Group

ID	Food	Travel	Shopping	Feelings	Animals	Colors	Academic	Finance	Health	Body Parts	Sports
1.	4	2	0	1	0	0	0	0	0	0	0
2.	0	2	2	0	0	0	0	0	0	0	0
3.	0	1	1	1	1	0	0	0	0	0	0
4.	5	1	2	1	0	0	0	0	0	0	0
5.	1	3	1	0	0	1	0	0	0	0	0
6.	2	1	1	1	0	0	0	0	0	0	0
7.	3	2	1	1	0	0	0	0	0	0	0
8.	4	4	0	0	1	0	0	0	0	0	0
9.	1	2	1	1	0	0	1	0	0	0	0
Total	20	18	9	6	2	1	1	0	0	0	0

The ALI group had the lowest amount of application usage compared to the other groups. At the same time, this group had the highest amount of average daily phone usage as reported on the questionnaire prior to taking part in the study. Thus, while the ALI group had the highest amount of average daily mobile phone usage (as reported on the questionnaire), it was the group who used *Idiomobile* the least. The EFL group had the second highest average daily usage of mobile phones, the BUS group was third, and the CT group had the lowest average daily usage of mobile phones. The groups' average daily phone usage prior to participating in the study is displayed in Figure 10.

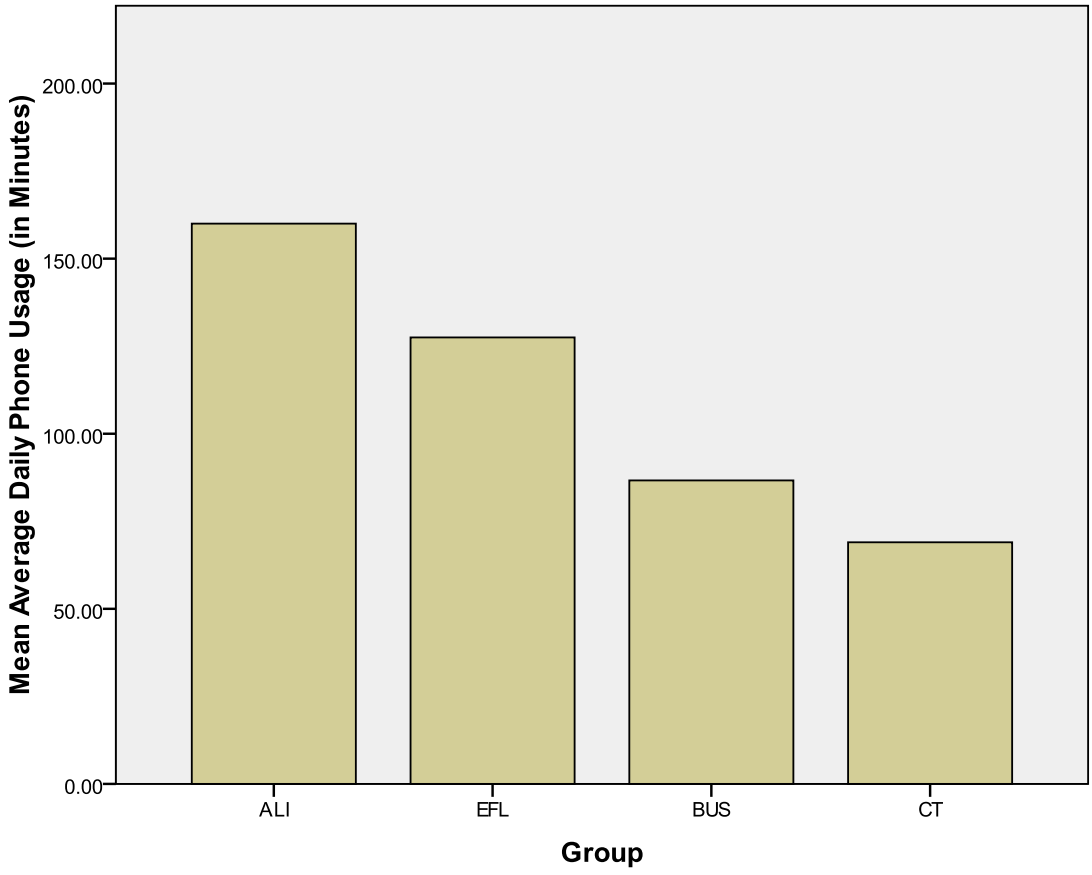


Figure 10. Groups' average daily phone usage.

Conversely, the CT group, which had the lowest average daily phone usage, based on the data in Figure 10, used *Idiomobile* the most. This could be related to the CT learners' motivation and learning goals. Being able to recognize idiomatic expressions and collocations and understand their meaning is directly tied to the CT learners' future long-term goals of being teachers of English. This could explain that despite their lowest reported daily usage of mobile phones, they had the highest usage of *Idiomobile*, since it is part of their 'perceived' job to know what idiomatic expressions and collocations mean. On the other hand, the ALI learners' lowest amount of usage of *Idiomobile* may have to do with several factors. First, ALI learners' short-term goals are not necessarily learning how to learn idiomatic expressions and collocations, but rather pass the TOEFL exam to be able to enroll in classes with credit in their major of choice. Thus, learning idiomatic expressions and collocations may not seem to ALI learners to be immediately connected to doing better on the TOEFL test, compared to learning how to write an essay or how to become familiar with answering questions on a reading passage, skills that are clearly and officially present in the TOEFL exam. Second, ALI learners may not be in a developmentally 'appropriate' stage to learn idiomatic expressions and collocations. For learners who are in an early stage of learning English, idiomatic expressions may not seem to lend themselves to learners in the beginner stage.

The average score for the quizzes taken by all members of the ALI group is 51, which is the lowest of all groups (CT=67.49, EFL= 65, BUS=64, ALI=51). It is not surprising that the ALI group had the lowest average, considering their average self-reported TOEFL score being the lowest of all groups. In addition, ALI learners are in an intensive English language learning program, which underscores the fact that they are at

an early stage of language learning, and therefore, expected to have difficulty with idiomatic expressions and collocations. Table 24 lists the number of quizzes each participant in the ALI group took during the study, their self-reported TOEFL score, and their average score on the quizzes.

Table 24

ALI Learners' Usage of the Quiz and their Average Score

ID	Self-Reported TOEFL score	Quiz	Game	Average Score
1	400	16	0	32.69231
2	410	12	0	63.46154
3	460	2	1	20
4	400	9	0	59.09091
5	425	7	1	59.375
6	410	11	1	58.62069
7	485	10	0	64.35644
8	493	5	3	65.85366
9	460	3	1	35.71429
Average Self-Reported TOEFL Score=438		Group's Average Score on Quizzes=51		

As I explained earlier, usage of the *quiz* section was the highest among all groups, followed by the *game*, *food*, *travel*, and *shopping* sections which were the next most used applications respectively. In terms of groups, the CT group used *Idiomobile* the most, followed by the EFL group, the BUS group, and the ALI group. The hypothesis for this research question states that there is a significant difference between the groups' usage of

Idiomobile. To determine this, an ANOVA test was administered using the values for application usage. This test is used when researchers want to run a comparison between more than two groups using one dependent variable (application usage). The ANOVA test produces an *F*-value, which measures the variation between the groups to the variation within the groups. It tests the null hypothesis that the means of all groups are equal.

Table 25

ANOVA Results for Groups' Usage of Idiomobile

ANOVA

Usage of *Idiomobile*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.661	3	1.220	9.878	.000
Within Groups	5.065	41	.124		
Total	8.726	44			

Based on results in Table 25, there is a significant difference between the groups in their usage of *Idiomobile*. However, the *F* value here does not show which group differs from another. In addition, this ANOVA test does not take into consideration groups' TOEFL score, which could affect how each group used the application. In other words, is the CT group's usage of *Idiomobile* significantly different from ALI's? Or is the ALI group significantly different from BUS group in terms of application usage? To find out which

group's usage significantly differs from one another, researchers use a post-hoc analysis test, like Tukey test (Mackey and Gass, 2005). Based on the data in Table 26*Table 30*, the ALI's group usage of *Idiomobile* was significantly different from the three other groups. The results of the Tukey test are presented in Table 26.

Table 26

Tukey Test for Post-hoc Analysis of Groups' Difference in Application Usage

Tukey Test-Multiple Comparisons

Dependent Variable: Usage of *Idiomobile*

(I) Name	(J) Name	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
ALI	EFL	-.71879*	.15499	.000	-1.1338	-.3038
	BUS	-.55365*	.16569	.009	-.9973	-.1100
	CT	-.74947*	.14820	.000	-1.1463	-.3526

*. The mean difference is significant ($p < 0.05$)

However, the CT group's usage of *Idiomobile* was not significantly different from the EFL group, nor the BUS group and vice versa. In other words, the ALI's group was the source of difference in the ANOVA results presented earlier.

Because the groups in the study differed in terms of their language proficiency which is measured via their self-reported TOEFL score, it follows that these differences in how they used the application can be due to the varying levels in language proficiency between the groups. To determine if self-reported TOEFL scores contributed to how the groups differed in their usage of *Idiomobile,* an ANOVA test was administered using the

self-reported TOEFL scores as a covariate. Results show there was no significant difference between the groups in their usage of the *quiz* section and the *game* section. There was, however, a significant difference between the EFL group's usage of the remaining sections and the ALI (mean difference is 10.550), BUS (mean difference is 4.644), and CT (mean difference is13.818) group's as can be seen in Table 27. In addition, there was a significant difference between the BUS group's usage of the remaining sections and the CT group's (mean difference is 9.174). There was no significant difference between the CT group's usage of the remaining sections of the application and the ALI's.

Table 27

Tukey Post-hoc Analysis of Application Usage Using TOEFL as Covariate

Dependent Variable	(I) Name	(J) Name	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
						Lower Bound	Upper Bound
Other sections	EFL	ALI	10.550*	2.024	.000	4.932	16.169
		BUS	4.644*	1.646	.044	.075	9.213
		CT	13.818*	2.157	.000	7.829	19.806
	BUS	CT	9.174*	2.071	.000	3.425	14.923

a. Adjustment for multiple comparisons: Bonferroni.

*. The mean difference is significant (p<0 .05)

To summarize, the CT group used *Idiomobile* the most, followed by the EFL group, the BUS group, and the ALI group. While the groups' usage of *Idiomobile* differed, there was no significant difference in the way learners in all groups used the *quiz* section and the *game* section. There was a significant difference in terms of using the other sections of the application between the EFL group, and the rest of the groups. There was also a significant difference in usage of other sections between the ALI group and the other groups. The CT group and the ALI group did not significantly differ in their usage of other sections in the *Idiomobile*. In addition, English learners who had the highest average self-reported TOEFL score had the highest average score on the quizzes in *Idiomobile*.

The differences in using the other sections of *Idiomobile* between the EFL group and the other groups can be related to learning strategies, and other behaviors learners employ when using digital devices like mobile learning applications. Learners in the CT group for example found that it was better to use the *quiz* section and the *game* section rather than the other section of the application since they can receive immediate feedback, a feature not present in the other sections of the application. Other learners did not prefer the *quiz* section because they indicated that they get anxious while taking tests.

Research Question 3

III. To what extent does usage of *Idiomobile* correlate with scores on the quizzes in *Idiomobile*?

3. Hypothesis: There is a significant positive correlation between usage of the sections in *Idiomobile* and the scores on the quizzes in *Idiomobile*.

   According to this hypothesis, the more English learners use *Idiomobile*, the better

their scores are on the quizzes. *Idiomobile* provides the meanings of over 3,000 idiomatic expressions and collocations. Hence, learners' usage of the application helps them learn the meaning of idiomatic expressions and collocations, which in turn will allow learners to be able to identify the meaning of idioms on the quizzes. Based on results of a Pearson correlation between usage of *Idiomobile* and the average score on the quizzes learners took, there is a positive correlation between usage of *Idiomobile* and the average scores on the quizzes. This correlation is significant (p=0.000, p<0.05) and positive (R=.583).

When a correlation is statistically significant, it does not necessarily mean that it is important, useful, or meaningful, in particular when generalizing to the general population of learners. It does mean that there is a difference. However, it is possible to find a difference between groups, even when one does not exist. This difference can sometimes lead to Type I errors, suggesting there's a significant difference when there is not one, and Type II errors, suggesting that there is no significant difference when there is one. To make sense of a significant correlation, researchers use power testing which allows for discerning meaning from the statistical significance. Zint (2009) suggests that "Power refers to the probability that your test will find a statistically significant difference when such a difference actually exists." Zint argues that it is generally accepted that power should be 0.8, which is an 80 percent chance of finding a statistically significant correlation when it exists.

To determine if the significant correlation between usage of *Idiomobile* and quizzes' average score is meaningful, the effect size for this correlation must be calculated. As a general guide, Cohen (1988) suggests that an effect size of 0.1 is considered small, 0.3-0.5 is moderate, and anything over 0.5 is considered large. A

smaller effect size, which provides a better idea of the strength of the correlation and the importance of its significance, is usually obtained when the sample is large. Taking into consideration the sample size (N=45), a *p-value* of 0.05, and an 0.8 power for the test, the effect size for this correlation is 0.38, which is considered a moderate effect size. In other words, there is an 80 percent chance that the significance of this correlation exists when it should with a moderate effect of the sample size on this correlation. The correlation results between usage of *Idiomobile* and the average score on the quizzes learners took is shown in Table 28.

Table 28

Pearson Correlation between Usage of Idiomobile and Quizzes Average Score

Correlations

		Quizzes Average Score
Usage of *Idiomobile*	Pearson Correlation	.583**
	Sig. (2-tailed)	.000

**. Correlation is significant (p<0.05) (2-tailed).

Another important set of correlations to be reported include how usage of each section of *Idiomobile* correlated with the average scores on the quizzes. Since all learners used the *quiz* and *game* sections the most, it is expected that these two sections will be significantly correlated with the average scores on the quizzes. Findings indicate that the *quiz* and *game* sections are the only two sections that are significantly correlated with the learners' average scores on the quizzes in *Idiomobile*. The correlation coefficient for the

quiz section is positive (*R*=.374) and significant (*p*=0.011<0.05). The *game* section is also positively correlated with the average score (R=0.0437, *p*=0.003). The correlation coefficient between the remaining sections combined in *Idiomobile* and the average score is presented in Table 29. Based on the data in Table 29, the only two significant positive correlations are the *quiz* and the *game* sections. Usage of the *quiz* and *game* sections positively correlates with the average score.

Table 29

Correlation between Application' Sections Usage with the Average Score

Correlations		
		Average Score
Quiz	Pearson Correlation	.374*
	Sig. (2-tailed)	.011
Game	Pearson Correlation	.437**
	Sig. (2-tailed)	.003
All Other Sections	Pearson Correlation	.236
	Sig. (2-tailed)	.119
*. Correlation is significant (*p* <0.05) (2-tailed)		
**. Correlation is significant (*p* <0.05) (2-tailed).		

Taken together, usage of all the sections in the applications excluding the *quiz* section and the *game* section is not correlated significantly with average score on the quizzes

(R=0.236, p= 0.11). Taken separately, the sections either correlate negatively or have a low positive insignificant correlation.

Correlations show the relationship between two variables. Thus, the variables can be significantly correlated with one another without the presence of other variables. The multiple regression correlation, however, shows the correlation of the variables only in combination. To determine which usage of *Idiomobile's* sections can predict the average score learners got on the quizzes, I ran a multiple regression test. The correlation coefficient between all the sections combined to predict scores on the quizzes learners took is presented in Table 30.

Table 30

Multiple Regression for Application Usage and Average Score

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.700[a]	.490	.276	9.850067236	.490	2.292	13	31	.029

a. Predictors: (Constant), game, travel, shopping, quiz, food, feelings, colors, finance, academic, health, sports, animals, body parts

b. Dependent Variable: Average Score

It must be noted that questions for each quiz were randomly selected, which means that no two quizzes were alike. *Idiomobile* randomly selects questions to appear on each quiz. This means that each quiz can contain new questions that have not appeared on previous quizzes. *Idiomobile* has access to a pool of questions - over three thousand items to

choose from. Table 30 presents the model summary for the multiple regression coefficient for usage of all the sections to predict the average score. According to Table 30, the multiple correlation coefficient (*R*) between the predictors and the outcome (average score on the quizzes) is fairly high (*R*=0.700). This indicates that the predictors taken together do positively correlate with the average score. In addition, the model does indicate that this correlation is significant (*p*=0.029<0.05). The Adjusted *R* square (Table 30) value is less than the value of *R square*, which indicates that if this model was derived from the real population and not from the sample, it would account for the difference between *R Square* and the *Adjusted R Square* which is (0.490 – 0.027=0.012) 2.2 percent less variance in the outcome. In other words, while the correlation coefficient (*R*=.700) is fairly high, considering a real population, the coefficient would be smaller (.276) which in turn is not a high correlation.

The multiple regression analysis also produces a table of coefficients that indicate which of the predictors taken separately significantly correlates with the variable to be predicted (average scores on quizzes). Taken separately, some of the predictors are negatively correlated with the average scores on the quizzes. For example, the *travel* section taken separately is negatively correlated with the average quizzes score (*R*=-0.010), and insignificant (*p*=.942). Looking closely at these predictors, only the *quiz* and the *game* sections as predictors are significantly correlated with average score. The coefficients for usage of each section and average score on the quizzes are presented in Table 31. There is a significant positive correlation between usage of the *quiz* section and the *Average Score* on these quizzes at the 0.002 level (*p* <0.05). The correlation coefficient for the *quiz* section is positive and significant (*R*=0.490, *p*= 0.002<0.05).

Table 31

Coefficients for Sections Usage and Average Score

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Academic	-2.016	1.448	-.226	-1.393	.174
Animals	.812	2.541	.062	.320	.751
Body Parts	1.942	3.085	.148	.630	.534
Colors	2.165	2.370	.168	.913	.368
Feelings	-2.958	2.738	-.196	-1.080	.288
Finance	2.541	2.541	.179	1.000	.325
Food	.885	1.079	.116	.820	.419
Game	1.301	.560	.363	2.323	.027*
Health	.963	1.392	.118	.691	.495
Quiz	.477	.141	.490	3.386	.002*
Shopping	-.191	1.382	-.020	-.138	.891
Sports	-.009	3.039	.000	-.003	.998
Travel	-.105	1.429	-.010	-.073	.942

a. Dependent Variable: Average Score

b. * Correlation is significant (p<0.05)

The *game* section is also positively correlated and significant (R=0.363, p= 0.027<0.05). The *shopping*, *feelings*, and *travel* sections are negatively correlated with the average

score, while correlation coefficient for the *food*, *finance*, *body parts*, *colors*, *health*, and *animals* is very low and insignificant. The histogram in Figure 11 shows that data analyzed follows an approximate normal distribution, which is an important assumption for running a multiple regression test.

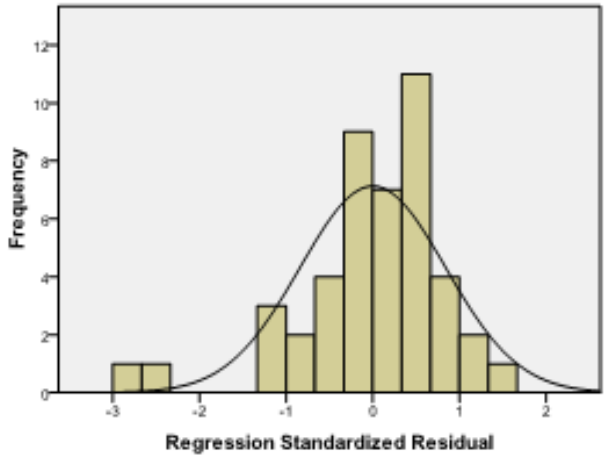


Figure 11. Histogram for average score predicted by usage of all sections.

Based on the fact that all groups used the *quiz* section the most, I wanted to determine whether the number of quizzes the learners took and whether or not the time they spent with *Idiomobile* each day of the study could predict the average score on the quizzes learners took. A multiple regression test could provide information regarding whether more quizzes and more time with *Idiomobile* would predict higher average scores on the quizzes. However, instead of examining the number of quizzes taken, I examined the number of questions that learners actually attempted to answer. This is more meaningful than looking at the number of quizzes for several reasons. First, in some instances when learners took a quiz, they would plan on answering 5 question items, but would instead answer 2. This is due to a variety of reasons. Some of the learners indicated that while taking the quiz, they would stop and do something else. Some other

learners reported not completing the quiz because they would receive a phone call during the quiz. An example of a participant planning to take a quiz that includes five questions is presented in Figure 12.

Figure 12. Quiz set-up in *Idiomobile*.

In this example, the learner planned to take a quiz consisting of five questions, but actually answered 2 of these questions when they received a call or stopped using *Idiomobile* for whatever reason. In that case, *Idiomobile* would have recorded that a quiz was taken, but only two questions on that quiz were answered. Hence, a participant would have a value of 5 quizzes taken per day, but would have actually answered fewer than five questions. Therefore, instead of using the number of quizzes as the variable, I chose the actual number of questions answered on these quizzes. Two independent variables were used to predict learners' average scores on the quizzes: The number of questions that appeared on each quiz each day of the study (*Total Questions* variable), and the day of study at a given point (*Day of Study* variable). In other words, this will test whether these two variables can be a significant predictor of learners' average score. The

multiple correlation coefficient (*R*) between the predictors (*day of study* and *number of questions*) and the outcome (average score) is 0.439 (*R*=0.439). This indicates that the predictors taken together do to a certain extent predict the average score. In addition, the model does indicate that this correlation is significant (p=0.000<0.05). Table 32 presents the model summary for the total number of questions on all quizzes taken and the day of the study to predict the average score.

Table 32

Model Summary for Day of Study and Number of Quizzes

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.439[a]	.193	.181	12.21873	.193	17.058	2	143	.000

a. Predictors: (Constant), Day of Study, Total Questions

b. Dependent Variable: Average Score

Some researchers take into consideration the value of the Adjusted *R square*, which takes into consideration the number of observations and the variables, and it is usually smaller than *R* (compare .493 to .181). The adjusted *R* value then shows the correlation is positive but very small. Each of these predictors contributes significantly to the model. Both the *Number of Questions* and the *Day of the Study* as predictors are significantly correlated with average score. The correlation coefficient for the *Number of Questions* section is

positive and significant (*R*=0.382) at the 0.000 level. The *Day of the Study* is also positively correlated and significant (Standardized *R*=0.287) at the 0.000 level. The correlation coefficients for number of questions taken on each quiz, and the day of study as predictors of the average score is presented in Table 33.

Table 33

Coefficients for Total Number of Questions and Day of Study

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	37.399	4.769		7.842	.000
	Number of Questions	5.374	1.071	.382	5.016	.000
	Day of Study	2.145	.569	.287	3.772	.000

a. Dependent Variable: Average Score

This means that the more quiz questions learners answer, the better their scores on the quizzes are. It is also important to note that each quiz contains questions that may have not appeared before on previous quizzes, as *Idiomobile* selects questions from a pool of questions of over 3,000 items.

To administer a multiple regression test, the data set must not violate the normal distribution that is assumed to exist to run this kind of analysis. As I mentioned earlier, underlying the administration of the multiple regression test is the normal distribution of the variable to be predicted. The histogram in Figure 13 displays a visualization of the distribution of the average scores that were to be predicted by the model which mostly

follows a normal distribution. The histogram (Figure 13) does not violate normality distribution assumed for this test.

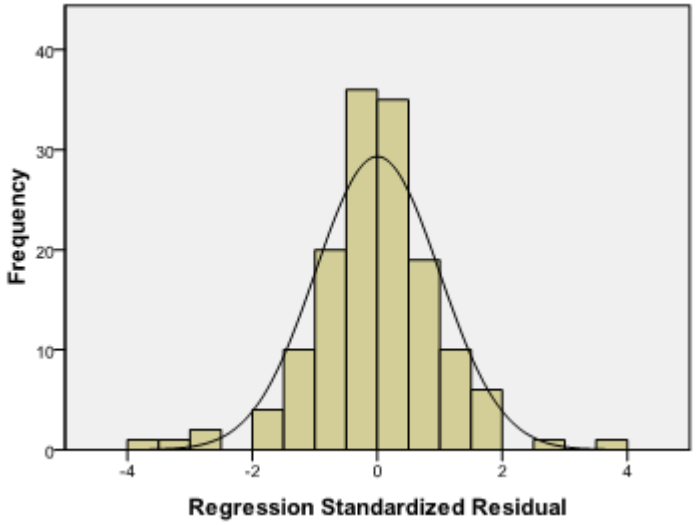


Figure 13. Histogram for dependent variable average score.

To sum up, there is a significant positive correlation between the number of questions that appeared on each quiz (*Total Questions*), and the average score on the quiz (p=0.001). In addition, there's a significant positive correlation between the day of the study variable and the average score.

Research Question 4

IV. To what extent do self-reported TOEFL scores correlate with English learners' scores on the quizzes in *Idiomobile*?

4. Hypothesis: There is a significant positive correlation between English learners' self-reported TOEFL scores and their scores on the quizzes in *Idiomobile*.

English learners reported their most recent TOEFL score on the preliminary questionnaire. Based on the TOEFL scores the learners reported on the questionnaire, the CT group has the highest average self-reported TOEFL score (608), followed by the BUS

group (525), the EFL group (510), and the ALI group (438). A discussion of the groups' characteristics can help put these scores in a meaningful context. Not only does the CT group have the highest self-reported TOEFL score, but they also have the highest average length of residence in an English-speaking community. Learners in this group have spent at least two years living in an English speaking community. In addition, they have studied and learned English on a graduate level, which provides them with strong knowledge of the English language. The ALI group, on the other hand, had the lowest self-reported TOEFL score, and being in the ALI indicates that they are at an early stage of English language learning. Learners in the BUS group have at least a year in terms of length of residence in an English-speaking community. EFL learners have never been to an English-speaking country. Table 34 provides the self-reported TOEFL scores for all English learners in this study, and how they compare. The highest reported TOEFL score for the CT group is 647, which is not surprising since competitive TOEFL scores for these learners are expected for admission to the graduate program. The highest TOEFL score reported for the BUS group is 550. The highest reported TOEFL score for the EFL group is 583, which is not common for learners in the EFL group. This can be considered an outlier since participants in the EFL group were enrolled in a TOEFL preparation course and are expecting to score higher to pursue degrees in English and/or immigrate to an English speaking country. The highest self-reported TOEFL score for the ALI group is 493, which is also expected to be less than 500, since scoring higher than 500 allows ALI students to join the university and the program of their choice. In other words, the self-reported TOEFL scores to a certain extent reflect in a general learners' proficiency of English. The self-reported TOEFL scores for all English learners in this study, and how

they compare are presented in Table 34.

Table 34

English Learners' Self-Reported TOEFL Scores

CT	BUS	EFL	ALI
647	550	583	493
637	547	580	485
631	543	550	460
629	532	547	460
622	521	532	425
610	516	521	410
605	513	516	410
600	510	490	400
600	500	477	400
600		473	
600		450	
593		410	
587			
583			
580			
Average=608	Average=525	Average=510	Average=438

The hypothesis states that there is a significant positive correlation between each learner's self-reported TOEFL score and the average quizzes' score. The Pearson

correlation in Table 35 indicates that there is a positive significant correlation between the self-reported TOEFL score and the average scores on the quizzes. The correlation coefficient between learners' self-reported TOEFL scores and the quizzes average score is positive (R= 0.472), and significant (p< 0.05).

Table 35

Correlation between self reported TOEFL score and Quizzes Average Score

Correlations		
		Average Scores
Self-Reported TOEFL	Pearson Correlation	.472**
	Sig. (2-tailed)	.001
**. Correlation is significant (p<0.05) (2-tailed).		

However, there could be other factors that may have contributed to the scores on the quizzes. One of these that can be investigated is learners' usage of *Idiomobile*. Because of continued exposure to *Idiomobile* and in turn to idiomatic expressions and collocations, learners are likely to become familiar with their meaning. This can be examined in a multiple regression analysis to test whether self-reported TOEFL scores or usage of *Idiomobile* would predict the average scores on the quizzes. Based on the results of the multiple regression test in Table 36, the correlation coefficient for the self-reported TOEFL scores is low (R=0.138), and insignificant (p=0.289). However, the coefficient for usage of *Idiomobile* is positive (R= 0.624) and significant (p=0.000). This indicates that while the self-reported TOEFL scores correlated positively and significantly with average scores on the quizzes when taken separately, there was no significant correlation

when taking into consideration usage of *Idiomobile*.

Table 36

Coefficients for Quizzes' Average Score and TOEFL and Usage of Idiomobile

Coefficients[a]					
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.374	10.719		-.128	.899
	Usage of *Idiomobile*	16.212	3.356	.624	4.830	.000
	Self-reported TOEFL scores	.023	.021	.138	1.073	.289

a. Dependent Variable: Quizzes Average Score

This indicates that usage of *Idiomobile* and not the self-reported TOEFL scores predicts learners' average scores on the quizzes. In other words, the self-reported TOEFL scores were not a significant predictor of learners' scores on the quizzes in *Idiomobile*. There may be several reasons why the analysis showed this pattern. First of all, the quizzes learners took mainly focused on idiomatic expressions and collocation, which are not the focus of the TOEFL test. Second, learners usage of *Idiomobile* enabled them to go over hundreds of idiomatic expressions and collocations that eventually appeared on the quizzes, and were therefore, more likely to identify them on the quizzes. In addition, the TOEFL test measures learners' ability in reading, listening, speaking, and writing mostly academic English; thus, idiomatic expressions and collocations which appear more

frequently in day to day conversations may not necessarily be reflected as frequently on the TOEFL test.

Research Question 5

V. To what extent does English language learners' average daily usage of mobile phones correlate with usage of *Idiomobile*?

5. Hypothesis: There is positive significant correlation between learners' average daily usage of mobile phones and usage of *Idiomobile*.

The hypothesis states that the more time learners spend on average using their mobile devices, the more they will use *Idiomobile*. Based on learners' reported daily average of phone usage on the questionnaire and usage of *Idiomobile*, there is a positive significant correlation between average daily phone usage and usage of *Idiomobile* as can be seen in Table 37.

Table 37

Correlation between Average Daily Phone Usage and Usage of Idiomobile

Correlations

		Usage of *Idiomobile*
Average Daily Phone Usage	Pearson Correlation	.336*
	Sig. (2-tailed)	.024

*. Correlation is significant (p<0.05) (2-tailed).

Mobile phones are becoming more capable and affordable, and therefore, it is legitimate to expect learners to rely on their mobile devices in serving a variety of functions, from

making calls, to Texting, to checking emails, and possibly doing homework from the mobile devices. We might be led to think that if learners use mobile devices frequently on a daily basis, that they will use educational applications like *Idiomobile* in similar ways. For example, ALI learners had the highest reported average daily usage of mobile devices, but used the *Idiomobile* the least of all groups. On the other hand, learners in the CT group who reported the lowest average daily usage of mobile phones used *Idiomobile* the most. Groups' average daily usage of mobile phones is displayed in Figure 10.

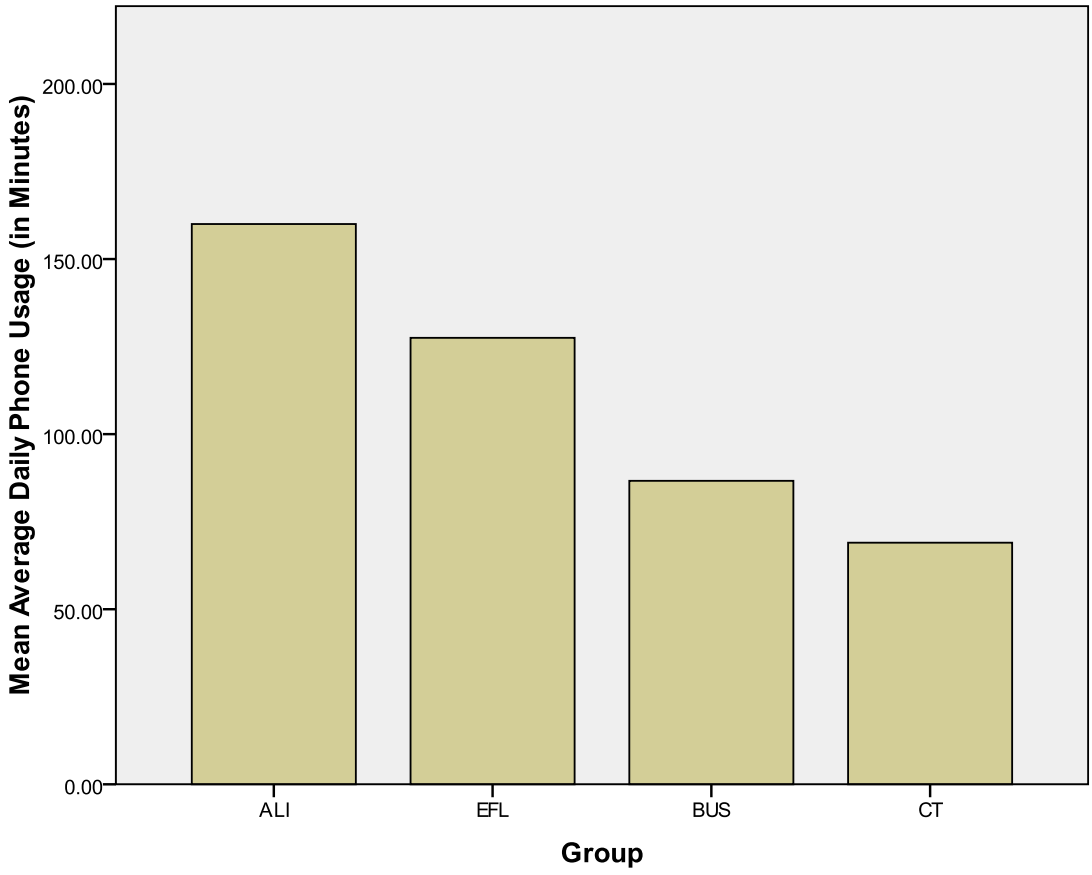


Figure 14. Groups' average daily usage of mobile phones.

Such enthusiasm about usage of mobile devices to deliver language learning experiences must be carefully examined. While usage and reliance on mobile phones are projected to increase in the coming years, we as educators should be wary of the limitations, and most importantly limitations in their use in the context of language learning.

Research Question 6

VI. What are learners' opinions towards the use of *Idiomobile* in particular and mobile technology in general to facilitate learning idiomatic expressions and collocations?

6. Hypothesis: Learners will have positive views of *Idiomobile*, and of using mobile technology in language learning in general.

Based on responses on the questionnaire, learners in all groups overwhelmingly agreed that mobile devices can be used to help them in their language learning process.

Table 38

Groups' Opinions towards the Use of Mobile Technology in Language Learning

Mobile devices can be used to help second language learners in their language learning						
Group	Strongly Agree	Agree	No Answer	Disagree	Strongly Disagree	Response count
ALI	66.7%	22.2%	11.1%	0.0%	0.0%	9
CT	26.7%	73.3%	0.0%	0.0%	0.0%	15
EFL	58.3%	41.7%	0.0%	0.0%	0.0%	12
BUS	66.7%	33.3%	0.0%	0.0%	0.0%	9

Based on the data in Table 38, English learners have strong positive views towards the use of mobile technology in language learning. Based on the interviews I conducted with learners after the study, most learners had positive views of using *Idiomobile* to learn idiomatic expressions and collocations. English learners commented on several aspects of the application that made the experience of using it to learn idioms enjoyable. Some learners commented on the design and technical aspects of the application. They indicated they were pleased with how the application ran; absence of waiting time for the application to load, and having a small file size. Others commented on how it allowed them to learn idioms.

> The application was very helpful in general. I thought it was light on the phone, and I can negotiate it easily. I also liked the nice colors and design of the application. I was hoping to see more examples of definitions, but overall it was a good application. (Ahmad)

Learners also commented on the challenging aspect of idioms, and how the application challenged them, which in turn made them use the application more often.

> I used to recommend that (mobile dictionaries)-I think this program is quite useful and it has a lot to add for the benefits of students. Personally, I used it more since it was challenging. I like to know what that idiom is since it is tied to the culture. It [the application] is always there, and I carry it all the time. It helps me widen all my horizons with the idiomatic expressions. The more you know about them [idioms], the more you become familiar with the environment. I was amazed at the number of idioms packed in the application. (Fadi)

Several learners indicated that they learned more idioms because of the application, and

indicated that they would use it more often, even after the study.

> Good experience-learned new idioms! I did not feel I used it as much as I should have. I think since I had it on my phone, I'll be able to use whenever I want to, but I think it is good application. I would definitely recommend it to ESL students. (Mazen)

Learners also commented on how the application was helpful to them. They indicated that such an application should be used by all ESL learners. For example, several learners from the CT group indicated that the application should be a must-have by ESL students, and international ESL teachers, since being an ESL teacher does not guarantee that you will be familiar with most of idioms.

> I think it is a very good application. Definitely! ESL students, EFL teachers, international teachers, because just being a teacher does not mean you can use it. Navigation and pictures were important; also tying idioms to a picture helps me use the idioms. (Tareq)

English learners in this study overwhelmingly agreed that mobile technology should be used to help them in their language learning process. They strongly believe that applications like *Idiomobile* must be used by ESL and EFL students since it provides ample learning opportunities for mobile users.

Overall, most learners believed that mobile devices can be used to help them in their language learning process. These findings extend to previous studies that examined learners views towards the use of mobile devices in language learning (Houser and Thornton, 2001)

Summary of Results

To summarize, the *quiz* and *game* sections were the most used sections of *Idiomobile* by all groups. The other most used sections were the *travel*, *shopping*, *food*, and *sports* sections. In terms of the groups' usage of *Idiomobile*, the CT group used *Idiomobile* the most, followed by the EFL group, the BUS group, and the ALI group. While the groups' usage of *Idiomobile* differed, the only significant difference was between the ALI group and the other groups. In addition, English learners who had the highest average self-reported TOEFL score had the highest average score on the quizzes in *Idiomobile*. While the self-reported TOEFL scores correlated positively with average scores on the quizzes when taken separately, there was not a significant correlation in the presences of the usage of *Idiomobile* variable. This indicates that usage of *Idiomobile* and not the self-reported TOEFL scores predicts the learners' average scores on the quizzes. In other words, the self-reported TOEFL scores were not a significant predictor of learners' scores on the quizzes in *Idiomobile*. In addition, the more learners used the application, the better their scores were on the quizzes in the application.

Furthermore, with each day of the study, learners' scores on the quizzes improved. In terms of average daily phone usage and usage of *Idiomobile*, learners in the CT group who reported the lowest average daily usage of mobile phones used *Idiomobile* the most, while ALI learners who reported the highest usage of mobile phones used *Idiomobile* the least.

In this chapter, I described in detail the data that was collected from *Idiomobile*, the questionnaire, and the interviews. I explained how the data was used in answering the research questions in the study. I explained the tests used, and how they are used to assess

the data, and in particular its relation to each research question. In the next chapter, I discuss the implications of the data in the study, its implications for this study and future studies, and recommendations for future research.

CHAPTER FIVE: DISCUSSION

This study aimed to explore how four groups of English language learners used *Idiomobile*, a mobile learning program that aids in learning idiomatic expressions and collocation. This research has been a very ambitious work in several respects. First, it recognized the difficulty of learning idiomatic expressions and collocation, a challenging aspect in the field of second language learning which has been well documented, and offered a new way to address this challenge. The research addressed this challenge by capitalizing on an ever powerful, affordable, and accessible technology. Second, this research is the only one to the best of my knowledge that documents a development of an application from the perspective of language learner, and an educator at the same time, realizing the importance of pedagogy and the opportunities provided by mobile technology. While this research provides answers to a handful of urgent research questions, it should only be considered a first step in a field that is projected to grow dramatically in the next few years. In no way are this research's findings detrimental to how idiomatic expressions and collocations can be best provided via the learning opportunities presented in the application. Rather, it provides a way to examine, and contribute to future studies on mobile learning and the role it can play in language learning in general and learning idiomatic expressions and collocations in particular. This research, moreover, shed light on learning habits of English language learners as they used their mobile devices. These findings can provide guidelines for future mobile learning application developers to make learning more enjoyable by capitalizing on mobile usage behaviors that led to increased learning, and avoiding design choices that learners were not particularly interested in.

In this section, I discuss the findings as they pertain to each research question and provide implications and recommendations for future research.

Research Question 1

I. To what extent do learners of English use *Idiomobile* to learn idiomatic expressions and collocations?

1. Hypothesis: The *quiz* and *game* sections will be the most used sections of the application by the four groups of learners of English.

English learners in this study favored two sections of *Idiomobile*, the *quiz* and the *game* sections. During the study, learners were instructed to use all the sections of the application, and were not instructed to focus on these two sections. Findings, however, indicated that usage of these two sections accounted for more than fifty percent of all application usage. Learners indicated in the follow-up interviews that because of the greater amount of control they had of these two sections, they used them the most. One student commented on why they used the quizzes and games:

> I like more quizzes and I also like the game. I wanted to take as many quizzes as I can. Both games and quizzes-but mostly just wanted to take quizzes-they're fun and gives you a score at the end- more quizzes, higher score. (Sammy)

Learning applications should offer learners great amount of control over the learning experience. Equally important is understanding why learners used these two sections most. One recurring theme from the follow-up interviews is the ability of *Idiomobile* to provide a challenging edge for learning idioms and collocations to learners, a challenge already documented in the literature. Several learners indicated that because they kept getting newer idioms and collocations every time they took a quiz, they felt challenged

by *Idiomobile*. One learner in particular indicated that if it were not for the variety of idioms with which they were not familiar that kept showing up, they would not have used *Idiomobile* as much as they did. The student commented on the idioms being challenging saying:

> When you are showered with idioms, you can't tell what to remember or not. It made feel embarrassed that I don't know some of the idioms. When I was taking the quiz, I was feeling like I must beat the computer. So I tried to set a perfect score, so even when I get one wrong, I start over to retake another quiz. I sometimes got frustrated but it made me use it which is good. (Wardah)

This challenge that several learners reported is due to the fact that *Idiomobile* could select a variety of idiomatic expressions each time learners took a quiz and that idiomatic expressions and collocations are generally difficult for ESL and EFL learners (Zhang, 1993; Farghal, and Obiedat, 1995; AL-Zahrani, 1998; Nesselhauf, 2005). Therefore, combining the interactive nature of *Idiomobile* and the difficulty of idioms and collocations was crucial in understanding why English learners' usage of the *quizzes* and *games* was particularly high.

Some learners across the groups indicated that they are used to taking quizzes and tests, and therefore, the *quiz* section was a familiar section to use. One student commented:

> Sometimes when I'm relaxed, I'd pick the phone and navigate through the application. Sometimes I used it for the sake of the study. But once I get there, I get hooked up! It's nice I liked it. I like taking quizzes. Every time I take a quiz, I feel that I am learning. (Dia)

Not all learners, however, were thrilled with the quizzes. One learner conveyed their anxiety about tests and quizzes, and even though learners were not told to use any specific section nor were they forced to use the quizzes, some learners still did not like the quiz format. They still indicated that it should remain as part of the application since it can provide feedback for students who do not mind tests. This student commented:

> I don't like evaluation. I like to learn without being assessed. I still think that you should definitely keep the quizzes. I have a test anxiety. I hate testing. I think if the user spends more time with other categories, they will use them more than the quizzes. (Saad)

English learners' favoring the *quiz* and *game* sections can best be understood by taking into consideration the following themes: interactivity, control, and feedback.

Interactivity

Because of their interactive nature, the *quiz* and *game* were the most used sections of *Idiomobile*. These two sections were the only sections that were interactive: Learners had control over how they run, and learners received feedback from these two sections. Usage of the *quiz* section accounted for almost half of all application usage. Learners indicated that they used the quizzes the most because they were able to get immediate feedback with regard to the accuracy of their answers. In addition, they indicated that they learned more idioms and collocations if they took quizzes. Many learners indicated that they can assess how many idioms they learn as they took the quizzes. Not all learners, however, were as interested in the quizzes. Some of the learners indicated that they do not like to be assessed. Therefore, their usage of the *quiz* section was minimal. There could be a variety of reasons why the learners interacted mostly with the *quiz*

section. First, quizzes in general are very common assessment tools. Therefore, many learners felt comfortable with the format of the activity and thus used it more often. Second, the *quiz* section in *Idiomobile* provided immediate feedback to learners, and many learners in the follow up interviews indicated that the feedback was the key feature for using the *quiz* section so often. In addition, learners had complete control of the format of the *quiz* section. They have control over how many questions to appear, the amount of time allocated to complete the quiz, and the categories of idioms and collocations to appear in the quiz. This control was key for the learners' frequent usage of the quizzes in *Idiomobile*.

Control

One of the highlights of *Idiomobile* that learners pointed was the fact that they had *Idiomobile* on their device. This allowed them to have access to *Idiomobile* any time. For example, many of the learners mentioned that they used *Idiomobile* during times of the day when they had only a short amount of time when they were not doing something in particular. For example, one student indicated that they used *Idiomobile* while waiting for the bus. The student mentioned that it was a great thing that they had control of when they could use *Idiomobile*. The student indicated that the freedom to access *Idiomobile* all the time helped them be in control of the learning experience and made them take every opportunity available to use it. However, some other learners voiced different opinions. For example, several learners indicated that they had access to *Idiomobile* all the time, and therefore, they did not feel the rush to use it everyday. They indicated that this made them feel lazy about using it. Because of immediate access to *Idiomobile* and because of its availability at all times, learners felt no pressure to use it.

Feedback

One of the benefits of computer assisted learning in general is its ability to provide immediate feedback to learners about their performance or interaction at any given point. *Idiomobile* was no exception. One of the highlights of *Idiomobile* as reported by the learners was that they got immediate feedback regarding their performance and knowledge of idiomatic expressions and collocations. This could provide an explanation as to why the *quiz* section was the most used in *Idiomobile*. It is one of two sections that have the capability of displaying immediate feedback to learners in addition to the *game* section. Two learners in the follow up interview indicated that the feedback they got "motivated" them to repeatedly retake the quiz. Because every time the learners took a quiz the idioms were new, the two learners felt they were "challenged" to keep practicing. Feedback is essential to learners since it promotes risk-taking, learners' autonomy, negotiation of meaning, and helps learners develop learning strategies. Learning experiences involving interaction between humans and the machine are valued because they allow for more risk-taking (Pennington, 1996; Spears and Lea, 1992; Skehan, 1998). Interaction with the machine is normally less risky than interaction with humans. Pennington (1996) argues that risk taking is one of aspects of the power of computer assisted learning. Pennington (1996) argues that language learners are likely to produce more language through the activities made available by the computer, and in turn produce more comprehensible input and comprehensible output (Swain, 1985). Because of the amount and the variety of learning modes in computer applications, learners often have more opportunities to increase their risk-taking behavior while interacting and experimenting with the language material in *Idiomobile*. Feedback also promotes control

of the learning experience. Researchers have stressed the importance of allowing learners to exercise more control over their learning (Watts, 1997; Wenden, 1991). This was evident during the follow-up interview where several learners mentioned that because of the feedback they received on their performance particularly while taking the quizzes helped them decide how much practice they should do, and helped them realize how much more learning they would like to take on. In addition, feedback allows for the negotiation of meaning. Based on the data from the interview, learners reported that they benefited from being able to review their incorrect answers as they took these quizzes. Learning is essentially the result of interaction between learners and others, and that learners attend better to learning when they have opportunities to interact and negotiate meaning (Vygotsky, 1978; Levin & Boruta, 1983; Ahmad, Corbett, Rogers & Sussex, 1985; Kelman, 1990; Skehan, 1998; Egbert, Chao, and Hanson-Smith, 1999; Chapelle, 2001, 2003). This negotiation of meaning took place in *Idiomobile* in a variety of ways. First, users are allowed to make selections and receive feedback before an incorrect answer is recorded. For example, if users are asked to provide an answer to a question, and they provide an incorrect one, *Idiomobile* will relay that information back to the users and ask them to try a different answer. This allows users to make another selection, a possibly correct one, before credit for a correct answer is either assigned or withdrawn. In addition, *Idiomobile* presents idiomatic expressions with varying degrees of formality and structure difficulty. For example, when users roll over an item in a given category, an idiomatic expression linked to the item is displayed. If the user decides to go over all the idioms in the category, *Idiomobile* will display another idiomatic expression linked to that item, with varying degree of formality and structure difficulty.

Learners also reported that the feedback they received from *Idiomobile* helped them decide which idioms are easier for them to learn and which sections they should practice as they take the quizzes, which in essence allowed the learners to develop learning strategies that are based on they feedback they got. One of the learners for example said

> What I liked about *Idiomobile* is that I was able to only practice the sections that I had most difficulty with. If you noticed from the data, there are a couple of sections that I mostly wanted to practice, the *animal* section and the *body parts* section. The idioms that are based on these two categories are harder for me than the other ones for some reason. (Fadwah, *my emphasis*)

It must be noted that learners in the CT group were the only group who had selected different categories to appear on the quiz. The other groups tended to go with the default options, which included all the categories. This could be the case partly because the CT group overall had at their disposable more learning strategies than other groups.

Research Question 2

II. In what ways do the four groups of English learners use *Idiomobile* to learn idiomatic expressions and collocations?

2. Hypothesis: There is a significant difference between English language learners' usage of *Idiomobile*.

Learners in the CT group used the application the most of all groups, while the ALI group used the application the least. The CT group can be considered to include the most advanced learners in this study based on their self-reported TOEFL score and the program of study they are pursuing. Similarly, the ALI group has the lowest average self-

reported TOEFL score and is in an intensive English language program to develop their English. Based on the ANOVA and Tukey test, the ALI group's usage of *Idiomobile* was significantly different from the other groups. There are several reasons why the group's usage of the application differed. ALI learners have the lowest average self-reported TOEFL score of all groups and are placed in an intensive English language learning program, which exhibits characteristics of beginner language learners. Therefore, learning idioms and collocations might not have seemed important or developmentally appropriate language learning material for learners in this group.

Inferred-Motivation

I argued earlier that motivation can be a key in determining success and failure in language learning. Researchers have shown that motivation positively correlates with success in the second language learning process (Gardner, 1985; Baker, 1992; Samimy & Tabuse, 1992; Oxford & Shearin, 1994; McGroarty, 1996; Oxford, 1996; Dörnyei, 2000; Segalowitz & Freed, 2004; Rueda & Chen 2005). Highly motivated learners tend to spend more time in their learning process, are attentive during a given learning task, and tend to be high risk-takers in their learning, all of which enable them to use failure and success to their benefit in their learning process. Masgoret and Gardner (2003) argue that motivation correlates with achievement in second language learning. They argue that there are certain characteristics that are found in motivated individuals: They spend effort, they are persistent, they focus on the task at hand, they enjoy the activity, experience reinforcement from successes, and are upset when they fail, and they make use of learning strategies to aid them in learning. These characteristics were evident in this study. I assumed earlier that the CT group for example is a highly motivated group of

learners. Because of the fact that these learners are pursuing an advanced degree in English, they are highly motivated language learners. The CT learners exhibited many of the characteristics reported in the literature of highly motivated language learners. They are persistent and goal oriented. This was obvious in a variety of ways. First, they had the highest amount of application usage of any group. Their usage of *Idiomobile* reflects specific features, showing that they are goal oriented. For example, they are the only group whose members customized the quizzes to include selected categories of idiomatic expressions and collocations to be quizzed on.

Learning Goals

Watts (1997) argues that computer mediated language learning should be based on learners' needs rather than what technologies can offer; a learner-based approach is more likely to help a student learn, rather than one built based on a technological approach. Watts explains that embracing what technology can do without focusing on the learning aspect is an unsuccessful approach. Kristiansen (2001) claims as well that success of using mobile technology in learning should have more to do with the pedagogical task than the technology available. There is a number of variables in the study that could have influenced the learners to use *Idiomobile* one way or another. Learners' learning goals are one important variable to help understand the nature of interaction between *Idiomobile* and users. Clearly, the best mobile applications in the world would have been useless if learners do not view them as important in their language learning process. This seems like stating the obvious, but because learners in general found *Idiomobile* to be a learning aid, they used it as they believed it would help them improve their learning of idioms and collocations. This is one of the key aspects of

implementing pedagogical principles in developing learning applications. Findings in this study underscore the importance of taking into consideration learners' goals and implanting them in the design and development of *Idiomobile*.

Research Question 3

III. To what extent does usage of the sections in *Idiomobile* correlate with scores on the built-in quizzes in *Idiomobile*?

3. Hypothesis: There is a significant positive correlation between usage of the sections in *Idiomobile* and the scores on the built-in quizzes in *Idiomobile*.

As I mentioned in Chapter Three, my usage of the term "usage of the application" refers to the number of times a learner used *Idiomobile*. Based on the results in the earlier chapter, the more times the learner used the application, the better their scores were on the quizzes. Only usage of the *game* and *quiz* sections, in particular, significantly correlated with the scores on the quizzes. There are several factors that could have contributed to learners' improved scores on the quizzes as the study progressed and as learners used the application. First, despite the quiz questions being randomly selected, the probability of repeated questions increases as the learner takes more quizzes and answers more questions. Thus, a learner is more likely to become familiar with certain questions and the correct answer for those questions the more they appear. Yet, this does not necessarily mean that a repeated item will be answered correctly. Several learners incorrectly selected certain idiomatic expressions even when they were repeated on the quizzes. In addition, a repeated question that appeared toward the end of the study may not likely be answered correctly if it appeared earlier in the study. A learner may simply forget what that idiomatic expression meant. Furthermore, while a quiz question might be

repeated, the answer options for that question are not necessarily repeated. For example, if a learner had to answer a quiz question about the meaning of *Black Friday* and had the following choices to choose from: *A good day for business, A sad day,* or *a happy day,* the next time the question appeared, new options would appear along with the correct answer with the exception of the correct answer, which is *a good day for business*.

Another factor that could have contributed to the correlation between usage of *Idiomobile* and the average scores on the quizzes is learners' familiarity with the format of the program. Learners become familiar with the questions and the answers presented for each question, and thus are more likely to select the right answer.

It is important to note that improved average scores on the quizzes do not necessarily mean that users are learning the idioms and collocations. Learners' might have become better at guessing the right answer simply because of familiarity with the questions and the application.

Research Question 4

IV. To what extent do self-reported TOEFL scores correlate with English learners' scores on the quizzes in *Idiomobile*?

4. Hypothesis: There is a significant positive correlation between English learners' self-reported TOEFL scores and their scores on the quizzes in *Idiomobile*.

As I showed earlier, there was a positive (R=0.472) and significant (p=0.001) correlation between the learners' self-reported TOEFL score and their performance on the built in quizzes in *Idiomobile* when correlated separately with the average score. However, when it is measured in combination with other variables, like the amount of times a learner used *Idiomobile*, the self-reported TOEFL score was not significantly

correlated with the average score on the quizzes.

There are several reasons why the correlation between self-reported TOEFL scores and the average scores on the quizzes was not significant when analyzed in combination with usage of *Idiomobile* variable. First, the self-reported TOEFL scores do not necessarily indicate learners' knowledge of being able to identify the meaning of the idiom as it appeared on the quiz. While idiomatic expressions and collocations are an important part of second language learning like I argued earlier, they are not necessarily tested on the TOEFL test. At the same time, self-reported TOEFL scores did provide a general idea of the range of proficiency of the learners in the groups, which could also be explained by the other groups' characteristics. For example, the average self-reported TOEFL score for the CT group was 608, which is higher than the ALI self-reported TOEFL score of 438, which is reasonable. This explains why the self-reported TOEFL scores correlated positively and significantly on its own with learners' average scores on the quizzes.

Research has shown that learners' degree of fluency in a language allows them to use a variety of learning strategies in their language learning process (Nunan, 1999). Thus, it could be that proficiency in English could point to more learning techniques, and thus, learners can use these strategies to their advantage. This was evident in this study as learners in the CT group focused attempting to find ways to use idiomatic expressions they learned.

In my interviews with CT learners in particular, they showed for the most part that they have employed far more strategies than learners in the other groups. For example, several learners indicated that to help remember the idioms, they would try to

practice them in everyday situations. One student commented: “I like to practice English in general alone by myself. I repeated

Based on data from *Idiomobile*, the CT group was the only group whose learners bypassed the quiz defaults to choose certain categories to appear on the quiz. This suggests that they were aware of which idiomatic expressions they wanted to practice on the quizzes.

Research Question 5

V. To what extent does English language learners’ average daily usage of mobile phones correlate with usage of *Idiomobile*?

5. Hypothesis: There is positive significant correlation between learners’ average daily usage of mobile phones and usage of *Idiomobile*.

While data show that there is a positive significant correlation between learners’ reported average daily usage of mobile phones and usage of *Idiomobile*, the CT group who had the lowest average daily usage of mobile phones used *Idiomobile* the most of all groups, and the ALI group who had the highest average reported daily usage of mobile phones used *Idiomobile* the least. There are two possible interpretations for this behavior: learners inferred motivation and inferred learning goals.

Learners’ motivation, which can be inferred based on the context of learning English, can explain why there was a difference in the amount of daily usage and usage of *Idiomobile*. The CT group, for example, used the application far more than the rest of the groups. Learners’ usage of the application is an indication of their motivation in the sense that their usage of the application exhibits characteristics motivated learners do in

the learning process.

Learners' learning goals which can also be inferred based on the learners' goals for learning English can provide insight into the reasons for using the application. To further illustrate my point, I will use the example of learners in the CT group. Most of the learners in this group will be future teachers of English, and thus, being able to know the meaning of idioms is important to them since they will be teaching English and therefore expected to know what they mean.

Research Question 6

VI. What are learners' opinions towards the use of *Idiomobile* in particular and mobile technology in general to facilitate learning idiomatic expressions and collocations?

6. Hypothesis: Learners will have positive views of *Idiomobile,* and of using mobile technology in language learning in general

Learners overwhelmingly enjoyed using *Idiomobile*. Learners had positive views of the application and strongly indicated that they would recommend it to someone who is learning English. One student commented:

> Definitely! ESL students, EFL teachers, international teachers (being a teacher does not mean you can use it [idiomatic expressions]. (Raed)

Learners also suggested that using *Idiomobile* will help ESL and EFL learners understand the culture better.

> Absolutely-to any ESL student-the problem facing EFL/ESL students is that we feel we don't know how to use the idioms-because we don't know how to use them—it will help oral and cultural communication between native and non-

native speakers. (Ahmad)

The positive views of the application based on the follow-up interviews with learners focused on three main themes: accessibility, mobility, and ease of use. Accessibility of the application can be understood in a variety of ways. First, learners indicated that *Idiomobile* being an educational non-profit application is a good thing, because it will allow them to have access to it without having to worry about paying for fees or updates for the application. Accessibility can also be understood to mean that *Idiomobile* is self-sustaining since learners' usage of it is not dependent on external factors, like a connection to the internet or cellular data plans. For example, learners were pleased that using *Idiomobile* does not require an internet connection. In addition, accessibility can be understood with respect to loading the application on the phone without delays or waiting time. Furthermore, learners indicated that *Idiomobile's* versatility in terms of running on even older mobile devices means that it could reach a wide audience of learners without having to buy specific phones that *Idiomobile* is compatible with. One student commented:

> This is free and it is good, but I think you should make some money. I will buy it but some people do not want to pay money for it [applications] since they can steal them from the net. I also like that it works on my Nokia so I don't need to buy a special phone or card to use it. I am actually surprised that it works so well on my phone. (Mohammad)

Mobility can be understood to refer to carrying around 3,000 idiomatic expressions and collocations on the phone compared to carrying, for example, 3,000 flash cards with idiomatic expressions and collocations. While dictionaries and flash cards, for

instance, can provide similar capabilities, learners indicated having that number of idioms and collocations on the phone, a device they are already carrying around, is much simpler and more convenient.

Ease of use refers to aspects of the application that learners felt were very easy to use. For example, the application features shortcuts that allow learners to access idiomatic expressions and collocations in different sections, without having to struggle to find the idioms. For example, learners indicated that the thematic categorization of *Idiomobile* allowed them to access idioms that have do with, say, shopping faster than if they would have to search through lists or using a search function.

In general, learners overwhelmingly indicated that they strongly believe that mobile learning can assist them in their language learning. One of the questions learners asked was whether mobile devices should be used in the classroom to complement classroom learning. Learners were split on this. Some learners believed that this measure could disrupt the rhythm of the class. Others thought it would be an important step in helping them learn. Researchers who examined the use of mobile devices in the classroom found similar results. For example, in a study by Kennedy and Levy (1999), the researchers found that students who received text messages featuring definition of vocabulary words in Italian during regular intervals learned more vocabulary items and had improved their learning compared to those who did not. In this study, some of the learners will be future teachers of English, and even among them, results varied. For example, some of them believed that allowing mobile devices can help in the classroom, but it has to be sequentially done. For example, some teachers voiced fears that students might get distracted by the other students while using the phones. Another problem they

fear is equal access. Despite the fact that it is hard to find a student without a mobile device in today's mobile world, some students in certain locations of the world still do not have access to these devices. Under this option (allowing mobile phones in the classroom), teachers assume equal access among their students, which is not necessarily the case. In addition, a set of technical difficulties presents itself. While most students generally have access to a mobile device, not all of these devices are created equal. To assume participation among students, applications to be available to learners must have a universal installation format to allow students with different mobile devices to use the same application. Equal access not only means access to the phone, but to the same features of the applications on all students' phones. This means that the application must run as efficiently on all students' phones.

Some learners still believe that levels of maturity among students will contribute greatly towards their adoption of mobile devices in the classroom for learning purposes. For example, a participant in this study who is a teacher of English indicated that students, albeit willing to learn from mobile devices, they are still not mature enough to handle that kind of mobile learning in the classroom. In addition, participants indicated that issues of class management will likely hinder aspects of mobile learning. For example, some of the respondents in this study indicated that use of mobile phones in large classrooms can be a nightmare, shifting the control from the teacher to the students. This is pivotal point in the discussion of using cell phones in the classroom for learning purposes. Realizing that teachers may give up a large part of control in their class might be a problematic issue for mobile enthusiasts. The concerns are legitimate in the sense that mobile usage will only be possible if it is practical, and useful. Determining if these

two main conditions exist will take more than affordable and capable mobile phones.

Based on the findings from the interviews conducted with learners regarding their interaction with the device, the majority of the learners had no problems using and running *Idiomobile*. No participant indicated that technical difficulties (when present) affected how they used *Idiomobile*. In terms of user friendliness, most learners considered *Idiomobile* very user friendly in terms of loading, and the way the sections are organized. Some learners reported minor problems with *Idiomobile*; however, they all agreed that these minor issues did not affect the way they used *Idiomobile*. One of the benefits of the pilot study was to get feedback regarding the use of *Idiomobile*. Some minor problems that existed in *Idiomobile* were fixed following the pilot study. Some of the minor problems that learners presented were a loading message where *Idiomobile* was attempting to load a section endlessly. Learners indicated that they could press the home button to return to the main menu. No participant reported an occasion where *Idiomobile* existed unexpectedly or crashed the system.

In addition to its user friendliness, learners' comments regarding improvements did not suggest that sections be removed, but rather suggestions for more games and more explanations. For example, some of the learners suggested that the *quiz* section should include the idiomatic expressions in context, like in a sentence or example where the idiomatic expression is used. They indicated that would help them score higher than if it were the phrase and the meaning only. Some other suggestions concerned the possibility that learners can add their own idiomatic expressions that are not included in *Idiomobile*. One of the learners in the EFL group indicated that he pays special attention to idioms and he wondered whether it was possible for him to add more idioms to

Idiomobile. Another suggestion concerned one of the games in *Idiomobile*, the *deal or no deal* game. The participant suggested that game should include a story of the origin of the idiom and the participant should identify whether the story of the origin of the idiom is true or made up. There were many suggestions regarding the possibility of two students participate in the quiz from their separate phones, thus requiring phones to connect to each others somehow. These two learners suggested that this will make the quizzes more fun and helpful to their learning.

Findings in this study also provided valuable information regarding the times learners used their mobile devices to 'learn' idiomatic expressions and collocations. When asked what times of day learners used *Idiomobile,* most learners said that they would use it during a “free moment,” which could be a number of minutes during the day when they have extra free time. Learners felt it was something beneficial to do, to make something useful of their extra free time. Several learners indicated that they used *Idiomobile* at the end of the day whenever they were getting ready for bed. This could raise a couple of questions regarding the amount of attention and seriousness they would bring to the task. It could also provide insights as to how this time period can provide for better design insights. Bull and Cui (2005) investigated the use of a hand-held computer to facilitate mobile learning based on learners’ available learning opportunities. Tense ITS, the system the authors investigated, allows learner to customize their learning based on opportunities for learning. Users set profiles, including how much time they have to work on the assignments, what kind of tutoring they need (fluency level), and the kind of feedback and assessment they want during each profile. Then, when users encounter such an opportunity, the system automatically does the rest.

Another area of interest that emerged from the study is whether usage of *Idiomobile* encouraged the learners to use the idiomatic expressions and collocations in real life situations. Most learners said that they had not had the chance to use the idiomatic expressions they learned in real life. Some did indicate that they used some of them in emails and by practicing them out loud on their won. Several learners indicated that they practiced these idioms with themselves, by repeating them out loud. Those learners indicated that this practice provides for less inhibition, and allows for more risk-taking. But the majority of learners believed that if given enough time, they would start using these idiomatic expressions and collocations whenever they had free time. As far as encouraging the learners to use more idioms and collocations, learners indicated that what *Idiomobile* has certainly helped them do is become aware of the importance of idiomatic expressions. For example, most of the learners indicated that since they started using *Idiomobile* during the course of the study that they are noticing these idioms and collocations in real life. They would stop and think about them, something which they said they did not do prior to the study. This can be linked to an earlier issue that they asked about regarding the capacity of *Idiomobile* to include new idioms and collocations they encounter. If *Idiomobile* does make them aware of the existence of these expressions, one way this could be examined in future studies is by allowing *Idiomobile* to include more idioms, and determine at the end of the study how many new idioms and collocations they added to *Idiomobile*. Learners reiterated their strong positive attitude toward *Idiomobile*. While it can be argued that many of them would not feel comfortable criticizing *Idiomobile* especially since the developer was also the one conducting the interview, learners were exceptionally forthcoming. *Idiomobile* was to them very helpful.

They stressed that during the interview several times. In addition, all learners requested a copy to use after their participation in the study ended. In fact, many of them asked whether it was possible for them to share a copy of *Idiomobile* with other potential users. Learners were also forthcoming with regard to the areas *Idiomobile* can improve upon. For example, they indicated the potential it may have if it allowed learners to add idioms not found in *Idiomobile*.

Are Some Idioms and Collocations Particularly Harder to Learn?

It is practically problematic to define which idioms are harder to learn. I argued earlier that because of the way they are configured, idioms are particularly harder for ESL and EFL learners because the meaning of the idiom is not linked to the individual meaning of words making up the expression. One way difficult idioms can be categorized is by keeping record of the idioms learners could not identify on the quizzes they took. Hence, a difficult idiomatic expression is one that learners incorrectly identify consistently. For example, to determine if an idiomatic expression or a collocation is particularly hard to learn, the idiomatic expression or collocation must appear at least three times during the course of the study on the quizzes the learners took, and it must be answered incorrectly three times to be considered a particularly difficult to learn idiom. While this is not necessarily the best way to identify difficult to learn idioms, within the capabilities of *Idiomobile*, this is one of the few ways to do it.

The most incorrectly selected idioms belong to the *Feelings* category. This would include idioms like *Hot under the collar* and *A chip on your shoulder*. These idioms are categorized under the *Feelings* category because they refer to a feeling or a state of mind. Figure 15 displays the frequency of the most incorrectly selected idioms in *Idiomobile*.

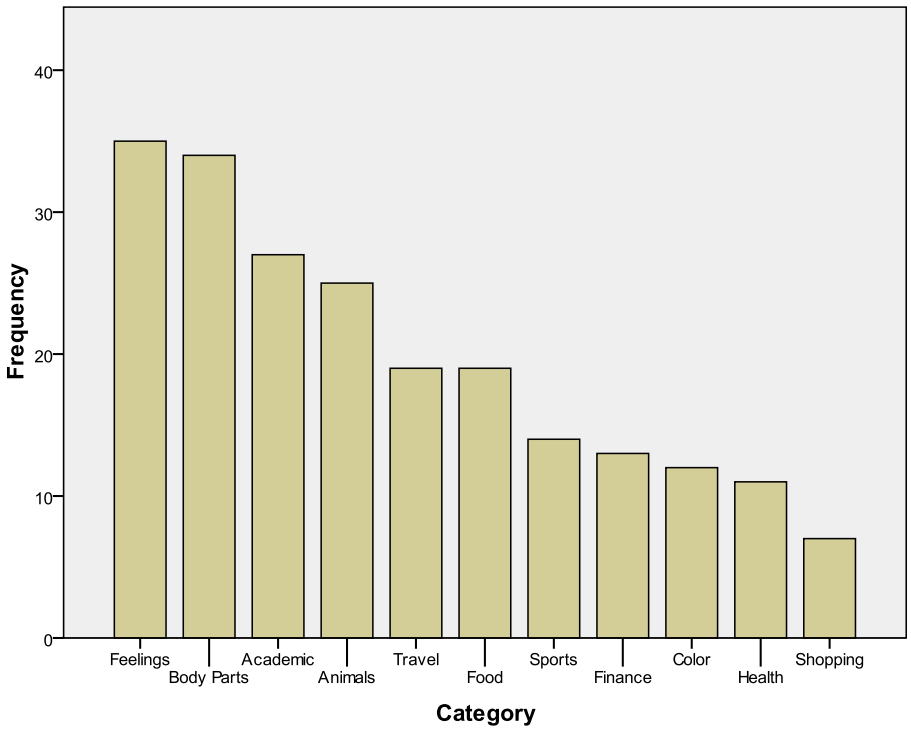


Figure 15. Categories of the most incorrectly selected idioms and collocations.

In addition, I found that verb phrase (VP) idioms and collocations were the most incorrectly selected according to their grammatical make-up, which is similar to what Liu (1999) found in a study of Chinese students' papers and exams for errors in using collocation. Liu found that learners had most difficulty with V-N collocation types. These expressions were categorized based on Phrase Structure Rules (PP=Prepositional Phrase, i.e., *in the black;* NP=Noun Phrase, i.e., *water under the bridge*; VP=Verb Phrase, i.e., *pony up*; AP=Adjective Phrase, i.e., *black coffee*; CP=Complete Phrase, i.e., *If you have lemons, make lemonade*; AS AS= Expressions in the form of *As Adjective as Noun*, i.e., *As cool as cucumber*). The percentage of incorrectly selected idioms based on grammatical category is displayed in Figure 16.

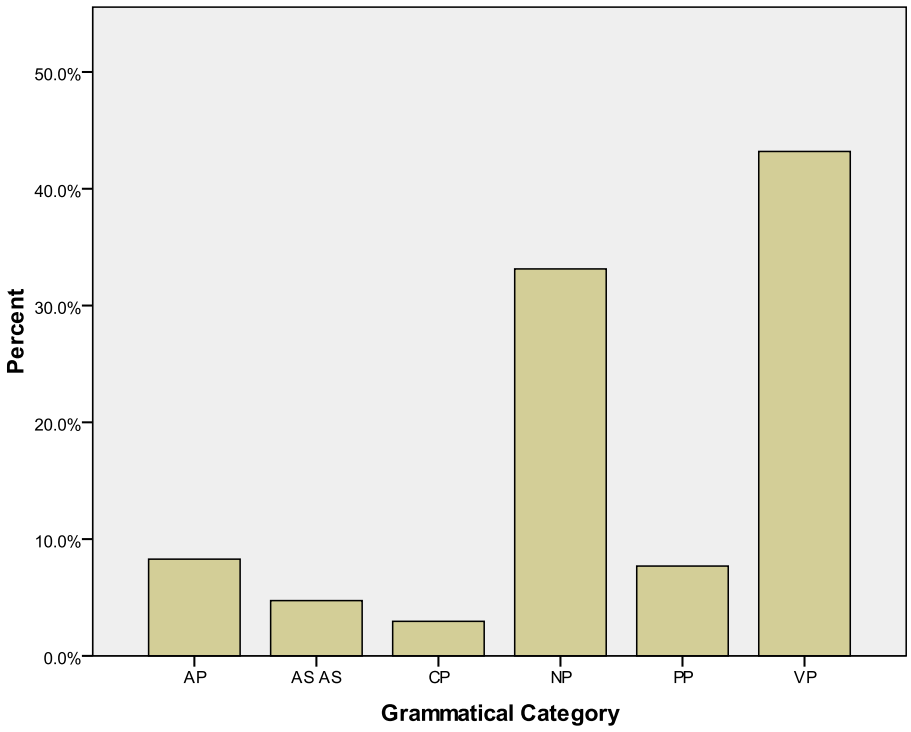


Figure 16. Percentage of incorrectly selected idioms based on grammatical category.

Implications for Teaching Idioms and Collocations

Based on the findings in this study, there are a few implications that are particularly useful for tips on teaching idiomatic expressions and collocations. I discuss them in the section below.

Context Matters

Findings in this study point to the importance of building a context for the explanation of idiomatic expressions and collocation. Learners' comments regarding the kind of improvements they would like to see in *Idiomobile* focused on one major theme: More contextual clues for how these idioms are used. Idioms in the application are presented with examples that help learners demystify their meaning and help use them in context. However, because most of the learners in the study used the *quiz* section, they

were not as familiar with these context clues. One of the suggestions provided by the learners was to include a game in *Idiomobile* that shows the story of how each idiom presented in the application came to exist. This, learners believe, will help them better learn idioms, and eventually use them in the appropriate context.

Length of Expressions

It seems from the data obtained by *Idiomobile* that the longer the idiomatic expression is, the more likely it will be understood by the learners. In other words, the number of constituents in an idiomatic expression seems to strongly predict whether that idiomatic expression will be recognized by learners. For example, idiomatic expressions that contain seven or more words are easier to recognize their meaning than the ones with fewer words. One way to explain this aspect would be the fact that some idiomatic expressions provide more clues with each word contained in them. For example, idiomatic expressions that followed the structure (*as adjective as Noun*) provide a key clue to their meaning. For example, the expression *as busy as a bee* would be clearly identified to mean “very busy”. However, learners were not as successful in producing these particular idioms. For example, when learners were asked on the quizzes to complete these kinds of expressions in a complete-the-phrase-type-of-quiz, they were not as successful as in completing them. Learners had difficulty providing the word *whistle* in an expression like *As clean as a whistle*. When compared to the data in Figure 16, lengthier (containing more words) idiomatic expressions are the least unrecognized by learners. In other words, the longer the expression, the more likely that it will be recognized by learners. The mean length of idiomatic expression for each category is displayed in Figure 17.

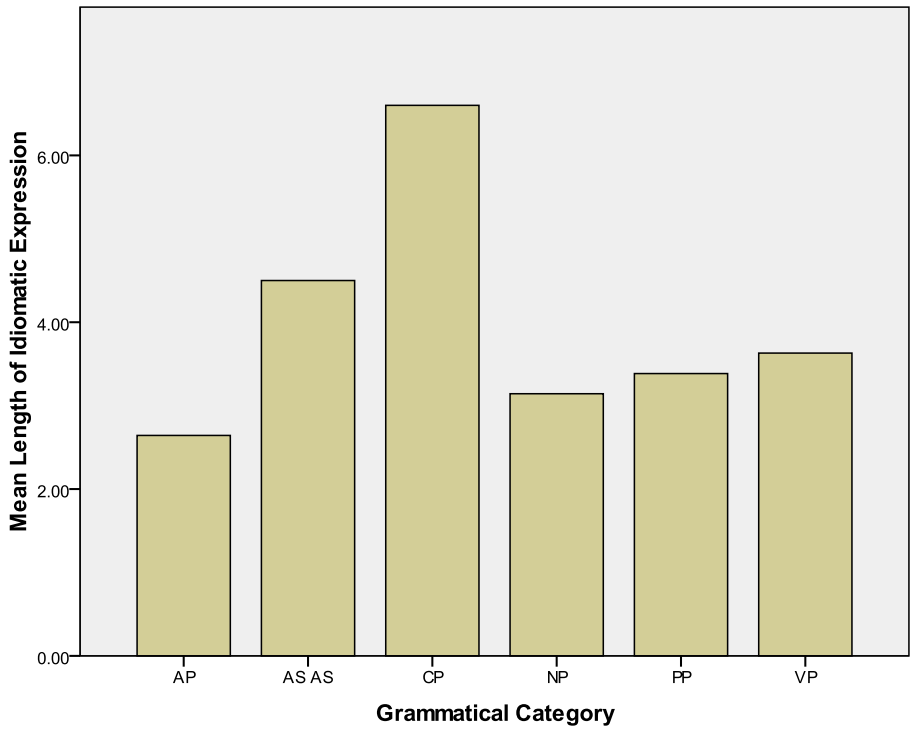


Figure 17. Length of idiomatic expression per grammatical category.

Theme Usage

Results in the study indicated that among all groups, learners' interaction with *Idiomobile* thematically varied. This area has a lot to offer to the field of teaching idioms and collocations. For example, learners' usage of certain sections was higher than other sections. For example, the food, travel, and shopping sections of *Idiomobile* were the most used ones. This might have relevance in a couple of ways. It could provide a basis for teachers when teaching students idiomatic expressions and collocations. For example, teaching idiomatic expressions and collocations can be based on themes that are particularly functional for learners. These idioms are popular in everyday life. Learners who are just beginning their learning experience might benefit from idiomatic expressions that have to do with basic functions in everyday life, like shopping and food.

Usage of Pictures

Most of the learners believed that use of images in *Idiomobile* was good. However, they indicated that the images did not help them better understand or learn idiomatic expressions and collocations. They suggested that images must in a way represent the idiomatic expression as a whole, where an image of literal meaning of the idioms is provided side by side with an image that conveys the actual meaning of the idiom. According to their suggestions, an expression like *It's driving me bananas* could be best illustrated with two images, one containing an image of a driver in a car with a banana in the background, and another one showing a person who is getting furious.

Limitations

While it is every researcher's goal to ensure that research is complete and accurate, all research is limited one way or another. This research is no different. I discuss the limitation in this study in this section.

Duration of the Study

One of the limitations in this study is the duration of the study. Learners were given one week to interact with *Idiomobile*. While there was plenty of data to work with, a longer study would have provided more insights regarding usage of *Idiomobile*. It would be interesting to see the how learners use *Idiomobile* over a period of three to four months. Would the availability of *Idiomobile* mean that learners would use it regularly? In addition, would it indicate how they would use the idioms in real life situations?

Usage Data

Despite the fact that *Idiomobile* recorded learners' usage of *Idiomobile*, usage does not necessarily reflect actual learning. For example, when each participant accessed

a certain section of *Idiomobile*, there is no way to tell how the learners used the section. There are a variety of scenarios possible. Learners could open a section, review some of the idioms, and then proceed to take a quiz. Duration of the time they spent on each section was not available. In addition, there is no way to tell if learners received help during the quizzes they took during the study. For example, *Idiomobile* could not record if the learners were receiving help as they took the quizzes. A participant may have shared the contents of the quiz with another person, and might have received help on it. There is no way of knowing that. In addition, while the subjects were willing to participate in the study, there is no way of telling whether personal events or busy schedules could have affected how they used *Idiomobile*.

Usage and Learning

Usage of *Idiomobile* does not equal learning. While i showed earlier that application usage was a significant strong predictor of the average score learners received on the quizzes, this does not necessarily indicate learning. This study did not examine whether learners were able to use the idioms in real life situations after they learned them from the application. In addition, increased scores from the quizzes do not necessarily mean the learners were learning the idioms. Learning idioms does not equal usage of them in real life. In addition, even if learners learned new idioms from the application, it was not clear whether they would retain this knowledge of idioms after the study was over. It was not clear whether learning would extend over a longer period of time. Learners could forget those idioms after a while.

Correlation vs Causation

Correlation does not equal causation. While correlation is required to make

inferences about whether the application caused the learners to learn idioms and collocations, correlations reported in this study by no means indicate a causal relationship between the application and learning as measured by increased scores on the quizzes. This is partly because there could have been other external variables at work during the study that could have affected how learners performed.

Ideas for Future Research

There are several areas for research in this growing and developing field. Assessing this application as a supplement to a class focusing on idioms could establish practical and theoretical ground for the future of mobile device usage in the classroom. Extending the study to last a little longer than a week might provide valuable insights as to how usage of the application changes over time, and whether there is a saturation period where learners eventually stop using the application altogether. Such a study could examine at what points learners decide to stop using the application, and the reasons behind doing so. Future studies could also look into the possibility of a social experiment where text messages between learners discussing idioms during their daily interactions could be examined and how they assist learners in learning and producing these idioms. Texting is an essential component of mobile application usage, and studies in this field can examine this potential. Findings in this study indicate that learners' most used feature of mobile devices is texting as can be seen in Table 39. Future studies could examine how texting can be implemented within this application to allow learners to communicate with each other as they use the application, and share idiomatic expressions and collocations with each other.

Table 39

Learners' Usage of Texting as Reported on the Questionnaire

GROUP	Never	About 15 minutes	Half an hour	An hour	Two hours	Three hours	Four or more hours
EFL	0.00%	31.30%	37.50%	6.30%	12.50%	0.00%	12.50%
CT	6.30%	56.30%	37.50%	0.00%	0.00%	0.00%	0.00%
BUS	0.00%	33.30%	33.30%	33.30%	0.00%	0.00%	0.00%
ALI	0.00	0.00	0.00	22.22	22.22	0.00	55.56

This study explored how four groups of English learners used a mobile software application developed by the researcher for learning idiomatic expressions and collocations. Findings in the study show that idiomatic expressions and collocations are particularly difficult for English language learners. All learners in this study averaged less than 70 percent on the quizzes they took during the study, which echoes reported findings in the field regarding the difficulty of idiomatic expressions and collocations for English language learners. In addition, findings show that learners' usage of the application correlated with their average scores on the quizzes. The more learners used the application, the higher they scored on the quizzes in the application. Learners' usage focused mainly on the *quiz* and *game* sections of the application. In a week, learners in all groups answered 8,654 quiz questions with an average of 60 questions for each learner. In addition, findings show that usage of mobile devices in general can predict how English learners used the application.

Findings also underscore the importance of providing language learners with

resources to help them learn idiomatic expressions and collocation. Learners strongly indicated that even within a short period of time, they felt they knew more idioms and collocations since they started using the application. Data from the application show that learners had difficulty understanding idiomatic expressions relating to feelings, such as *a chip on your shoulder*, or *hot under the collar*. Findings also show that learners in this study seem to recognize longer idiomatic expressions than shorter idiomatic expressions. Findings also show that learners' have strong positive opinions toward the use of mobile technology in language learning.

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APPENDICES

Appendix A: Preliminary Questionnaire

I would like to ask you to help me by responding to the following statements. There are no "right" or "wrong" answers. I am interested in your opinions about the use of mobile devices in second language learning. Please answer all the questions sincerely in order to help me with this investigation. Thank you

Name:_____

Email:_____

How long have you been in the US?

☐ NEVER

☐ Less than a year

☐ 1-2 years

☐ 3-4 years

☐ 4-5 years

☐ 5-6 years

☐ 6-7 years

☐ More than 7 years

Please write down the date of your entry to the US

_____

How old were you when you started learning English?

_____

What is your first language?

_____

What is your recent TOEFL score? If you have not taken the TOEFL, please leave this field empty

_____

Please check which form of TOEFL you have taken

☐ PPT

☐ CPT

☐ IPT

☐ iBT

Which other languages do you know?

Language	Poor	Average	Fluent	Native-Like
Arabic				
Armenian				
Chinese				
English				
French				
German				
Hebrew				
Italian				
Japanese				
Korean				
Russian				

Spanish
Turkish

On average, how often per day (in minutes) do you do any of the following?

	Never	15	30	60	120	180	240
Watch TV shows in English to help you understand spoken English							
Listen to Pod casts to help you learn English							
Interact with English native speakers to help you learn English							
Participate in activities where English is practiced and/or spoken to help you improve your English							
Read books in English other than your class books to help you learn English							
Go online and surf the web to learn English							
Play games online to learn English							
Use your laptop to access exercises online to learn English							
Read the news/blogs online to improve your English							

On average, how often do you use your mobile phone per day to

	Never	Less than 15 minutes	15-30 minutes	45-60 minutes	1-2 hours	3-4 hours	More than 5 hours
Check your email							
Surf the internet							
Play games							
Listen to music							
Chat with friends							
Send Text Messages							
Read the news							

On average, how often do you use any of these devices PER DAY

	Never	Less than 15 minutes	15-30	45-60	1-2	3-4	More than 5 hours
Mobile Phone							
iPod(MP3)							

PDA (Personal Digital Assistant)
Portable Game
Mini-Laptop
PC
Other

Please respond to the following statements. There are no "right" or "wrong" answers. I am interested in your opinions about the use of mobile devices in second language learning. Please answer all the questions as accurately as possible. Thank you

	Strongly Agree	Agree	No Answer	Strongly Disagree	Disagree
Mobile devices can be used to help second language learners in their language learning					
Teachers should allow students to use mobile devices during class for language learning purposes					

Dictionaries on mobile device help me in learning English
Mobile games are a good way for me to learn English
I consider myself to be a motivated second language
My main goal of learning English is to be able to communicate with other people
My main goal of learning English is to succeed in school
My main goal of learning English is to succeed in my work
Other Goals (please specify) _____

Appendix B: IRB Form (Arabic Version)

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m4her1@yahoo.com

Appendix C: preliminary questionnaire (arabic version).

_____

_____

_____ 1-2

_____ 3-4

_____ 4-5

_____ 5-6

_____ 6-7

_____

_____

_____

_____

_____

- - - -

- - -

-

(iPod or mp3)

(PDA (Personal Digital

Assistant)

(Laptop)

Appendix D: questionnaire data

Mobile devices can be used to help second language learners in their language learning	Strongly Agree	Agree	No Answer	Disagree	Strongly Disagree	Response
ALI	66.7%	22.2%	11.1%	0.0%	0.0%	9
CT	26.7%	73.3%	0.0%	0.0%	0.0%	15
EFL	58.3%	41.7%	0.0%	0.0%	0.0%	12
BUS	66.7%	33.3%	0.0%	0.0%	0.0%	9
Teachers should allow students to use mobile devices during class for language learning purposes	Strongly Agree	Agree	No Answer	Disagree	Strongly Disagree	Response
ALI	22.2%	22.2%	11.1%	22.2%	22. %2	9
CT	20.0%	13.3%	26.7%	26.7%	13.3%	15
EFL	25.0%	8.3%	25.0%	8.3%	33.3%	12
BUS	22.2%	22.2%	33.3%	22.2%	0.0%	9
Dictionaries on mobile device help me in learning English	Strongly Agree	Agree	No Answer	Disagree	Strongly Disagree	Response
ALI	66.7%	22.2%	11.1%	0.0%	0.0%	9
CT	60.0%	33.3%	0.0%	0.0%	6.7%	15
EFL	58.3%	16.7%	16.7%	8.3%	0.0%	12
BUS	44.4%	11.1%	44.4%	0.0%	0.0%	9
Mobile games are a good way for me to learn English	Strongly Agree	Agree	No Answer	Disagree	Strongly Disagree	Response
ALI	22.2%	66.7%	11.1%	0.0%	0.0%	9

CT	6.7%	40.0%	33.3%	13.3%	6.7%	15
EFL	33.3%	8.3%	58.3%	0.0%	0.0%	12
BUS	66.7%	0.0%	33.3%	0.0%	0.0%	9
I consider myself to be a motivated second language learner	Strongly Agree	Agree	No Answer	Disagree	Strongly Disagree	Response
ALI	44.4%	44.4%	11.1%	0.0%	0.0%	9
CT	73.3%	20.0%	0.0%	0.0%	6.7%	15
EFL	58.3%	25.0%	16.7%	0.0%	0.0%	12
BUS	88.9%	11.1%	0.0%	0.0%	0.0%	9
My main goal of learning English is to be able to communicate with other people	Strongly Agree	Agree	No Answer	Disagree	Strongly Disagree	Response
ALI	66.7%	22.2%	11.1%	0.0%	0.0%	9
CT	53.3%	26.7%	6.7%	6.7%	6.7%	15
EFL	66.7%	16.7%	16.7%	0.0%	0.0%	12
BUS	77.8%	22.2%	0.0%	0.0%	0.0%	9
My main goal of learning English is to succeed in school	Strongly Agree	Agree	No Answer	Disagree	Strongly Disagree	Response
ALI	44.4%	22.2%	33.3%	0.0%	0.0%	9
CT	60.0%	20.0%	6.7%	6.7%	6.7%	15
EFL	50.0%	8.3%	41.7%	0.0%	0.0%	12
BUS	100.0%	0.0%	0.0%	0.0%	0.0%	9
My main goal of learning English is to succeed in my work	Strongly Agree	Agree	No Answer	Disagree	Strongly Disagree	Response

ALI	66.7%	22.2%	11.1%	0.0%	0.0%	9
CT	80.0%	6.7%	0.0%	6.7%	6.7%	15
EFL	66.7%	8.3%	25.0%	0.0%	0.0%	12
BUS	77.8%	11.1%	11.1%	0.0%	0.0%	9

Appendix E: Questionnaire Opinions Items Data

GROUP	Never	About 15 minutes	Half an hour	An hour	Two hours	Three hours	Four or more hours
Music							
EFL	6.30%	6.30%	25.00%	31.30%	18.80%	0.00%	12.50%
CT	68.80%	12.50%	6.30%	12.50%	0.00%	0.00%	0.00%
BUS	33.30%	0.00%	16.70%	0.00%	50.00%	0.00%	0.00%
ALI	0.00%	0.00%	0.00%	0.00%	44.44%	0.00%	55.56%
SMS							
EFL	0.00%	31.30%	37.50%	6.30%	12.50%	0.00%	12.50%
CT	6.30%	56.30%	37.50%	0.00%	0.00%	0.00%	0.00%
BUS	0.00%	33.30%	33.30%	33.30%	0.00%	0.00%	0.00%
ALI	0.00%	0.00%	0.00%	22.22%	22.22%	0.00%	55.56%
Phone Usage							
EFL	0.00%	0.00%	6.70%	20.00%	46.70%	13.30%	13.30%
CT	0.00%	18.80%	18.80%	18.80%	43.80%	0.00%	0.00%
BUS	0.00%	0.00%	0.00%	50.00%	33.30%	16.70%	0.00%
ALI	0.00%	0.00%	0.00%	11.11%	22.22%	22.22%	44.44%

PC Usage							
EFL	26.70%	0.00%	6.70%	6.70%	40.00%	20.00%	0.00%
CT	11.80%	0.00%	5.90%	0.00%	23.50%	17.60%	41.20%
BUS	0.00%	0.00%	0.00%	0.00%	0.00%	33.30%	66.70%
ALI	44.44%	0.00%	0.00%	0.00%	11.11%	44.44%	0.00%
Playing Games							
EFL	80.00%	13.30%	6.70%	0.00%	0.00%	0.00%	0.00%
CT	68.80%	31.30%	0.00%	0.00%	0.00%	0.00%	0.00%
BUS	83.30%	16.70%	0.00%	0.00%	0.00%	0.00%	0.00%
ALI	77.78%	22.22%	0.00%	0.00%	0.00%	0.00%	0.00%