

IMPLICIT VOCABULARY ACQUISITION IN PROJECT-BASED LEARNING

WITH IPAD TECHNOLOGY

by

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## Abstract

This study aims to investigate the pedagogical impact of extensive reading and listening in project-based learning on the *implicit* acquisition of vocabulary. The study involved twenty-seven female ESL student participants in two pre-intermediate classes in an Academic Bridge Program at a higher education institution in the UAE. In this study, the participants were required to use their iPads to research and present an iMovie or a digital book about the project's general focus, which was *How to Design a Specific Space*. A quantitative analysis of the participants' written essays, using Laufer and Nation's Lexical Frequency Profiler, explored if there were any differences in the level and sophistication of the vocabulary between essays written pre-project and essays written post-project, using the same prompts. The results revealed that extensive reading and listening throughout the project helped the participants *implicitly* acquire new word families and word types that belong to West's (1953) first one-thousand most common words in the English language (K1). In addition, there was a decrease in the total number of words belonging to the K1 category, as well as an increase in the total number of words that belong to Coxhead's (2000) Academic Word List (AWL) in the post-project essays. A survey examined the participants' perspectives on the different aspects of the project. This survey showed that the majority of the participants felt that they improved their English, enjoyed working on the project, and enjoyed using their iPads to create the final product.

**Search Terms:** implicit vocabulary acquisition, project-based learning, iPad technology in the ESL context, vocabulary profiling, and motivation.

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## Chapter 1. Introduction

### Statement of the Problem

Creating a generation of independent learners who are equipped with the skills and knowledge needed for the 21<sup>st</sup> century is the goal of most educators. One way to achieve this is by transforming the classroom from a teacher-centered classroom into a student-centered one, where the teacher becomes a *facilitator* or *enabler* instead of a *doer*. This constructivist orientation views learning as being collectively created by learners, where the seeds of autonomous life-long learning in the participants are fostered.

Project-based learning (PBL), with the use of technology, is one effective way of creating a student-centered classroom, where the teaching and learning can be designed in a way to investigate an authentic problem, and create maximum student engagement (Blumenfeld et al., 1991). Task-based instruction, which is part of PBL, is defined as “activities that engage the language learners in meaningful, goal-oriented communication to solve problems, complete projects, and reach decisions” (Pica, 2008, p. 71). In the PBL approach, the participants carry out a multitude of tasks that simultaneously lead to a solution to an authentic problem, where the solution is presented in the form of a final product.

A project requires extensive reading in order to build a portfolio of knowledge around a certain topic. There is a common consensus amongst educators that extensive reading helps ESL learners improve their language skills. Since extensive reading is not an approach that goes under the umbrella of explicit instruction, knowledge acquired through extensive reading is labeled as *implicit*. *Implicit* or *incidental* are terms used interchangeably to describe the learning that is opposite of explicit learning. Incidental learning, according to Decarrico (2001), is “learning that occurs when the mind is focused elsewhere, such as on understanding a text or using language for communicative purposes” (p. 289). When it comes to first language acquisition, a large proportion of the words that a child acquires are not formally taught by parents or teachers. The words are incidentally acquired through encounters in the speech or writing of other people. Krashen (1982) makes the distinction between learning and acquisition where learning is conscious knowledge, while acquisition is the *implicit* or informal learning where language is “picked up”

naturally without formal instruction. Krashen (2003) in his Taipei lectures suggests that learners should be provided with access to interesting reading material and should be given time to read. He also asserts that there is good evidence that rewards and incentives do not increase the amount of reading carried out by a learner (Krashen, 2003).

For English teachers, it is commonly known that even providing interesting material to read might not be enough incentive to motivate students to read. This is a problem common in ESL classrooms in general (Johnson & Delawsky, 2013; Zyngier, 2011), and in ESL classrooms in the UAE in particular (Gitsaki et al., 2013). Therefore, finding ways to motivate students to read is of paramount importance. Teachers need to be innovative in their approaches to motivate them and make reading worthwhile. One way to motivate students to read is to give them a project where extensive reading and listening are required to construct a portfolio of knowledge regarding a particular topic. A project gives students an authentic problem to solve. Thus, reading becomes purposeful, and the need to search for the solution and to produce a final product might give a boost to the students' level of motivation.

My previous ESL teaching experience involved structured grammar-based syllabi, where linguistic forms were mostly presented in a strictly linear progression. Recently, while working as an English Language Instructor in an English preparatory program in a higher education institution, I was exposed to project-based learning for the first time. This institution's curricular documents give four reasons for infusing projects into the curriculum: (1) to cultivate the seeds for autonomous learning, (2) to boost the students' motivation, (3) to help the students acquire skills for their future careers, and (4) to utilize the newly incorporated iPad in meaningful ways in the classrooms.

Working on these projects, I noticed that though the participants encountered some difficulties when researching and weaving together the parts of the project, they seemed to enjoy producing their end products and showcasing them to the whole class. Throughout the project's six-week period, many questions came to my mind regarding the pedagogical implications of projects in general. I began to note that some students were using new vocabulary words that were not explicitly taught in class. This observation led to my becoming interested in researching about *implicit*

vocabulary acquisition through PBL. It seemed worth exploring if new vocabulary is *implicitly* acquired through extensive reading and listening within a specific context during a project, especially since this method of *implicitly* acquiring vocabulary through PBL is relatively new, and has not been extensively explored in the literature. Therefore, this study aims to measure the *implicit* vocabulary acquired in such projects, and gain the participants' perspectives on PBL in general by answering the following research questions:

- 1- Are there any differences in the level and sophistication of the vocabulary between essays written pre-project and essays written post-project using the same prompts?
- 2- What are the students' perspectives on project-based learning in terms of improving their language skills as well as enhancing their level of motivation?

### **Significance of the Research**

This research will add to the literature on PBL in general, and in the ESL context in particular. Moreover, this study will examine the effectiveness and pedagogical implications of PBL through mobile technology specifically in the UAE context. Results from this study may prove beneficial to educators who are currently involved in PBL and mobile technology in the UAE, or those who might be willing to attempt this innovative learning strategy in their own classrooms.

This study will also attempt to enrich another area in the literature that is related to *implicit* methodologies of vocabulary acquisition. Traditional vocabulary instruction, in which the students are solely provided with lists of vocabulary to memorize, can be de-motivating and might only serve the teacher-centered approach. In contrast, this method of incidentally acquiring vocabulary through PBL is relatively new and has not been extensively explored in the literature. Producing evidence of its effectiveness might be highly beneficial for the UAE context because there is a major problem with students' disengagement and lack of motivation in ESL classrooms.

## Chapter 2. Review of Literature

This chapter will be divided into six different sections that correspond to the different constructs covered in this thesis. The sections include: (1) project-based learning, (2) vocabulary acquisition, (3) assessment issues, (4) vocabulary profiling, (5) iPad technology in the educational context, and (6) motivational facets of PBL with iPad technology.

### Project-based Learning

Project-based learning (PBL) is a constructivist approach to learning. It acknowledges the fact that teaching is not only a process of transmission of knowledge from teacher to learners. PBL is part of task-based learning which is defined as “an activity in which meaning is primary; there is some sort of relationship to the real world; task completion has some priority; and the assessment of task performance is in terms of task outcome” (Skehan, 1996, p. 38). In this kind of learning, knowledge is collaboratively shared by both the learners and the teachers. Freire’s (1970) perspectives in his seminal work *Pedagogy of the Oppressed* had an impact on constructivists’ views by introducing the concept of empowering students in classrooms. He refused the traditional teacher-centered classroom and saw learning as a cooperative operation where outcomes are negotiated, critical thinking is developed, and learning related to the outside world is discovered.

One positive aspect of project-based learning is that it steers away from traditional teacher-centered classrooms toward student-centered ones, and projects related to language learning can offer opportunities for meaningful use of language. Mills (2009) argues that the students’ usage of skills is no longer isolated; instead they are integrating manageable tasks that they might find in real-world contexts. Furthermore, projects can create meaningful and authentic learning experiences that are transferrable. When the students work in pairs or groups on a project, they may learn new skills that can be transferred to their workplace in the future. Johnson and Delawsky (2013) argue that problem solving, critical thinking, collaboration, and presenting ideas were not necessary in the workplace during the last century, but are now essential for many newly created careers. Thus, project-based learning prepares the students for the future and provides them with life skills needed for the 21<sup>st</sup> century.

Another positive aspect of PBL is that it exposes the students to new knowledge and facilitates the development of critical thinking skills. Without critical thinking and analysis, the problem which is the central element of PBL, cannot be resolved (Markham, 2011). Blumenfeld et al. (1991) suggest that projects have the potential to: (1) “enhance deep understanding because students need to acquire and apply information, concepts and principles”, and (2) “improve competence in thinking (learning and metacognition) because students need to formulate plans, track progress, and evaluate solutions” (p. 373). Thus, students enhance their critical thinking through researching and acquiring new knowledge in order to solve the problem.

Students also get exposed to the skills of deducting and synthesizing relevant information, which in turn facilitate their linguistic progress. The nature of project-based learning can be seen as *integrative* because it “integrates knowing and doing” (Markham, 2011, p. 38). The practice of exploration of different online communities and various sources exposes students to authentic language and culture allowing the integration of both content and language (Stoller, 2006). Learners progressively observe their linguistic progress and develop competence after the completion of manageable tasks (Mills, 2009).

PBL is not only *integrative*, but it can also be seen as *comprehensive*. To a certain extent, PBL cover all of Nation’s (2007) four strands of a well-balanced language course. These strands are (1) meaning focused input (learning that occurs through reading and listening), (2) meaning focused output (learning that occurs through writing and speaking), (3) language-focused learning (pronunciation, spelling, grammar and meaning), (4) and fluency development. In PBL, meaning-focused input is covered through extensive reading and listening to contextualized texts through multiple simultaneous modalities that can enhance student understanding (Blumenfeld et al., 1991). Meaning-focused output is witnessed when students present their final products which are “assessed against specific criteria established at the beginning of the project and defined in the assessment plan” (Markham, 2011, p. 39). Language-focused learning might be achieved when students struggle to process new lexical items or new phonological forms in the reading or listening texts. Researchers agree that “processing new lexical items more elaborately... will lead to higher retention than processing new lexical information less elaborately” (Hulstijn & Laufer, 2001, p. 6). Fluency development is a by-product

of the other three strands. It is achieved through purposeful communication and meaningful language use which are fostered through the end product (Levy, 1997).

Projects, in project-based learning, not only help the students improve their linguistic skills, but “have the potential to enhance deep understanding because students need to acquire and apply information, concepts, and principles, and they have the potential to improve competence in thinking (learning and metacognition)” (Blumenfeld et al., 1991, p. 373). Two types of metacognition are employed in project-based learning, where one is “tactical, relating to the moment-to moment control and regulation of cognition” and the “other is strategic and concerns more molar levels of control over larger units of thought” (Blumenfeld et al., 1991, p. 379).

Extensive reading and listening of authentic texts during the project can help the student acquire target vocabulary incidentally (Decarrico, 2001). Another benefit of reading in PBL is that the students read material that is context-specific and related to their topic of research. The difference between reading contextual material and learning words in lists is very wide. In word lists, students might “focus only on the spelling and meaning of words, but not on using the words themselves in speaking and writing” (Coxhead, 2011, p. 358). Acquiring vocabulary through contextualized material might be the way that aids effective memory retention and vocabulary acquisition (Greenwood and Flannigan, 2007).

Project-based learning involves a number of tasks in search of an answer to a problem. Hulstijn and Laufer (2001) propose the construct of task-induced involvement for vocabulary learning, which has three motivational and cognitive dimensions: *need*, *search*, and *evaluation*. The *need* component, according to Hulstijn and Laufer (2001), is “the motivational, non-cognitive dimension of involvement” while *search* and *evaluation* are the “two cognitive (information processing) dimensions of involvement” (p. 14). In other words, *searching* is finding the meaning of the L2 word to express a concept by looking it up in a dictionary or by asking the teacher, while *evaluation* involves assessing which words fit together in a specific context of writing or speaking (Hulstijn & Laufer, 2001). In projects, different tasks generate different levels of involvement. For example, after the students collect information from different sources (*need* and *search*), there seems to be strong involvement on the part of the student to figure out meanings of unknown words (Mohseni-Far, 2008), then sort out relevant information and combine this information

in forms that are meaningful and comprehensible (*evaluation*). During this process, learners combine new information with existing information that is stored in their long-term memory (Fotos, 2001). The last part of the process involves a higher level of cognitive involvement on the part of the student. This leads to the idea of *elaboration* which was introduced by Sully (1890) and has been repeated by educational psychologists for many years. Hulstijn and Laufer (2001) explain the effects of *elaboration* by stating that:

The more attention that is paid to the formal and semantic aspects of words, and the richer the associations that are made with existing knowledge (e.g. in the form of establishing similarities and contrasts between the old and the new information), the higher are the chances that the new information will be retained (p. 1).

PBL not only consists of the three cognitive dimensions of *need*, *search*, and *evaluation*, but it also provides fertile ground for three elements that are important for educational systems in the 21<sup>st</sup> century, which are: *Student-centered learning*, *collaborative learning* and *inquiry-based learning* (Johnson & Delawsky, 2013). *Student-centered learning* is the main concept that PBL revolves around. Schwartz et al. (1998) describe *student-centered learning* as the process of reflection on one's own learning and improvement with the provision of resources and encouragement in order to help learners take responsibility of their own learning. Since PBL is based on finding an answer to an authentic problem, it can be seen as *inquiry-based*. Inquiry-based learning, as characterized by Lee (2014), is an information exchange where students are stimulated to actively engage in activities that promote cognitive involvement and discovery. In PBL, students *collaboratively* share knowledge and skills within the project in order to settle their own goals and find innovative solutions to achieve their objectives (Muresan, 2014).

### **Vocabulary Acquisition**

Even though applied linguists and language teachers have long acknowledged the importance of vocabulary teaching and learning, vocabulary research was neglected for a long time, while more importance was placed on grammar and rule-based instruction (Schmitt, 2000). Vocabulary was viewed as supplementary to the use of functional language. Strikingly, since the 1980s, this situation has been reversed with “over 30% of the research on L1 and L2 vocabulary learning of the last

120 years occurring in the last 12 years” (Nation, 2011, p. 530). There is widespread knowledge amongst language educators and researchers that an essential component in second language acquisition (SLA) is the mastery of vocabulary (Al-Darayseh, 2014; Cobb, 2007; Hulstijn & Laufer, 2001; Nation, 2011; Yang & Dai, 2011). Vocabulary knowledge not only allows the second language learners (SLL) to convey their spoken message in a meaningful way, but it also helps improve their (L2) writing, their listening, and most importantly facilitates their reading comprehension. Therefore vocabulary knowledge improves the productive as well as the receptive skills of the SLL.

Since vocabulary learning is multidimensional, different areas in vocabulary acquisition have been researched. Of the areas investigated are different strategies and techniques that facilitate the acquisition of vocabulary in the teaching and learning process. Two of these areas are *implicit* (incidental) vocabulary learning strategies as well as *explicit* vocabulary learning strategies. *Implicit* and *explicit* learning have their roots in cognitive psychology. Krashen (1989), in his Input Hypothesis, asserts that new words can be acquired subconsciously as a result of repeated exposure in different contexts, where the conscious focus is on the message, not the form. This kind of *implicit* (subconscious) learning is defined by Milton (2009) as learning “involving no deliberate intention to analyze language or learn, as well as learning which might be intentional on the part of the learner even if not part of an organized syllabus” (p. 219). Another explanation of *implicit* vocabulary learning is that it involves activities that do not focus attention on vocabulary (Mohseni-Far, 2008). Explicit learning, on the other hand, is defined as learning that focuses attention directly on the information to be learned (Schmitt, 2000). The general consensus in most of the studies investigated is that both *implicit* and *explicit* strategies are an integral part in the vocabulary acquisition process and should be used in a complementary fashion (Al-Darayseh, 2014).

As indicated before, *implicit* vocabulary acquisition can be a side effect or a by-product of another activity. It is commonly known amongst educators that vocabulary acquisition and reading comprehension are closely connected (Al-Darayseh, 2014; Joe, 2010; Milton, 2009). Greenwood and Flannigan (2007) argue that direct vocabulary instruction has very little impact on overall reading performance and that “90% of words are learned through repeated meaningful encounters in direct experience” (p. 249). This leads to the idea that *implicit*



vocabulary acquisition can be achieved through extensive meaning-focused reading as well as extensive listening. As mentioned in the previous section on PBL, Nation (2007) suggests a well-balanced program should consist of four strands: (1) meaning-focused input, (2) meaning-focused output, (3) language-focused learning, and (4) fluency development. Three of these strands are message-focused with stress on conveying the message, and only one strand is based on deliberate learning. Nation (2007) also warns against the over-application of deliberate attention to vocabulary.

Mohseni-Far (2008) asserts that the exposure to comprehensible text must be frequent and the first encounter with a lexical item must be followed by repeated contextualized exposures in order to consolidate and secure word meaning. Learners often resort to strategies that determine *how* and *how well* a new word is acquired, which Mohseni-Far (2008) labels as *recognizing*, *knowing* and *using*. He stresses that this process demands “meta-cognitive decision, choice, and deployment of cognitive strategies for vocabulary learning” (Mohseni-Far, 2008, p. 122).

### **Assessment Issues**

If students learn a set of words in a vocabulary list, then designing a test to evaluate what they have learned is a straightforward process. However, assessing how much vocabulary a group of students acquire through extensive reading and listening in PBL can be a challenging and tricky process. PBL, a performance-based educational approach related to portfolio development, is considered one aspect of alternative assessment within the framework of communicative language teaching. O'Malley and Pierce (1996) suggest six characteristics of performance-based assessment: (1) students make a constructed response, (2) students engage in open-ended tasks with higher-order thinking, (3) tasks are authentic, meaningful as well as engaging, (4) tasks involve integration of language skills, (5) process and product are assessed, and (6) emphasis is on depth of mastery not breadth. Brown and Abeywickrama (2010) assert that alternative assessment methods, such as portfolios and journals, “offer markedly greater washback, are superior formative measures and because of their authenticity, usually carry greater content validity” (p. 124) in comparison to formal standardized tests which tend to be “one-shot performances that are timed, multiple choice, decontextualized, norm-referenced, and foster extrinsic motivation” (p. 123).

One reason why educators steer away from certain alternative assessment, like projects, is the fact that evaluating projects is a time-consuming process that might leave teachers wondering if such a form of open-ended work that involves creativity can be reduced to a letter grade, especially when it involves assessing language learning at a very multi-dimensional level. Brown and Abeywickrama (2010) give steps and guidelines to ensure the success of such an evaluative method: (1) state objectives clearly, (2) be precise regarding the type of work to include, (3) communicate assessment criteria to students, (4) designate time for portfolio (project) work, (5) set time for periodic conferencing, and (6) provide positive washback for the final assessment.

The next section will focus the attention on the literature available on a particular computational text analysis tool called Lextutor Vocabulary Profiler and how teachers can utilize this measurement tool to compare students' pre-project and post-project levels of vocabulary.

### **Vocabulary Profiling**

Reading rich contextual texts can aid comprehension and ultimately lead to improvements in an individual's vocabulary size. Krashen (1985, 1989, 2003) believes that extensive reading can help second language learners (SLL) naturally acquire all the vocabulary needed for reading comprehension. However, the issue here is the feasibility of assessing the lexical increments that incidentally or discreetly make their way into the learners' vocabulary. Milton (2009) asserts that it was historically difficult to find evidence of large amounts of vocabulary gained in informal activities, such as reading and listening.

In a study conducted in 1998, Horst, Cobb and Meara questioned the amount of vocabulary resulting from free extensive reading. Participants in their study were "low-intermediate" EFL students in Oman. They read a version of the *The Mayor of Casterbridge* that was simplified (21,232 words). The students followed along in class while the story was read aloud by the teacher in six class sessions. Horst, Cobb and Meara (1998) gave the participants a multiple-choice vocabulary test a week before the reading. The test consisted of words that were potentially unknown to the participants. The same test was given after finishing the book. The test before the readings averaged 21.64 correct with SD = 6.45, while the test after the readings averaged 26.26 correct with SD = 6.43. They described this increase as a 5-word

increase in a 20,000-word book and stated that if the participants read one book per week, they would only gain 250 words per year, which is very short of the target 5000-word level as the minimum requirement for comprehension of authentic texts. Horst, Cobb and Meara (1998) claimed that the number of new words acquired through extensive reading was tightly controlled and very minimal; ultimately indicating that reading alone does not have the ability to enrich a learner's lexicon and that explicit teaching is more effective. Krashen (2003), in response to this study, pointed out four problems with it: (1) direct teaching results in learning not acquisition and learning fades quickly with time unless stringent conditions are met, (2) the reading conditions in the study were not natural and did not allow for pausing and rereading, (3) the participants might have acquired words that were not part of the test, (4) there is no evidence that learners who reach the 5000-word level attain that level only through direct instruction. Most importantly, he made a strong claim that many words acquired through extensive reading cannot be easily reflected in the crude nature of testing employed in the Horst, Cobb, and Meara study. Instead this knowledge hides invisibly inside as one reads (Krashen, 2003). Cobb (2007), in response to Krashen's criticism, states that these claims made by Krashen (2003) are not supported with empirical evidence that reflects the extent of this hidden learning. There is an urgent need to measure this hidden vocabulary learning, and the literature is severely lacking in this area. Therefore, a study that attempts to quantitatively measure the hidden vocabulary acquired in extensive reading and listening can be highly beneficial.

Vocabulary knowledge is essential for the four productive and receptive language skills (speaking, writing, listening and reading). These four skills are the pillars of L2 learning used by the second language learner to comprehend as well as convey meaning. However, the dilemma for educators and curriculum designers is to decide exactly which necessary vocabulary items to include for functional use in the various communicative contexts. It has been estimated that there are about 54,000 word families in the English language (Schmitt et al., 2015). A word family, as defined by Kennedy (2003), is a collection that consists of a headword with its derivational inflected word forms (e.g., *estimate*, *estimated*, *estimating*, *estimates*, and *estimation*). Corpus linguists have found solutions to this dilemma by dividing these words into high frequency and low frequency categories. High frequency words are about 2,000 content word lemmas or families and about 250 function words that are

most frequently used in the English language (Kennedy, 2003). These words are based on West's (1953) widely used list of most frequent words. Low frequency words are the words above the first two-thousand words in English (Kennedy, 2003). The high/low frequency words that were generated by Paul Nation and based on West's 1953 list, were derived from the British National Corpus (BNC), which consists of a hundred-million words of spoken and written English (Horst & Cobb, 2006). The pedagogical importance of corpus-based frequency lists and their impact on second language learners' vocabulary has been the focus of many studies on L2 vocabulary acquisition (McNamara et al., 2013; Nation, 2011; Schmitt et al., 2015; Shzh-chen Lee & McLean, 2013).

Nation (2011) emphasizes the importance of this distinction between high frequency words and low frequency words and stresses that high frequency words should be given high priority in the classroom. The reason is that these words facilitate language use, expedite the acquisition process, and are specifically critical to the early L2 language development. These 1000 and 2000 level word lists should be taught as soon as the L2 learners start learning English, to play the role of a baseline for lexical development (Nation, 2011).

Another very important list for the development of L2 learners is Coxhead's (2000) Academic Word List (AWL). This list of 570 word families is divided into ten sub lists. According to Coxhead (2000), "the list includes stems plus all affixes up to and including Level Six of Bauer and Nation's (1993) scale and it was developed using a written academic corpus of 3.5 million running words" (p. 355). This corpus was divided into four discipline areas: arts, law, commerce and science. The corpus, which contained 414 texts, was balanced for length and taken from articles, textbooks, book chapters and laboratory manuals, and the idea behind it was that it should imitate the reading of first-year students at a university (Coxhead, 1998, 2000). It is worth mentioning here that even though the list was created using words frequently encountered in academic texts, these words are *not* part of the first 2000 (West, 1953) words of English. Nation (2011) states that when the first 2000 words of English are added to the AWL list, together the two lists cover about 80% of running words in English. Therefore, knowing both the AWL and the first 2000 words will give the learner access to a large proportion of running words in many texts. This AWL list is widely known and used by educators and curriculum designers, and many texts used in language classrooms are based on it (Alemi et al., 2012; Liqin & Xinlu, 2014;

Murphy & Kandil, 2004). Moreover, research websites like the Lextutor Vocabulary Profiler make use of it.

An L2 learner needs a large-sized vocabulary, and there is a need for tools to measure the size of vocabulary growth in order to set educational goals. Before the availability of text computing software, it was not easy to measure how much vocabulary had been acquired and make comparison studies. The software program Lextutor Vocabulary Profiler (<http://www.lexutor.ca/vp/eng/>) was created with that purpose in mind. It is a Canadian vocabulary site created by Tom Cobb to be used by researchers, instructors and students (Laufer & Nation, 1995). It is mostly used to test vocabulary knowledge of the most frequent words in English. This site analyzes texts according to the proportions of frequent and less frequent words. In other words, it provides a breakdown of percentages based on West's (1953) first one-thousand most common words (K1), and second one-thousand most common words (K2), in addition to Coxhead's (2000) AWL, and off-list words. The off-list includes words that do not belong to any of the previously mentioned categories. Moreover, Lextutor gives the percentage value of Anglo-Saxon words encountered in the text. It also generates the number of families, types and tokens for K1, K2 and AWL, as well as the tokens and percentages of the function and content words. Table 1 below gives the definitions of all the categories that are generated by Lextutor.

**Table 1.** Lextutor Vocabulary Profiler Category Definitions

Category	Definition
1000 Words (K1)	The first most frequent 1000 English words (West, 1953).
2000 Words (K2)	The second most frequent 1000 English words (West, 1953).
Academic Word List (AWL)	The words most frequently encountered in academic texts (Coxhead, 1998, 2000).
Off-list words	The words that do <i>not</i> belong to K1, K2, or AWL (Horst & Cobb, 2006) as well as spelling mistakes.
Families	A word family includes the stem and all the affixes that are semantically linked lemmas. Example: <i>collect, collectable, collection, collective, collectively, collector, collective bargaining</i> (Kennedy, 2003).
Tokens	The number of words that are found in a specific text (Kennedy, 2003).
Types	All the words in a passage, except the repeated words. If the word

	“run” is repeated three times in a text, it is only counted once (Kennedy, 2003)
Token Per Type Ratio	All the words that are found in a specific text divided by the number words in the passage without the repeated words (Kennedy, 2003).
Function Words	About 250 “grammatical words” or “structural words” in English make up over 20 percent of words we use. Example: <i>a, an, the, in, is, to, that, was, etc.</i> (Kennedy, 2003).
Content Words	They are the lexical words which belong to open classes (verb, noun, adjective, and adverb). There are hundreds of thousands of content words in English, and more get added each year (Kennedy, 2003).
Anglo-Saxon Words	Words pertaining to Old English are essential because they are considered core literacy vocabulary. Most of the Old English words are no longer in use, but a few have survived (Algeo & Pyles, 2010).

The general consensus on proficiency is that L2 learners should adequately comprehend 98% of the words in general English written texts (Hu & Nation, 2000). However, there is conflicting data in the literature regarding how much English vocabulary an L2 learner needs to know in order to achieve this 98% comprehension. Nation’s (2006) landmark study suggests a figure of 8000-9000 word families. Another study by Van Zeeland and Schmitt (2012) suggests a much smaller knowledge figure of 2000-3000 word families to cover 95% of written texts. A study by Cobb (2007) aimed to show that reading natural, ungraded texts is not adequate and that comprehensible L2 input is required to reach the target percentages of vocabulary needed for comprehensibility. Knowing how much vocabulary is needed to be functional in L2 is very important for setting vocabulary goals when designing syllabi. Therefore, a recent study by Schmitt et al. (2015) proposed an approximate replication of the Nation (2006), Van Zeeland and Schmitt (2012) and Cobb (2007) studies in order to give a clear figure of sizes and coverage. Schmitt et al. (2015) concluded that 6000-7000 word families are needed for spoken discourse and 8000-9000 words are needed for written discourse. Lextutor Vocabulary Profiler helps analyze the different vocabulary categories found in Table 1 and can play an important role when assessing vocabulary and when designing the vocabulary content of language courses.

Since part of the focus of this study is on PBL with the use of iPad technology, the next section will explore the literature available on the benefits and educational impact of the use of the iPad in the classroom.

### **iPad Technology in the Educational Context**

Another significant factor that contributes to the level of engagement in project-based learning is the use of technology. Technology for this generation of learners is not a luxury. It is a necessity. Gawelek et al. (2011) state that “no matter their economic status, (students) know the world wide web, social media, and entertainment technologies such as film, music, and games as consistent and constant components of everyday experience” (p. 28). The primary focus of speculation and research on technology in the educational setting these days is on the impact of the iPad on the teaching and learning. Skeptics like Murray and Olcese (2011) claim that the iPad is “woefully out of sync with modern theories of learning and skills needed for the 21<sup>st</sup> century” (p. 48). In contrast, Pilgrim, Bledsoe, and Reily (2012) claim that integrating technology into instruction helps students utilize technology to enhance higher-level thinking skills and problem solving. In a study related to the iPad initiative in the UAE, many factors contributed to improvement in the students’ performance, such as innovation and creativity, collaboration and teamwork, organization and time management, and most importantly the use of iPad technology, which facilitated all these contributing factors (Gitsaki et al., 2013). Gitsaki et al. (2013) concluded that “the use of technology is generally related to an increase in student performance when interactivity and other important features of instructional design are applied to its use” (p. 11).

The iPad plays an important role in promoting collaboration amongst pairs or teams working together. Through these devices, students can create electronic mind maps and share resources with each other and their teacher. Melluish and Falloon (2010) point out two types of connectivity facilitated by the iPad: (1) a literal connection to infrastructure and peripherals, and (2) virtual connections to individuals that are synchronous and asynchronous. These connections allow students to create and share with others, and participate in online learning communities. Thus, information literacy skills are acquired in an authentic learning situation that widens the learners’ educational horizons (Melluish & Falloon, 2010).

Another great benefit of the iPad is that it can be a platform that leads to a high level of engagement to this generation of students. For starters, the multi-touch interface of the iPad is itself a primary source of interaction (Molnar, 2013). When students use the iPad to search for sources, download images, view video footage or listen to an audio on a research topic, then collect all the information they need for a project and present it using an App, this is the definition of an all-in-one tool. Melluish and Falloon (2010) assert that the use of mobile technology like the iPad will change the long-held perceptions in this young generation of learners that education is becoming increasingly detached and irrelevant to them.

A feeling of satisfaction is achieved when students create an end product for a project with the use of their iPads. According to Nurul Islam (2011), the tasks achieved using the iPad can be inspiring to a great extent because the learners take learning into their own hands. Educational technology tools “can support students and teachers in obtaining, analyzing, and sharing information and constructing artifacts” (Blumenfeld et al., 1991, p. 374). Finally, the iPad is a fairly new teaching and learning tool, and research is needed to check on its cognitive contributions as well as its educational benefits.

### **Motivational Aspects of PBL with iPad Technology**

In the previous sections of this review of literature, many constructs were explored such as PBL, vocabulary acquisition, assessment issues, vocabulary profiling, as well as the iPad in the educational context. This section will explore how these various components are combined with one ultimate goal in mind: *Motivation*.

Being cognitively involved for extended periods of time is one of the requirements of PBL, and it is directly proportional to the students’ perceptions of the project and of their own abilities. According to Blumenfeld et al. (1991), elements that affect students’ motivation are (1) students’ perceptions of the project as being interesting and valuable, (2) students’ perceptions of how competent they are to engage in it and complete it, and (3) students’ focus on the project for learning rather than outcomes or grades. Blumenfeld et al. (1991) also claim that one way to make the project motivational is that “it should be designed to be interesting and meaningful to learners and promote deep level understanding of the content” (p. 372). Therefore,



a carefully designed project with a high degree of scaffolding can create a meaningful learning experience with valuable learning outcomes.

Motivation leads to more focused attention and information processing. Hulstijn and Laufer (2001) claim that “ motivation promotes success and achievement in the L2 learning and that students who experience high amounts of an external or *intrinsic* drive or need to learn will achieve higher levels of proficiency than students with low levels of drive” (p. 1). In addition, presenting something new that was built collaboratively can create a feeling of pride and self-actualization (Blumenfeld et al., 1991; Mills, 2009).

As mentioned before, the use of iPad technology by itself can be motivating due to its interactive features. If a teacher adds an interesting and meaningful project with an authentic question which resembles real-life problems, the outcome can be very rewarding. Using iPads should not be the main focus of the project. Melhuish and Falloon (2010) assert that applications should be “pedagogically sound in their design and foster interaction...rather than focusing solely on content, engagement, or ‘edutainment’” (p. 11). Therefore, Apps for projects should be chosen with care in order to serve their purpose of helping students reach the educational goal.

One definition of motivation is the “anticipation of reward, whether internally or externally administered; choices made about goals to pursue and the effort exerted in their completion” (Brown, 2007, p. 386). There are two types of motivation: *extrinsic* and *intrinsic*. *Intrinsic* motivation stems from activities that do not offer any apparent reward except the activity itself, where people engage in order to feel internally rewarding consequences of competence and self-determination (Deci, 1975). On the other hand, “extrinsic motivation is fueled by the anticipation of a reward from outside and beyond the self” (Brown, 2007, p. 172). Maslow (1970) claims that *intrinsic* motivation is superior to exterior motivation and can lead to *self-actualization*. Flow theory research claims that a perceived balance between challenge and skills, positive feedback and the ability to focus intensely on clear task goals are all factors that lead to optimal performance (Brown, 2007). All of the research mentioned here stresses the importance of the learners’ *intrinsic* involvement as a way to attain educational goals.

Creating the end product using an iPad App is by itself a motivating aspect of the use of the iPad. An end product can be a documentary that student creates using the iMovie App or a digital book created using the Creative Book Builder App. Producing an end product and sharing it with the teacher and the classmates can be a rewarding experience for the students that leads to a feeling of pride and satisfaction. Weinstein (2001) argues that “materials created by learners are often more powerful and compelling for future learners than anything the most dedicated material writer can dream up” (p. 181).

As teachers look for ways to keep their students engaged throughout the lesson and as curriculum designers try to explore pedagogies that can sustain the students’ level of engagement for longer periods of class time, combining two areas like PBL and iPad technology into one approach might be a way of motivating the students.

### **Chapter 3. Research Methodology**

This study was conducted in two ESL classes in an Academic Bridge Program at a higher education institution in the UAE. In the Fall of 2013, when the projects were first introduced to the program, the researcher was teaching a cohort of elementary students, which is when the idea of this study came about. This study took place about a year later. It is worth mentioning here that the researcher was *not* the one teaching these two pre-intermediate classes that participated in this study. However, she was working closely with the two classroom teachers and attended all the sessions related to the project.

#### **Participants**

The students in the study were twenty-seven Emirati females, 17-20 years old, who were taking intensive English courses with the aim to achieve a band 5.0 on the IELTS test, which is pre-requisite to them starting their university studies. The two pre-intermediate classes were a sample of convenience selected by the manager of the program out of a set of five pre-intermediate classes. As part of their course requirements for all the pre-intermediate classes, students were expected to work on a 6-week long project that was worth 8 % of the total grade for the whole course. The title of the project that they were assigned was *How to Design a Specific Space*. The students were assessed (see Appendix A for Assessment Form and Rubrics) on five different components: (1) process (10%), (2) group discussions (10%), (3) weekly reflective writing (10%), (4) final presentation (30%), and (5) end product (40%). Before starting the different stages of the research project, the participants were given details about this study and were asked to sign a consent form. Participants who were below eighteen years of age were asked to provide their parents' signatures.

#### **Data Collection**

The following section includes the details of the stages that the researcher followed: (1) setting up the students' project, (2) pre-project data collection, (3) post-project data collection, (4) data processing and analysis.

#### **Setting up the Students' Project**

To set up the project, the two classroom teachers showed the participants a PowerPoint presentation (Appendix B) that guided them on how to find information

sources for the project. The total number of students was twenty-seven, which is an odd number. The teachers divided the students into twelve pairs, and only one set of three students. The participants chose a space that they wanted to focus on and design. Each pair of students drafted their own research question (Appendix C). An example of a research question is [*How can you design a kid's playroom (9-15 yrs.) that is fun, educational and encourages healthy living?*]. The two teachers guided them on how to use their iMovie App and Creative Book Builder App for the final product. For some participants, it was their first time using their iPads for educational purposes. Therefore, they needed more guidance from the teachers. They were also given tips on how to paraphrase, synthesize data, and how to avoid plagiarism.

The two teachers gave the participants two hours of class time every week to work with their partners on the project. During these sessions, the two teachers and the researcher offered support as needed. The teachers made it clear that, besides working in class, the students were expected to do most of the project work outside class, in an attempt to encourage independent learning. They were expected to scout internet sites, iPad Apps on design, and design magazines, as well as library catalogues in search of sources that would help them collect information. They also had to send their reflections on the progress of their work to their teachers every week. The reflections consisted of details related to the different tasks achieved by each pair of students every week, enjoyable aspects, as well as challenges.

At the end of the sixth week of the project, each pair of participants presented their work, where they showed how they designed their chosen space. They used their iPads to showcase their designs and information about their designs, where they either used the iMovie App or the Creative Book Builder App. Some pairs brought miniature models of their design to class (Appendix D).

The participants who used the iMovie App created their own movies by combining video footage, written scripts as well as images, and incorporated them all in one movie. They also added background music to the movie. Those who used the Creative Book Builder App used ePub format to create their own interactive book by embedding pictures, video files, audio files, and texts in the different chapters of the book.

As mentioned before, the participants were given only two hours of class time every week to work on their project with the rest of the work done outside class. The rest of the class time was spent learning English and practicing all four skills (reading, writing, listening, and speaking) with a focus on grammar and vocabulary. The vocabulary taught during this six-week period was *not* directly related to the project topic.

### **Pre-Project Data Collection**

On the same day that the participants were shown the PowerPoint presentation with all the details of what was expected of them, they drafted their research question, and the researcher collected the first set of data: the pre-project essays. This entailed having each student in the pairs write, by hand, an essay of 100-150 words on the topic of design they had chosen. The time given to the students to write this essay was 30 minutes. The students were provided with prompts. These prompts were the research questions (see Appendix C) that they had drafted earlier. For example, the pair of students who chose the prompt [*How can you design a kid's playroom (9-15 yrs) that is fun, educational and encourages healthy living?*] had to write an essay of 100-150 words on this topic in 30 minutes. These pre-project essays were collected before the participants commenced any work on their projects.

### **Post-Project Data Collection**

After six weeks of working on the projects, the participants presented their final products. After they all finished their presentations, each participant was given the same prompt that was given to them in the pre-project stage. Each participant was again asked to write by hand a 100-150 word essay in 30 minutes.

To address the second research question, [*What are the students' perspectives on project-based learning in terms of improving their language skills as well as enhancing their level of motivation?*], a survey (see Appendix E) was created in both Arabic and English using Survey Monkey. The translation was made to ensure that these pre-intermediate students fully understood the question asked on the survey. The survey consisted of seven Likert Scale questions and two open-ended questions. It was sent via email to the participants one day after they presented their final products to ensure that the information was still fresh in their minds. Only thirteen students responded to the survey.

## Data Processing and Data Analysis

For anonymity purposes, the two pre-project essays that were collected from each pair of participants were assigned a code letter, e.g.: (A1 pre, A2 pre, B1 pre, B2 pre, etc.), while those that were collected post-project were labeled as (A1 post, A2 post, B1 post, B2 post, etc.). The researcher typed the pre- and post-project essays into MS Word without making any grammatical or spelling error corrections. This was achieved by switching off the auto spelling and grammar correction function on the researcher's PC. The researcher went over each transcription to check that it was typed as originally written by the student.

To answer the first research question [*Are there any differences in the level and sophistication of the vocabulary between essays written pre-project and essays written post-project using the same prompts?*], these now typed pre-project and post-project writing samples were analyzed using the Lextutor Vocabulary Profiler (<http://www.lex tutor.ca/vp/eng/>). The data produced by Lextutor was typed in an Excel sheet for quantitative comparisons between the pre-project and post-project samples. As mentioned above, Lextutor Vocabulary Profiler analyzes texts according to the frequency of the words in the language at large. It is based on Laufer and Nation's Lexical Frequency Profiler, which divides the words in the text into the first 1000 (K1) or second 1000 levels (K2), Anglo-Saxon words, Academic Word List (AWL), and the rest as 'offlist'. Statistics for K1 and K2 were used to indicate vocabulary *level* in the pre-project and post-project essays, whereas the AWL and the Anglo-Saxon words along with word families, word types, and token per type ratio, were used to indicate *sophistication* in vocabulary use.

Lextutor generates percentage values for K1 words, K2 words, Anglo-Saxon words and AWL words. The researcher had to make calculations for the word families and word types for K1, K2 and AWL to change them from whole numbers to percentage values. For example, the number of word families in K1 was divided by the total number of families in the 'onlist' and then multiplied by 100.

The following were the categories that were entered into the Excel sheet:

- 1- Pre and Post K1 words (families, types and total percentages).
- 2- Pre and Post K1 Anglo-Saxon words percentage.

- 3- Pre and Post K2 words (families, types and total percentages).
- 4- Pre and Post K2 Anglo-Saxon words percentage.
- 5- Pre and Post K1+K2 percentage.
- 6- Pre and Post AWL (families, types and total percentages).
- 7- Pre and Post token per type ratio
- 8- Pre and Post total number of words.

The 'offlist' results were not used in this study because they were misleading. The 'offlist' category combined any words that did not belong to the first one-thousand words, the second one-thousand words or the AWL. They contained any words above the second one-thousand words and up to the 20th level, based on the British National Corpus (BNC). They also contained the spelling mistakes. Since the participants are pre-intermediate ESL students, and main focus of this study is on the first 2000 words, Anglo-Saxon words and AWL words, the 'off-list' words were not used.

The data from the Excel sheet were analyzed using Minitab to find out if the pre-project and post-project essay results reflected any significant differences in percentages. The value used to determine *significance* in this study was 5%. The statistical method used in this study was the dependent paired t-test which works well with small data sets (Nunan & Bailey, 2009). It is used to determine significant differences between two means, where the same group of individuals is contributing to the two sets of data in the pre and the post samples (Nunan & Bailey, 2009).

For the student survey, Survey Monkey software was used to collect the total number of responses for each seven Likert scale questions, as well as the detailed responses of the two open-ended questions.

## Chapter 4. Findings

This chapter consists of the findings which are divided into two sections: (1) Comparisons of the pre-project and post-project vocabulary profiler categories, (2) results of the participants' survey.

### **Comparisons of the Pre-Project and Post-Project Vocabulary Profiler Categories**

The results of the significant pre-project and post-project Lextutor Vocabulary Profiler categories are presented in boxplots below. Only the categories that exhibited significant differences are included in this section. As mentioned before, the degree of significance was 5%. Minitab was used for the paired t-test which calculates the differences between the two means for each of the pre-project and post-project essays categories. Most of the results were normally distributed, but some were approximately normally distributed. The categories that showed significant differences were (1) Pre- K1 and post- K1 families, (2) pre- K1 and post- K1 types, (3) pre- K1 and post- K1 total percentages, (4) pre- K1 Anglo-Saxon and post- K1 Anglo-Saxon percentages, (5) pre- K1+K2 and post- K1+K2 percentages, (6) pre- AWL families and post- AWL families, (7) pre- AWL types and post- AWL types, (8) pre- AWL and post- AWL total percentages, (9) pre- token per type ratio and post- token per type ratio. The pre-project and post-project word totals, as well as the pre- K2 and post- K2 total percentages, were included in the results and discussion, even though the differences were not statistically significant.

The first category produced that showed significant difference between the pre-project and post-project essays is the K1 word families. The results of this category are shown in Figure 1 below.



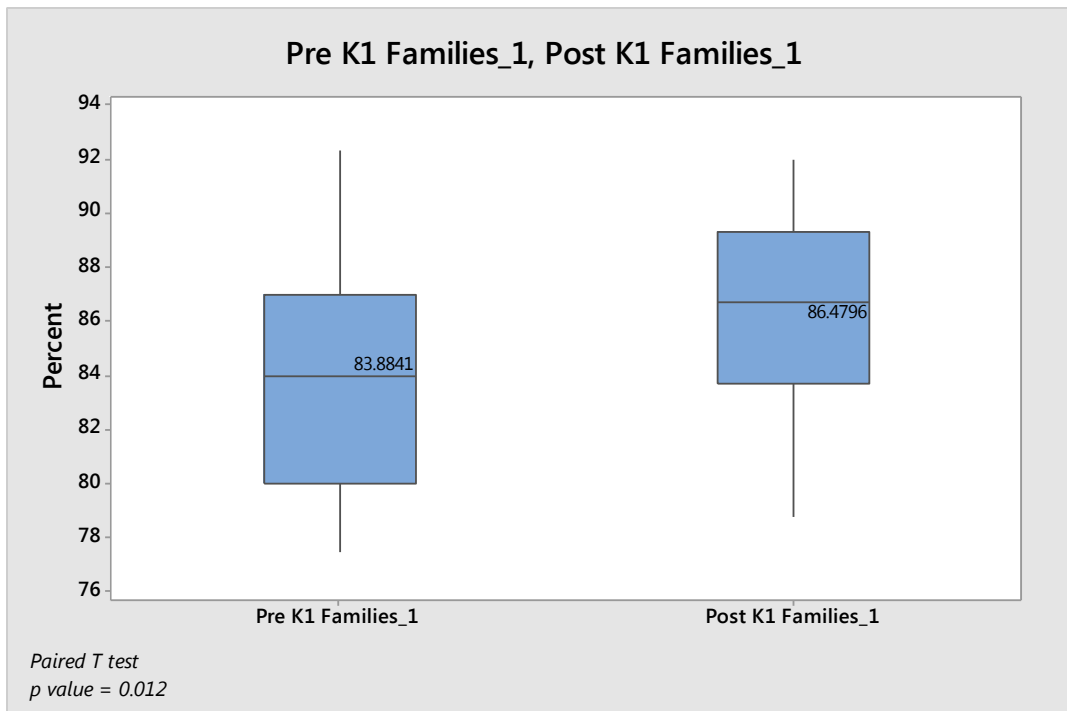


Figure 1. Average percentages of the pre- K1 families and post- K1 word families

The boxplots in Figure 1 illustrate the difference between the mean of the percentages of K1 word families in the pre-project essays (83.88%) with the mean of the K1 word families in the post-project essays (86.48%). Paired t-test results show that the post-project essays had significantly more K1 word families than did the pre-project essays (P-Value = 0.012). Also, the range was wider in the pre-project results than the post-project ones, reflected in Standard Deviations of 4.14 and 3.34, respectively.

The second Lextutor VP category that showed significant difference between the pre-project and post-project essays is the K1 word types. The results of this category are shown in Figure 2 below.

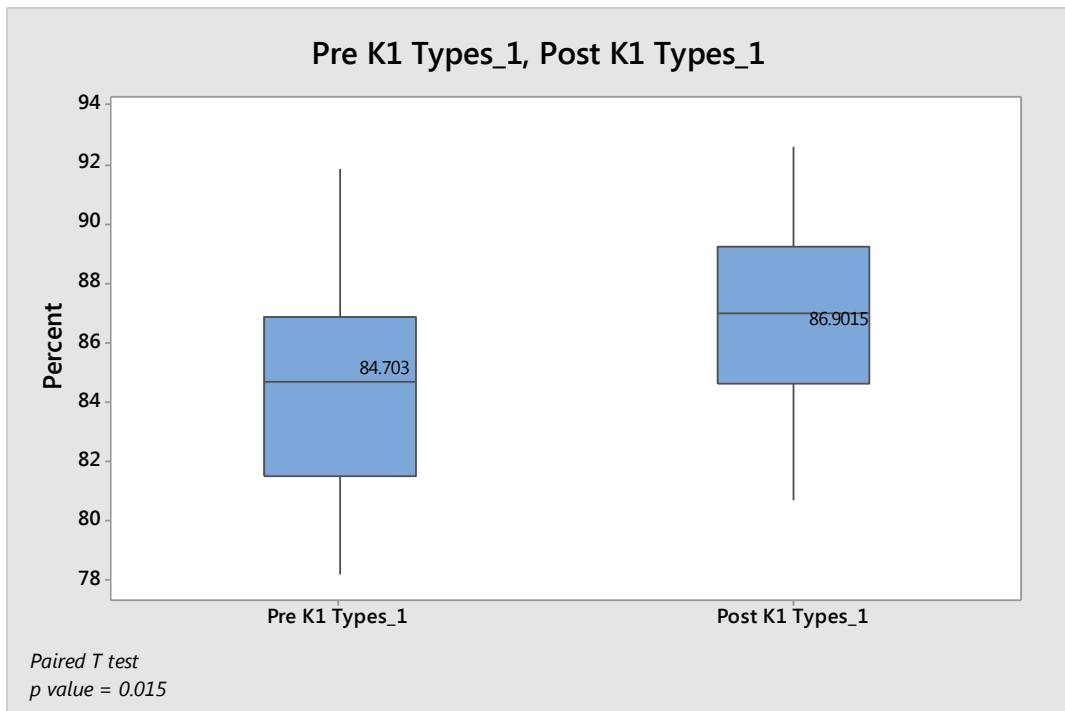


Figure 2. Average percentages of the pre- K1 and post- K1 word types

The boxplots in Figure 2 illustrate the difference between the mean of the percentages of K1 word types in the pre-project essays (84.70%) with the mean of the K1 word types in the post-project essays (86.90%). (Note: The original data was changed to percentages for uniformity.) Paired t-test results show that the post-project essays had significantly more K1 word types than did the pre-project essays (P-Value = 0.015). Also, the range was wider in the pre-project results than the post-project ones, reflected in Standard Deviations of 3.61 and 3.07, respectively.

The third Lextutor VP category that showed significant difference between the pre-project and post-project essays is the K1 total percentage. The results of this category are shown in Figure 3 below.

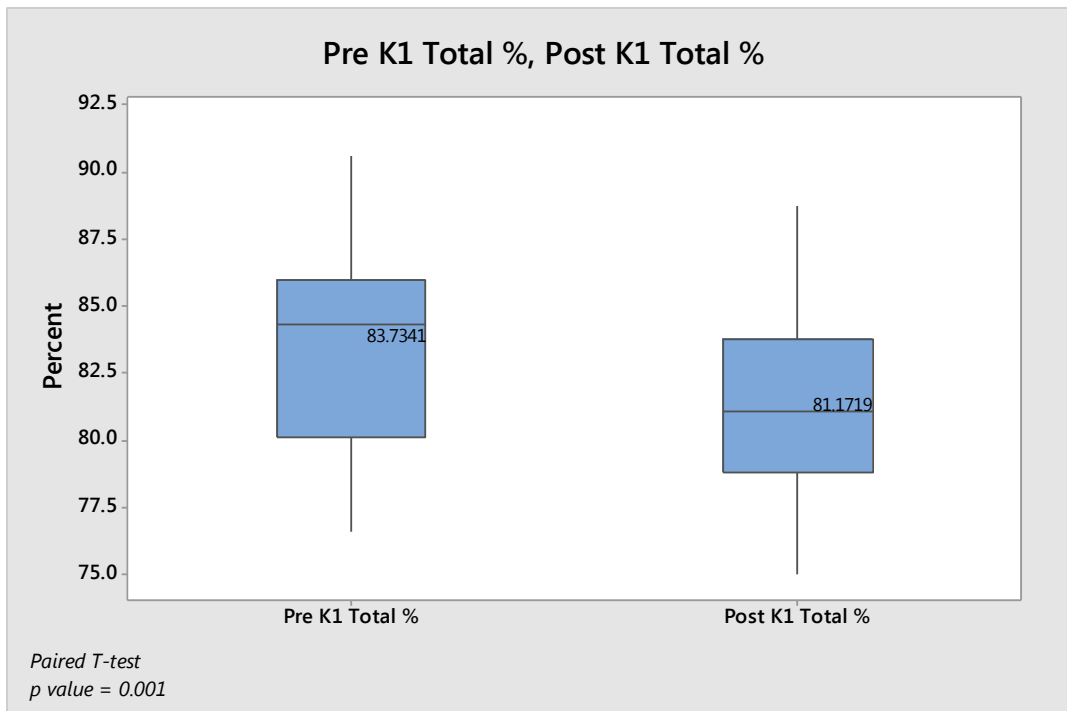


Figure 3. Average percentages of the pre- K1 and post- K1 word totals

The boxplots in Figure 3 illustrate the difference between the mean of the K1 total percentages in the pre-project essays (83.73%) with the mean of the K1 total percentages in the post-project essays (81.17%). Paired t-test results show that the pre-project essays had significantly higher K1 total percentages than did the post-project essays (P-Value = 0.001). Also, the range was wider in the pre-project results than the post-project ones, reflected in Standard Deviations of 3.97 and 3.29, respectively.

The fourth Lextutor VP category that showed significant difference between the pre-project and post-project essays is the K1 Anglo-Saxon percentages. The results of this category are shown in Figure 4 below.

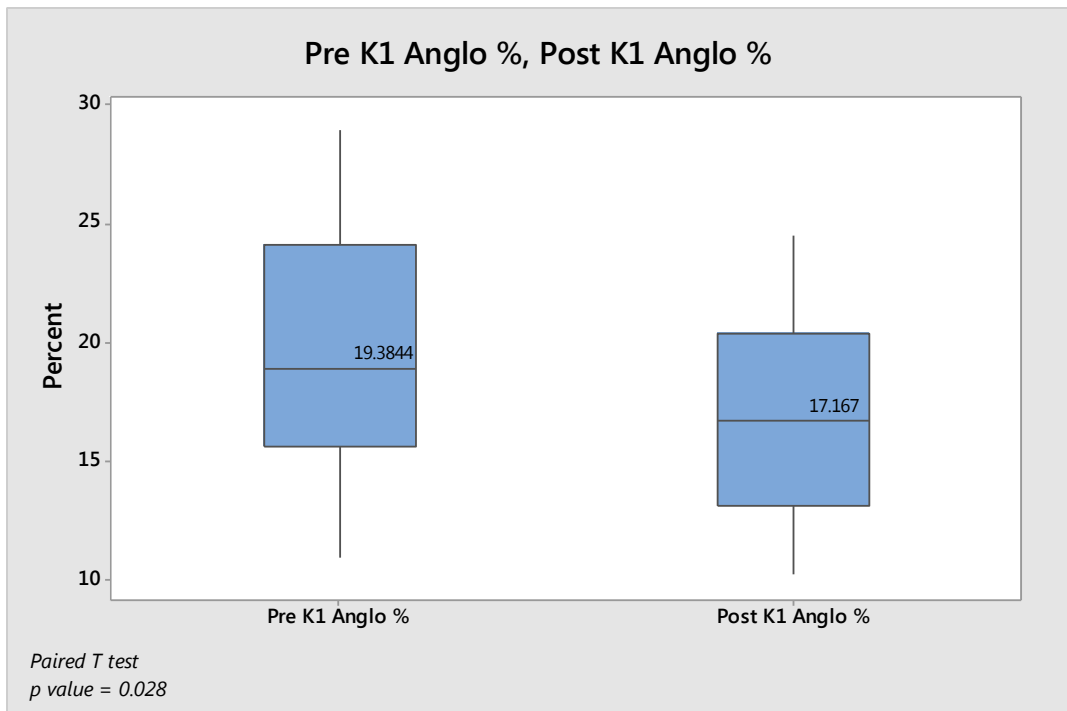


Figure 4. Average percentages of the pre- and post- K1 Anglo-Saxon words.

The boxplots in Figure 4 illustrate the difference between the mean of the K1 Anglo-Saxon words in the pre-project essays (19.38%) with the mean of the K1 Anglo-Saxon words in the post-project essays (17.17%). Paired t-test results show that the pre-project essays had significantly more K1 Anglo-Saxon words than did the post-project essays (P-Value = 0.028). Also, the range was wider in the pre-project results than the post-project ones, reflected in Standard Deviations of 4.65 and 4.09, respectively.

The fifth Lextutor VP category that showed significant difference between the pre-project and post-project essays is the K1 total percentages. The results of this category are shown in Figure 5 below.

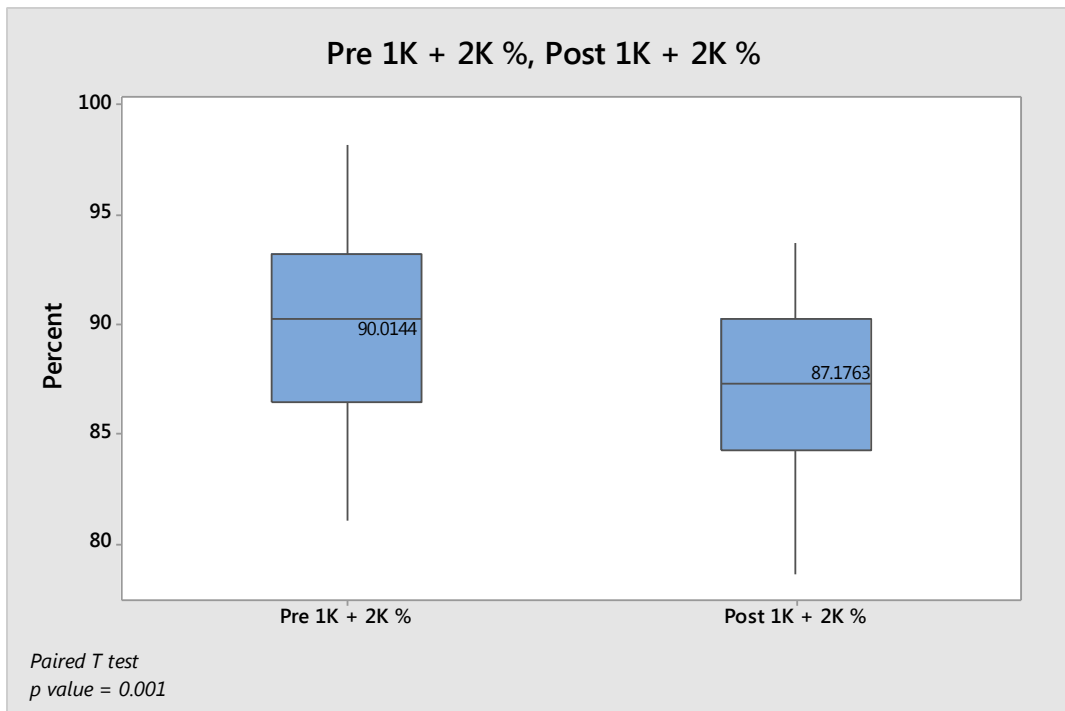


Figure 5. Average percentages of the pre- K1+K2 and post- K1+K2 word totals

The boxplots in Figure 5 illustrate the difference between the mean of the percentages of K1+K2 in the pre-project essays (90.01%) with the mean of K1+K2 in the post-project essays (87.17%). Paired t-test results show that the pre-project essays had significantly more K1 word families than did the post-project essays (P-Value = 0.001). Also, the range was slightly wider in the pre-project results than the post-project ones, reflected in Standard Deviations of 4.25 and 3.64, respectively.

The sixth Lextutor VP category that showed significant difference between the pre-project and post-project essays is the AWL word families. The results of this category are shown in Figure 6 below.

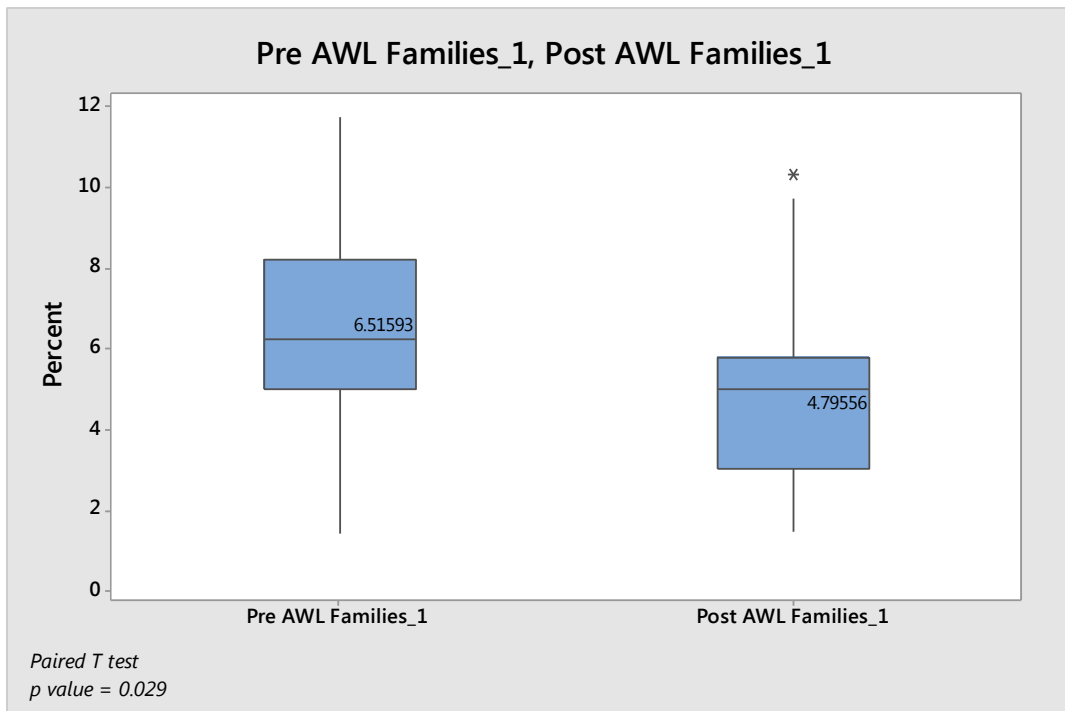


Figure 6. Average percentages of the pre- AWL and post- AWL word families

The boxplots in Figure 6 illustrate the difference between the mean of the percentages of AWL word families in the pre-project essays (6.52%) with the mean of the AWL word families in the post-project essays (4.80%). (Note: The original data was changed to percentages for uniformity.) Paired t-test results show that the pre-project essays had significantly more AWL families than did the pre-project essays (P-Value = 0.029). Also, the range was slightly wider in the pre-project results than the post-project ones, reflected in Standard Deviations of 2.77 and 2.43, respectively.

The seventh Lextutor VP category that showed significant difference between the pre-project and post-project essays is the AWL word types. The results of this category are shown in Figure 7 below.

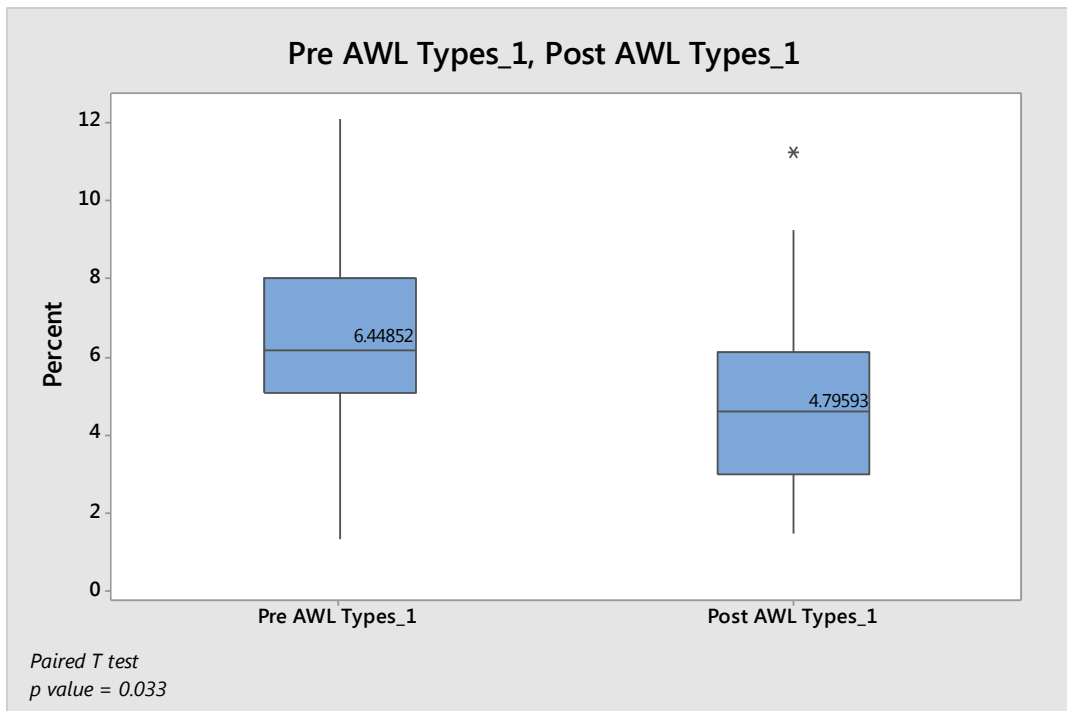


Figure 7. Average percentages of the pre- AWL and post- AWL word types

The boxplots in Figure 7 illustrate the difference between the mean of the percentages of AWL word types in the pre-project essays (6.45%) with the mean of the percentages of the AWL word types in the post-project essays (4.79%). (Note: The original data was changed to percentages for uniformity.) Paired t-test results show that the pre-project essays had significantly more AWL word types than did the post-project essays (P-Value = 0.033). Also, the range was slightly wider in the pre-project results than the post-project ones, reflected in Standard Deviations of 2.59 and 2.36, respectively.

The eighth Lextutor VP category that showed significant difference between the pre-project and post-project essays is the AWL total percentages. The results of this category are shown in Figure 8 below.

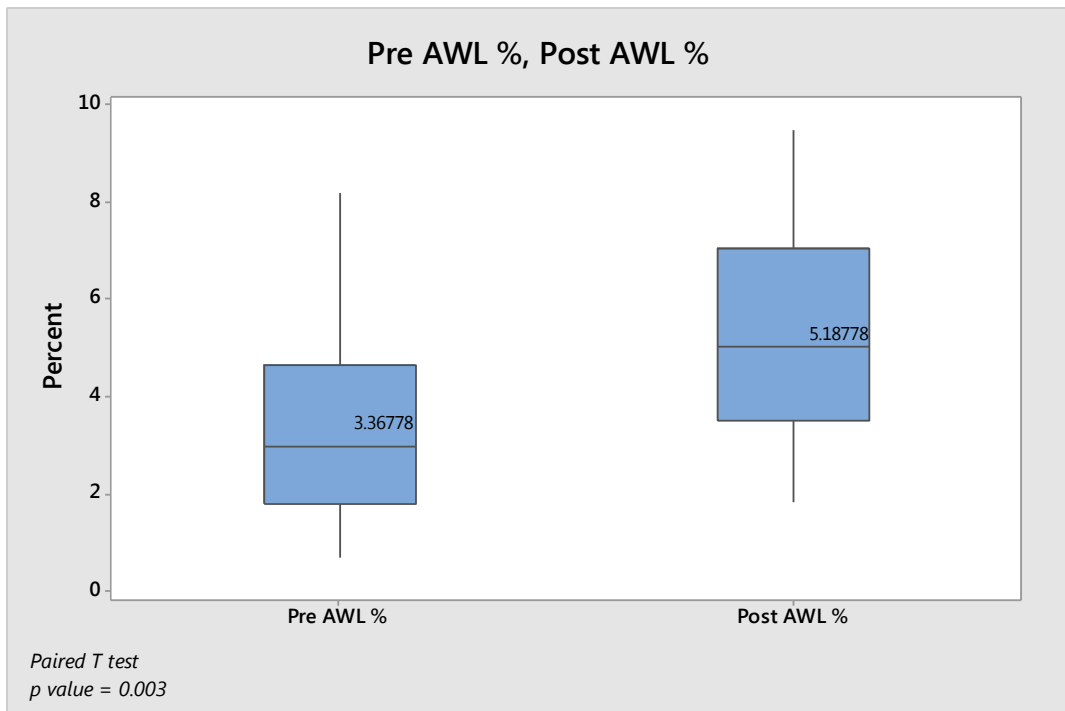


Figure 8. Average percentages of the pre-AWL and post-AWL word totals

The boxplots in Figure 8 illustrate the difference between the mean of the AWL total percentages in the pre-project essays (3.37%) with the mean of the AWL total percentages in the post-project essays (5.19%). Paired t-test results show that the post-project essays had significantly higher AWL word total percentages than did the pre-project essays (P-Value = 0.003). Also, the range was slightly wider in the post-project results than the pre-project ones, reflected in Standard Deviations of 2.11 and 1.89, respectively.

The ninth Lextutor VP category that showed significant difference between the pre-project and post-project essays is the token per type ratio. The results of this category are shown in Figure 9 below.



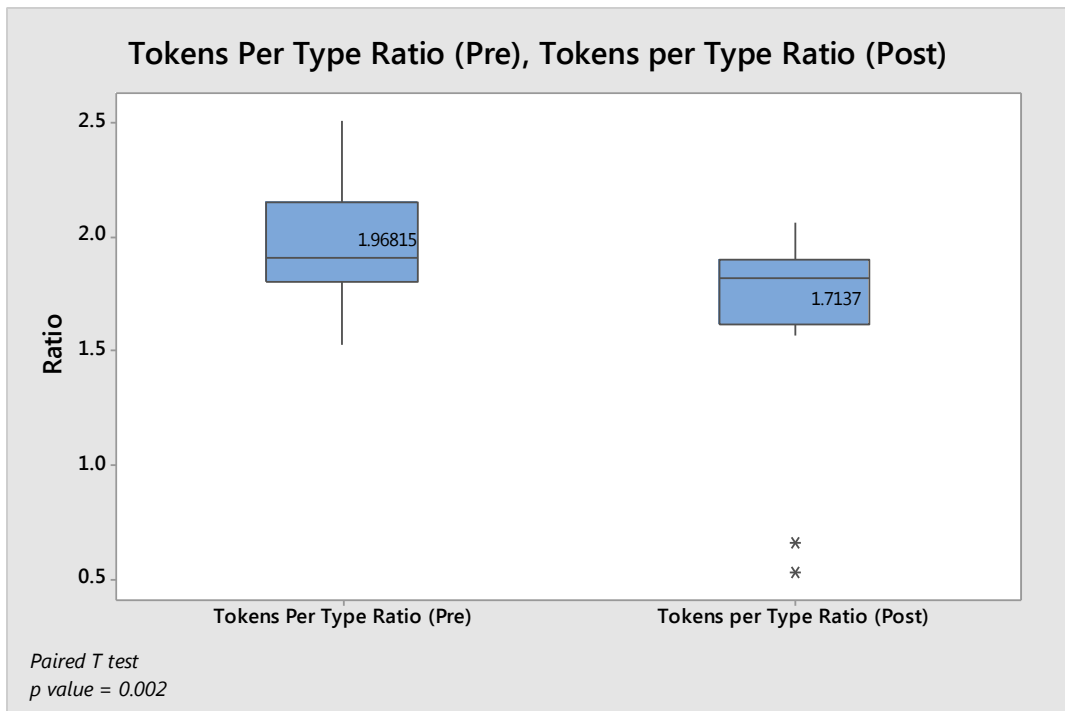


Figure 9. Averages of the pre- token per type and post- token per type ratios

The boxplots in Figure 9 illustrate the difference between the mean of the token per type ratios in the pre-project essays (1.97%) with the mean of the token per type ratios in the post-project essays (1.71%). Paired t-test results show that the pre-project essays had a significantly higher token per type ratio than did the pre-project essays (P-Value = 0.002). Also, the range was wider in the post-project results than the pre-project ones, reflected in Standard Deviations of 0.35 and 0.24, respectively.

The tenth Lextutor VP category is the number of words in text. Even though the difference in the results between the pre-project and post-project essays was not significant, the researcher decided to add it to the results of the study. The results of this category are shown in Figure 10 below.

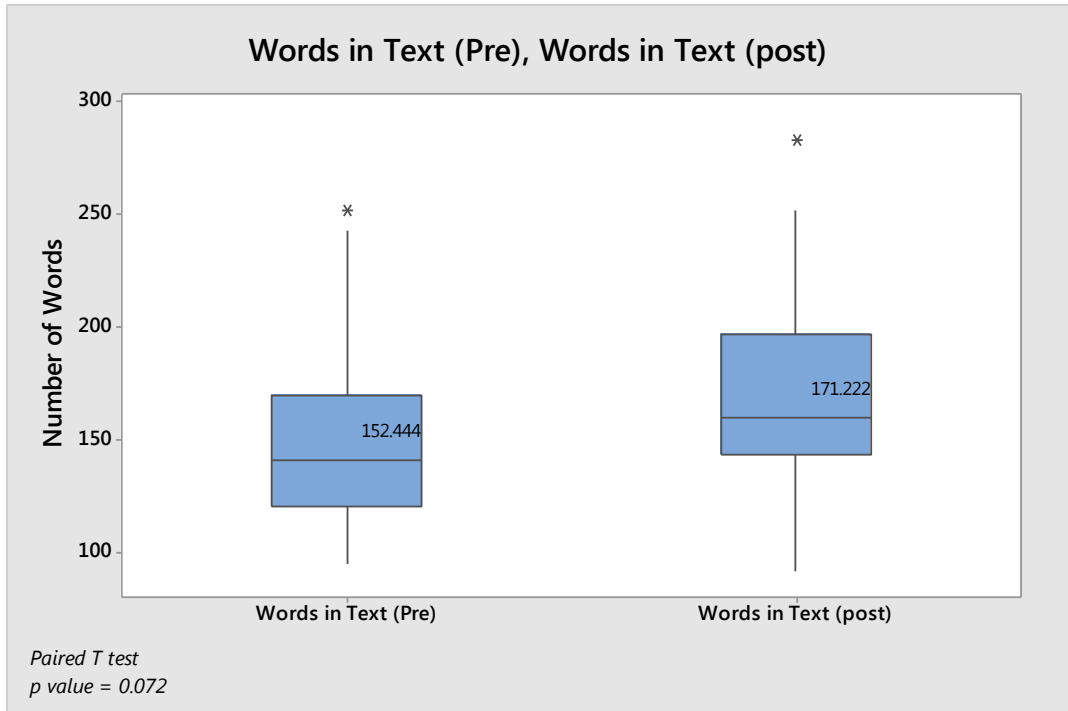


Figure 10. Averages of words per text in the pre-project and post-project essays

The boxplots in Figure 10 illustrate the difference between the mean of words in the pre-project essays (152.4%) with the mean of words in the post-project essays (171.2%). Paired t-test results show that the post-project essays had a higher number of words than did the pre-project essays (P-Value = 0.072). Also, the range was wider in the post-project results than the pre-project ones, reflected in Standard Deviations of 44.05 and 42.76, respectively.

Even though the difference was not significant (P-Value = 0.663), the means of the pre- K2 (6.28%) and post- K2 (6.00%) total words showed a decrease of 0.28.

The results of the nine categories that showed significance as well as the results of the number of words per text as well as the K2 results, which did not show significance, are summarized in Table 2 below.

**Table 2.** Summary of All the Categories That Showed Significant Differences

	Category	Means and Standard Deviations		Overall Difference
		Pre	Post	
	Pre K1- Families and Post- K1 Families	Mean 83.88 SD 4.14	Mean 86.48 SD 3.34	Post > Pre

K1	Pre- K1 Types and Post- K1 Types	Mean 84.70	Mean 86.90	Post > Pre
		SD 3.61	SD 3.07	
	Pre- K1 Total % and Post- K1 Total %	Mean 83.73	Mean 81.17	Pre > Post
		SD 3.97	SD 3.29	
	Pre- K1 Anglo-Saxon and Post- K1 Anglo-Saxon	Mean 19.38	Mean 17.17	Pre > Post
		SD 4.65	SD 4.09	
K1+K2	Pre- K1+K2 total % and Post- K1+K2 Total Percentages	Mean 90.01	Mean 87.18	Pre > Post
		SD 4.25	SD 3.64	
AWL	Pre- AWL Families and Post- AWL Families	Mean 6.52	Mean 4.79	Pre > Post
		SD 2.77	SD 2.43	
	Pre- AWL Types and Post- AWL Types	Mean 6.45	Mean 4.79	Pre > Post
		SD 2.59	SD 2.36	
	Pre- AWL and Post- AWL Total %	Mean 3.37	Mean 5.19	Post > Pre
		SD 1.89	SD 2.11	
Tokens Per Type Ratio	Pre- Tokens per Type Ratio and Post- Tokens per Type Ratio	Mean 1.97	Mean 1.71	Pre > Post
		SD 0.24	SD 0.35	
Words Per Text	Pre- Words in Text and Post- Words in Text	Mean 152.4	Mean 171.2	Post > Pre
		SD 42.76	SD 44.05	
K2	Pre- K2 Total % and Post- K2 Total %	Mean 6.28	Mean 6.00	Pre > Post
		SD 3.63	SD 2.38	

### Results of the Participants' Survey

This section includes the results of the participants' survey. The survey was designed to explore the participants' perspectives on the different aspects of the project such as overall perspectives on the project, using their iPads, pair work, learning outcomes, and motivation. Only thirteen participants responded to the survey (N=13). Table 3 presents the results of the seven Likert Scale questions, and the responses to the open-ended question are in Appendix E.

**Table 3.** Results of the Participants' Survey

Survey Item	Survey Question	Frequencies (N=13)				
		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Item 1	I liked the project	2 (15.3%)	0 (0%)	3 (23.1%)	5 (38.5%)	3 (23.1%)
Item 2	The project helped me improve my English.	1 (7.7%)	3 (23.0%)	1 (7.7%)	4 (30.8%)	4 (30.8%)
Item 3	Extensive reading and listening helped me learn new vocabulary.	1 (7.7%)	1 (7.7%)	3 (23.1%)	1 (7.7%)	7 (53.8%)
Item 4	I enjoyed using the iPad for this project.	0 (0%)	3 (23.0%)	1 (7.7%)	3 (23.1%)	6 (46.2%)
Item 5	I stayed motivated throughout the project.	2 (15.4%)	0 (0%)	2 (15.4%)	4 (30.7%)	5 (38.5%)
Item 6	This project was a good use of class time.	0 (0%)	1 (7.7%)	1 (7.7%)	5 (38.4%)	6 (46.2%)
Item 7	I enjoyed working in pairs during the project.	1 (7.7%)	0 (0%)	0 (0%)	2 (15.4%)	10 (76.9%)

The first item on the survey checked the participants' overall attitude towards the project. The results revealed that 8 out of 13 participants' responses ranged from agree to strongly agree that they liked the project, with only 2 indicating that their feelings were negative towards the project. On the second item, the participants were asked if they believed that the project helped them improve their English. Out of 13, 8 of the responses ranged from agree to strongly, while 4 out of 13 believed that the project did not help them improve. In the third item, the participants were asked if extensive reading and listening during the project helped them acquire new vocabulary items. The results showed that 8 out of 13 of the participants' answers

ranged from agree to strongly agree, with only 2 who believed that extensive reading and listening did not help them gain new vocabulary. The fourth item checked if the participants enjoyed using the iPad for the project. The results showed that 9 out of 13 responses ranged between agree and strongly agree, while 3 participants did not enjoy using it. The fifth item, which was designed to elicit if the participants felt motivated throughout the project, showed that 9 out of 13 of the participants felt that they were motivated, in comparison with 2 participants who did not. The sixth item checked if the participants believed that the project was good use of their class time. The results for this item showed that 11 out of 13 of the participants' responses ranged between agree and strongly agree, and only one participant who did not agree. The seventh item elicited if the participants enjoyed working in pairs during the project. The results indicated that 12 out of 13 of the participants' answers ranged from agree to strongly agree, while only 1 participant responded that she did not enjoy working in pairs.

The first open-ended question on the survey asked: [*What did you like about the project?*] Only eight out of thirteen participants responded to this question (see Appendix F for all the answers). Four of the participants wrote that they liked the project because of the pair work, and one student felt that she learned how to communicate with others. Three participants indicated that they liked everything about the project. In addition, one student wrote that she learned a few new things, while another stated that she “*spen[t] a lot of time with my friend learning a lot of new words. I learned how to present and be confedent (sic) of myself, how to use new app that I don't know before that topic helped me to focus on important things I need to creat (sic) my new bedroom.*”

The second open-ended question on the survey was [*What did you not like about the project?*]. Only seven participants responded to this question (Appendix F). Four out of the seven indicated that there was not a thing that they did not like about the project. Two participants responded that they did not like the fact that the time (six weeks) was very tight and that they were always in a hurry. One student wrote that she did not enjoy showcasing her final product to all the students in the class on the final day.

The researcher noted that when the participants presented their final products on the last day of the project, enjoyment was apparent on their faces and there was a certain air of pride reflected in their individual performances.

## Chapter 5 - Discussion

Looking at the first one-thousand most common words (K1), the results indicate that the total percentage of K1 words was less in the post-project essays (81.17%) in comparison to the total percentages of K1 words in the pre-project essays (83.73%) with a P-Value of 0.001. The participants were using a greater percentage of higher level words in the post-project essays than in the pre-project essays. This finding reflects an improvement in the participants' vocabulary level. In addition, the total percentage of the 1K+2K was lower in the post-project essays (87.17%) than the total percentages of the 1K+2K in the pre-project essays (90.01%) with a P-Value of 0.001. It seems here that the participants replaced the more frequently used 1K+2K words with higher level or less frequently used words in the post-project essays, which is a sign of improvement in the *level* of vocabulary.

When it comes to word families, the participants used significantly more word families in the post-project essays (86.48%) than in the pre-project essays (83.88%) with a P-Value of 0.012. At the early stages of learning English, students might know stem words, but their knowledge of the other words in a family is usually very limited. When inflections are added to stem words, other members of the word family are created. If students use different words belonging to the same family when writing or speaking, it is a sign of improvement in vocabulary use. The more word families that a student knows, the easier it is to express more complex thoughts and ideas of a wider range of topics. This finding indicates that the participants used a greater number of high frequency word families after the project than before the project, which is a sign of improvement in the *sophistication* of vocabulary. This finding supports Nation's (2011) claim that extensive reading is a very useful way for learners to acquire high frequency words.

Another interesting finding was that the participants also used significantly more K1 word types in the post-project essays (86.90%) than in the pre-project essays (84.70%), showing a sign of improvement in the *sophistication* of vocabulary use with a P-Value of 0.015. Word types are all words in a sentence, excluding repeated words (which are counted only once). ESL students' writing at the lower levels of proficiency suffers from repetition. One reason for this is that the students have not yet developed an extensive enough repertoire of words to avoid repetition. They repeatedly use the limited number of words they know. Therefore, repetition of the

same vocabulary words in writing is a sign of weakness in lexical use. The fact that these participants were using more word types in the post-project essay samples than the pre-project essay samples indicates that they might have acquired new word types and were using fewer of the same words repeatedly.

As for the K1 Anglo-Saxon words, percentages of these words were significantly less in the post-project essays (17.17%) when compared with the pre-project essays (19.38%) with a P-Value of 0.028. Old English or Anglo-Saxon words are the foundation of the polyglot English language and have always competed with more sophisticated French and Latin words that made their way into the English language (Metsala & Ehri, 2013). Nowadays, the small number of Anglo-Saxon items that have survived are low register words. Therefore, they are considered simple vocabulary words in comparison with higher level or more advanced kinds of words borrowed from Latin or French (Algeo & Pyles, 2010). The results show that the participants used a significantly smaller percentage of K1 Anglo-Saxon words in their post-project essays than in their pre-project essays. This finding indicates that there was improvement in the *sophistication* of vocabulary use.

The findings related to the AWL revealed that the AWL average percentage of word families was significantly higher in the pre-project essays (6.52%) than the average percentages of word families in the post-project essays (4.80%) with a P-Value of 0.029. Moreover, the results for AWL word types showed that the pre-project essays had significantly more AWL word types (6.45%) than did the post-project essays (4.79%) with a P-Value of 0.033. Also, the total percentage of the AWL words in the post-project essays (5.19%) was significantly higher than the total percentage of the AWL words in the pre-project essays (3.37%) with a P-Value of 0.003.

Although statistically insignificant, there was a decrease from pre- K2 (6.28%), to post- K2 (6.00%) percentage of total words. Due to the nature of the K2 word list, this finding could indicate a more academic character to the participants' post-project essays. Referring to a table by Nation (2001), Neufeld and Billuroğlu (2005) point out that academic texts had a smaller percentage of K2 words than did conversation, newspapers, or fictional texts. They comment that "academic texts often yield a vocabulary profile in which the AWL represents double or treble the



percentage of total tokens than K2. This runs counter to the basis of research into the frequency distribution of words in texts, in which the coverage provided by each set of commonly used words is less than the previous" (p. 2). Following this observation, it would make sense that the participants' post-project essays would include less K2 words, and more AWL words.

Together, these findings show that the participants used more academic words in the post-project essays; however, the percentages of types and families used were less in these essays. These small percentages of AWL families and types indicate that the participants more skillfully used a number of AWL families by adding affixes, thus generating more AWL words of the same families, which in turn lead to a significantly higher total percent of AWL in the post-project essays than in the pre-project essays. The significant increase in the total number of AWL words in the post-project essays is a clear indication that they did indeed acquire more academic words, a sign of *sophistication* in their vocabulary use.

The fact that the texts that the students searched through during the project were all academically oriented, where they had to extract and deduce information from these texts and infuse it into their final product, might have helped them sustain context-specific academic words in their memory and use them skillfully in their post essays. They wrote their essays on the same day that they presented their final product. Before students present, they have a tendency to memorize parts of their presentations. This might also be another reason why they had significantly higher percentages of academic words in their post-project essays. The results related to the AWL were imperative findings in this study. Nation (2011) indicates that the AWL list is widely used by teachers at tertiary level, and that one of the strengths of the AWL is that it can be used in a wide range of academic areas. Therefore, improving the students' academic words can have a significant effect on their ability to comprehend highly demanding academic texts in different subject areas.

Before discussing the results of the token per type ratios, it is important to mention how this ratio is generated. Tokens are all the words that are found in a specific text divided by the types which is the number of words in the text without the repeated words. The results indicate that the token per type ratio in the pre-project essays (1.97%) was significantly higher than the token per type ratio in the post-

project essays (1.71%) with a P-Value of 0.002. A lower token per type ratio in the post-project essays indicates a lower degree of repetition and a high degree linguistic diversity (Kunze, 2009). It was also seen that the average number of words in the pre-project essays (152.4%) was lower than the average number of words in the post-project essays (171.2%). By looking at these findings together, it is logical to conclude that even though the longer texts (post-project essays) would be expected to have a higher number of repeated function words like “a”, “and”, “the” etc. than the texts that contained fewer words (pre-project essays), the tokens per type ratio for the post-project essays was significantly lower than the tokens per type ratio in the pre-project essays (an indication of less repetition and linguistic diversity). These two findings together reflect an improvement in the *sophistication* of vocabulary.

The results of this study seem to be complementary to each other and together seem to paint a positive picture which reflects that extensive reading and listening on the topic of *design* might have helped this group of participants to *implicitly* acquire more sophisticated and higher frequency words related to the topic. The study seems to support Krashen’s (2003) claim that extensive reading does help readers increase their lexical repertoire, and it provides empirical evidence that may discredit Cobb’s (2007) argument that extensive reading is not a reasonable means of increasing a learner’s lexicon. But Krashen (1982) also claims that reading can be seen as the main and only source of increasing a learner’s lexicon. This is only partially true because implicit vocabulary learning through extensive reading should not be viewed as the only means to acquire vocabulary. An eclectic approach that incorporates both implicit and explicit vocabulary learning might be more effective.

Overall, the results of the survey were in favor of PBL, and they seem to correspond with the Lextutor VP comparison studies on the essays. Of the 13 participants who responded to the survey, 8 felt that the project was enjoyable. As seen from the results of the open-ended questions, those who did not agree, felt that the deadlines for the project were tight and the project involved work that was added to their existing workload. For the question that checked if the project helped them improve their English and learn new vocabulary, 8 out of 13 believed that it did. One reason why the rest of them did not feel that the project helped them improve might have been that students do not usually have a clear perception of the pedagogical implication of a learning activity. Another reason is that students do not necessarily

know how to measure their own linguistic improvement, especially improvement due to extensive reading in a project.

In regards to using the iPad in the project, 9 out of 13 participants surveyed enjoyed using it. One possible reason why the other four students did not enjoy using the iPad might have been due to the fact that some of these participants were using the iMovie and Creative Book Builder Apps for the first time. This might have resulted in instances of stress and frustration, especially if they had a partner who was also a novice iPad App user.

When it comes to the question of motivation on the survey, results show that 9 out of the 13 students stayed motivated throughout the project. This may be because they were constantly engaged during the two hours per week of class time that the researcher observed them work on the project. Results seem to support the notion that motivation stems from the high level of engagement that project-based learning requires. As Johnson and Delawsky (2013) explain, the need to find a solution requires emotional engagement and “when students are emotionally engaged, they are more likely to become behaviorally and cognitively engaged” (p. 562).

Some of the highest results in this survey were yielded from the two questions that addressed the usefulness of the class time for doing the project and pair work. Out of the 13 participants, 11 felt that the work they did on the project was a good use of their time. Twelve participants also enjoyed working in pairs. Pair work is one form of cooperative learning that Sachs et al. (2003) claim can be “more effective in promoting such values as *intrinsic* motivation and task achievement” (p. 340).

## Chapter 6 - Conclusion

Projects steer teachers away from the teacher-centered approach to a more student-centered one. Larsen-Freeman (2014) claims that “language development is no longer seen as a process of acquiring abstract rules, but as the emergence of language abilities through use in real time” (p. 5). The project described in this study aimed at making the learning more authentic by giving the participants an opportunity to tie the learning with real-life skills and at the same time facilitate language development.

Often when teachers try a new approach, they are left with puzzling questions regarding the implications of the new approach for learning in their classrooms. Teachers are left wondering if their students actually benefited from the new approach and most importantly, if they benefited from it, how the outcomes can be measured and how the results of the measuring tool can be interpreted.

This study attempted to answer similar questions when a project was added to the curriculum. Since a project is an approach where the dynamics of the lesson are totally different than with other more traditional teaching approaches, it can be quite challenging to measure the hidden knowledge of newly acquired vocabulary throughout the project. For this study, *implicit* vocabulary acquisition was chosen to be examined in an attempt to quantitatively measure the participants’ vocabulary after six weeks of project work. In more traditional approaches to teaching vocabulary like word lists or vocabulary embedded within reading and listening texts, it is very easy to measure vocabulary knowledge by creating a traditional test. However, when the task facing the teacher is how to measure *implicit* vocabulary acquired through extensive reading and listening throughout the project, the task at hand can be daunting.

This is where a website like Lextutor Vocabulary Profiler can be a useful tool in helping teachers measure if their students have gained new lexical items on a specific topic. In an attempt to answer the first research question [*Are there any differences in the level and sophistication of the vocabulary between essays written pre project and essays written post- project using the same prompts?*] the pre and post-project essay results analysis produced data that belonged to different categories. Results of the paired t-tests that showed significant differences were highlighted and

presented in the results section. Significant differences were based on the means, Standard Deviations, and the P-Values that the statistical analyses of the data produced.

This particular group of participants showed significant decrease in the total number of K1 words, K1 Anglo-Saxon words, as well as improvement in the number of K1 families and K1 types in the post-project essays. There was also an increase in the total number of words belonging to AWL. These findings are indicative of improvement in the level and sophistication of the vocabulary, respectively. These findings imply that extensive reading and listening did indeed help these participants *implicitly* acquire target vocabulary.

Throughout the project's six-week period, the important role of the iPad technology in this project became evident. The iPad was used throughout all the phases of the project. As Solomon (2003) puts it, "technology enables PBL" (p. 22). The most efficient way for the participants to collect information was to use their iPads to research different sites, use design Apps, listen to YouTube videos about design, and look for other sources that could help them find solutions to the problem at hand. The *need to search* through the multiple sources not only required extensive reading, but it also required a high level of cognitive engagement and critical thinking where they had to *evaluate* the usefulness of specific information from different sources, collate the information and weave it together to build the end product.

### **Implications**

This study is valuable for many reasons. First of all, it reflects how project-based learning can be used in ESL classrooms in the UAE in an attempt to steer away from the more traditional methods of teaching vocabulary and incorporate projects that can foster motivation and creativity. This study investigated whether or not projects have positive pedagogical implications, and how much vocabulary can be acquired through this alternative way of learning and assessment. It also suggests that PBL might be another approach that can be adopted in other ESL classrooms in the UAE that can push forward the language development process in general and vocabulary acquisition, in particular.

It is known that measuring vocabulary acquired through extensive reading is a difficult task. Therefore, this study suggests that teachers can use the Lextutor Vocabulary Profiler Website to measure their students' improvement in terms of newly acquired lexical items; thus, outcomes of one aspect of the project can be measured.

The fact that the project in this study led to positive outcomes might encourage ESL teachers and curriculum designers to incorporate such approach in their course planning, and to try to be more innovative in their implementation of language courses.

### **Limitations**

In every study, there are limitations, and this one is no exception. The first limitation in this study is the small number of participants. Only twenty-seven participants took part in it. Since this is such a small number, generalizations cannot be made to other classrooms where projects are being used.

Another limitation of this study is that only thirteen participants answered the survey. This small number does not reflect the perspectives of the whole group of students in the other classes where the study took place. The survey should have been conducted on the same day the participants presented their final product to ensure that all those involved in the study participate in the survey. The researcher was aware that the participants had exerted a lot of effort the day they presented their work and did not want to put more pressure on them.

Using the software <http://www.lex tutor.ca/vp/eng/> was a limitation by itself. This software provides very limited data because it is restricted to the first 1000 words (K1), the second 1000 words (K2), the AWL and the Off-list words. For the study to have been more grounded, using a more comprehensive website like <http://www.lex tutor.ca/vp/comp/> might have provided a more thorough analysis of the vocabulary in the pre-project and post-project essays. <http://www.lex tutor.ca/vp/comp/> provides a thorough analysis up to level 25 thousand with access to both the British National Corpus (BNC) and Corpus of Contemporary American English (COCA).

Since Lextutor VP only analyzes texts up to the 2000 most common words, this study is limited in its ability to support or negate Cobb's (2007) claim that "even the largest plausible amounts of free reading will not take the learner very far into the 3000-family zone" (p. 6).

In addition, the words above the second 2000 most common words (K2) in this study were calculated as Off-list words. The content of the off-list also included words that did not belong to the AWL, as well as spelling mistakes. Some of the spelling mistakes also included academic words, but because they were categorized as off-list, they were not accounted for in the AWL, the first 1000 or second 1000 word counts. Therefore, spelling mistakes might have skewed the data because not all the acquired words were counted in the profiling process.

### **Suggestions for Further Study**

A replication of this study investigating intermediate and advanced ESL learners of English is highly recommended in an attempt to uncover if there is an underlying pattern of implicit vocabulary acquisition when compared with the results of this study. Another suggestion is to replicate the study and include the corrected misspelled words in order to get an accurate picture of the vocabulary acquired.

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## Appendix A - Scoring Form and Rubrics

Student		ID	
Teacher		Section	
Project		Term/ Date	

<b>Part 1-Group Discussion</b>		<b>10%</b>
<b>1</b>	Task completion, range and accuracy	0 1 . 2 . 3 . 4
	<i>Comments</i>	
<b>Part 2-Product-Group Grade</b>		<b>40%</b>
<b>2</b>	Presentation and Completeness of Ideas	0 1 . 2 . 3 . 4
<b>3</b>	Content	0 1 . 2 . 3 . 4
<b>4</b>	Vocabulary	0 1 . 2 . 3 . 4
<b>5</b>	Accuracy	0 1 . 2 . 3 . 4
	<i>Comments</i>	
<b>Part 3-Presentation</b>		<b>30%</b>
<b>6</b>	Task Completion	0 1 . 2 . 3 . 4
<b>7</b>	Lexical and Grammatical Range and Accuracy	0 1 . 2 . 3 . 4
<b>8</b>	Fluency, Coherence, and Pronunciation	0 1 . 2 . 3 . 4
	<i>Comments</i>	
<b>Part 4-Reflective Writing</b>		<b>10%</b>
<b>9</b>	Task completion, range and accuracy	0 1 . 2 . 3 . 4
	<i>Comments</i>	
<b>Part 5-Process</b>		<b>10%</b>
<b>10</b>	Process	0 1 . 2 . 3 . 4
	<i>Comments</i>	
	<b>Overall Comments:</b>	<b>Total: _____/40</b> <b>OVERALL %: _____</b>

\*a 0 indicates that the student didn't complete that part of the project.

## Rubrics

### 1. Group Discussion (Individual Grade) 10%

	1 Beginning	1.5	2 Developing	2.5	3 Meets Expectations	3.5	4 Exemplary
<b>Task Completion and Discussion Skills</b>	<p><b>Task dealt with inappropriately</b></p> <p>Discussions: Does not reply adequately in most cases; little useful contribution to discussion</p>		<p><b>Task partly dealt with.</b></p> <p>Discussions: Simple, unexpanded contributions to discussion dominate; concentrates on own contribution, little effort at turn-taking</p>		<p><b>Task mainly dealt with.</b></p> <p>Discussions: Responses are mostly relevant and appropriate; turn-taking is mostly appropriate; contributions are mostly relevant and based on partner's comments.</p>		<p><b>Tasks dealt with fully.</b></p> <p>Discussions: Responds appropriately to questions and ideas; facilitates turn-taking and nominates others to take turns; contributions are relevant to partner's comments and follows on from them; initiates and ends information exchanges appropriately.</p>
<b>Lexical and Grammatical Accuracy</b>	<p>Generally lacks range and accuracy to express ideas. ***</p> <p>Frequent errors in level-appropriate grammar.</p>		<p>Vocabulary is sometimes appropriate, but there is limited range and flexibility.</p> <p>Numerous incorrect word choices or forms may inhibit expression and development of ideas ***</p> <p>Sometimes uses level-appropriate grammar correctly.</p>		<p>Vocabulary is usually appropriate and used correctly. Range and flexibility are sufficient to adequately express and develop ideas Attempts at formulaic expressions</p> <p>***</p> <p>Uses level-appropriate grammar correctly in most cases. Uses simple sentences well and attempts at compound and complex</p>		<p>Uses vocabulary appropriately and correctly from the level specific word lists. Exhibits appropriate flexibility and range in the use of vocabulary</p> <p>Uses formulaic expressions accurately and appropriately ***</p> <p>Uses level specific grammar</p>

					sentences.		<p>items correctly. Uses simple sentences effectively</p> <p>Uses compound &amp; complex sentences with some flexibility</p>
<p><b>Fluency, Coherence and Pronunciation</b></p>	<p>“vocalized pauses” dominate, there may be extensive silent pauses and/or repetition</p> <p>Mostly relies on incomplete utterances; Speech lacks fluency and coherence</p> <p><b>Inconsistent and/or inappropriate pitch and pace</b> ***</p> <p>Consistent, systematic problems with phonemes, stress and intonation</p> <p><b>Incomprehensible and very difficult to understand</b></p>	<p>Noticeable repetition, hesitation and self- correction occasionally affects fluency; some “vocalized pauses” such as “um” or “yanni”</p> <p>Some ability to create strings of discourse; limited fluency and coherence interfere with meaning</p> <p><b>Uneven pitch and pace may affect flow of speech</b> ***</p> <p>Noticeable problems with pronunciation.</p> <p>Stress and intonation may interfere with comprehension</p> <p><b>Concentration needed</b></p>	<p>Occasional repetition, hesitation and/or self- correction does not affect overall fluency</p> <p>Can carry on discourse as needed with some coherence and mostly clear meaning. Uses full sentences and level specific connectives frequently.</p> <p><b>Mostly appropriate and even pitch and pace</b> ***</p> <p>Most level appropriate words pronounced clearly</p> <p>Stress and intonation may occasionally cause strain for the listener</p> <p><b>Marginal concentration needed</b></p>	<p>Maintains a coherent flow of language on a familiar topic, everyday events and coursework topics effectively</p> <p>Uses a range of level specific connectives and discourse markers appropriately</p> <p>Coherence is evident with only occasional repetition, self- correction, pauses or hesitation</p> <p><b>Appropriate and even pitch and pace</b> ***</p> <p>Pronounces level appropriate words correctly and clearly</p> <p>Uses appropriate syllable and</p>			

							<p>sentence level stress</p> <p>Intonation is mostly well-controlled.</p> <p><b>No undue concentration needed</b></p>
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## 2. Product (Group Grade) 40%

	1 Beginning	1.5	2 Developing	2.5	3 Meets Expectations	3.5	4 Exemplary
<b>Presentation and completeness of ideas</b>  <i>Length, completeness of all parts, effectiveness of visual aids and technology used</i>	Not enough language to evaluate, off-topic*.		Task is attempted but not long enough; most parts are not complete; format is not appropriate; visual aids and other media are used but ineffectively.		The product is of appropriate length; most parts are complete and appropriate; format is appropriate; good use of visual aids and other media; technology chosen is mostly appropriate and effectively used.		The end product is of appropriate length; all parts are complete and appropriate; format is appropriate; visual aids and other media are used creatively and effectively; the right technology for the task is chosen and used effectively.
<b>Content</b>  <i>overall quality of ideas, creativity, relevance, and originality</i>	Content is off topic; overall quality of ideas is poor; several ideas are plagiarized*		Content is somewhat on topic; overall quality of ideas is below satisfactory; some ideas may be plagiarized;		Content is on topic; overall quality of ideas meets expectations; most ideas are either original or referenced		Completely relevant; overall quality of ideas is exemplary; all ideas are either original or referenced
<b>Vocabulary</b>	Vocabulary is inadequate; only very basic words are used, often repetitively or incorrectly; spelling errors are frequent and may cause misunderstanding; little/no control of word forms.		Vocabulary is sometimes appropriate, but there is limited range and flexibility and there may be noticeable repetition; spelling/pronunciation errors in target vocabulary are common; word forms and singular and plural nouns may be faulty.		Vocabulary is usually appropriate and used correctly; there is less range and flexibility, but unnecessary repetition is avoided; spelling/pronunciation of target vocabulary is mostly correct; word forms and singular and plural nouns are mostly correct.		Vocabulary is well chosen, used correctly and exhibits flexibility and range; target vocabulary is spelled/pronounced correctly; word forms and singular and plural nouns are used correctly.
<b>Accuracy</b>	A very limited range of structures is used; sentences (simple and		A limited range of structures is used; simple and compound sentences are often		A range of level-appropriate structures is used; simple and compound		A wide range of level-appropriate structures is used with flexibility and



	compound) are sometimes correct; complex sentences are not attempted and/or used incorrectly; very few (if any) verbs are used correctly; meaning may be lost due to lack of punctuation or faulty word order in written products.		correct; complex sentences are rarely correct or rarely attempted; word order may be faulty; there may be a few double subjects; there are recurrent errors in grammar and verb use, or excessive repetition; in written products punctuation and capitalization are sometimes correct; run-ons and/or fragments are evident.		sentences are almost always correct; complex sentences are attempted but may be faulty; word order is mostly correct and there are no double subjects; verb tenses, forms and grammar are mostly used correctly; in written products punctuation and capitalization are mostly correct, although there may be a few run-ons or fragments.		accuracy; simple and compound sentences are always used correctly; complex sentences are attempted and almost always correct; word order is correct and there are no double subjects; level specific verb tense(s), forms and grammar are correct, without unnecessary repetition; in written products punctuation and capitalization are correct and there are no run-ons or fragments.
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**Notes:**

**Students that do not hand in a project get a zero for this part of the ISP**

**\* Projects that receive a 1 in task completion and/or relevance should get 1s in all areas of the product.**

### **3. Presentation (Individual) 30%**

	<b>1</b>	<b>1.5</b>	<b>2</b>	<b>2.5</b>	<b>3</b>	<b>3.5</b>	<b>4</b>
	<b>Beginning</b>		<b>Developing</b>		<b>Meets Expectations</b>		<b>Exemplary</b>
<b>Task Completion and Presentation Skills</b>	<p><b>Task dealt with inappropriately</b></p> <p>Presentation lacks organization and planning; content is mostly irrelevant and task uncompleted; speaker fails to convey message and is not clear to understand; speaker has little contact with the audience; visual aids are not used</p>		<p><b>Task partly dealt with.</b></p> <p>Presentation is logically organized for the most part; content has some irrelevancies but task generally completed; visual aids are used reasonably well; speaker mostly reads from notes;</p>		<p><b>Task mainly dealt with.</b></p> <p>Presentation is well organized; content is mostly relevant, accurate and adequately covered; visual aids are generally appropriate and effective; speaker mostly keeps eye contact with</p>		<p><b>Tasks dealt with fully.</b></p> <p>Presentation is very well-organized; content is completely relevant, engaging, accurate and adequately covered; visual aids</p>

	well and are not appropriate to presentation; presentation is too short to assess; fails to answer questions.		speaker causes occasional misunderstanding; presentation is shorter than the required length; attempts to answer questions.		audience; speaker causes no confusion or misunderstanding; presentation is of appropriate length; answers questions adequately		are used effectively and appropriately; speaker keeps eye contact with audience; speaker conveys message very well; presentation is of appropriate length; answers questions competently.
<b>Lexical and Grammatical Accuracy</b>	Generally lacks range and accuracy to express ideas. *** Frequent errors in level-appropriate grammar.		Vocabulary is sometimes appropriate, but there is limited range and flexibility.  Numerous incorrect word choices or forms may inhibit expression and development of ideas *** Sometimes uses level-appropriate grammar correctly.		Vocabulary is usually appropriate and used correctly. Range and flexibility are sufficient to adequately express and develop ideas Attempts at formulaic expressions  *** Uses level-appropriate grammar correctly in most cases. Uses simple sentences well and attempts at compound and complex sentences.		Uses vocabulary appropriately and correctly from the level specific word lists. Exhibits appropriate flexibility and range in the use of vocabulary  Uses formulaic expressions accurately and appropriately. *** Uses level specific grammar items correctly. Uses simple sentences effectively  Uses compound & complex sentences

						with some flexibility
<b>Fluency, Coherence and Pronunciation</b>	<p>“vocalized pauses” dominate, there may be extensive silent pauses and/or repetition</p> <p>Mostly relies on incomplete utterances; Speech lacks fluency and coherence</p> <p><b>Inconsistent and/or inappropriate pitch and pace</b> ***</p> <p>Consistent, systematic problems with phonemes, stress and intonation</p> <p><b>Incomprehensible and very difficult to understand</b></p>		<p>Noticeable repetition, hesitation and self-correction occasionally affects fluency; some “vocalized pauses” such as “um” or “yanni”</p> <p>Some ability to create strings of discourse; limited fluency and coherence interfere with meaning</p> <p><b>Uneven pitch and pace may affect flow of speech</b> ***</p> <p>Noticeable problems with pronunciation.</p> <p>Stress and intonation may interfere with comprehension</p> <p><b>Concentration needed</b></p>		<p>Occasional repetition, hesitation and/or self-correction does not affect overall fluency</p> <p>Can carry on discourse as needed with some coherence and mostly clear meaning. Uses full sentences and level specific connectives frequently.</p> <p><b>Mostly appropriate and even pitch and pace</b> ***</p> <p>Most level appropriate words pronounced clearly</p> <p>Stress and intonation may occasionally cause strain for the listener</p> <p><b>Marginal concentration needed</b></p>	<p>Maintains a coherent flow of language on a familiar topic, everyday events and coursework topics effectively</p> <p>Uses a range of level specific connectives and discourse markers appropriately</p> <p>Coherence is evident with only occasional repetition, self-correction, pauses or hesitation</p> <p><b>Appropriate and even pitch and pace</b> ***</p> <p>Pronounces level appropriate words correctly and clearly</p> <p>Uses appropriate syllable and sentence level stress</p> <p>Intonation is mostly well-controlled.</p> <p><b>No undue</b></p>

							concentrati on needed
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## Reflective Writing (Individual) 10%

	1 Beginning	1.5	2 Developing	2.5	3 Meets Expectations	3.5	4 Exemplar y
<b>Task Completion</b>  *as appropriate to task  Relevancy, length; variety and clarity of ideas; format; complexity	Paragraphs fail to address the task and/or are unrelated to task. (See notes below)  Insufficient language to evaluate or off topic, extremely repetitive, or appears to have been memorized.		Paragraphs attempt to address the task but there is little development of ideas. They may not be completely relevant to the task or of sufficient length. Ideas are overly simple or unclear.		Paragraphs address the requirements of the task, but ideas may not be sufficiently developed. They are mostly relevant and is of sufficient length. Ideas are understandable, but may be simple.		Paragraphs clearly present a fully developed response. They are entirely relevant and more than sufficient in length. Ideas are complete, varied, and clear.
<b>Organization</b>  *as appropriate to task	Organization is not logical.		Some organization is evident, but development is somewhat unclear and ideas are not always logically ordered. Sentences		Text is mostly well organized. Ideas are developed and are mostly ordered logically. Cohesive devices are mostly appropriate.		Paragraphs clearly present a fully developed response. They are entirely relevant and more than sufficient in length. Ideas are complete, varied, and clear.

			and/or paragraphs are not clearly connected.			
<b>Vocabulary</b>	Vocabulary is inadequate; only very basic words are used, often repetitively or incorrectly. Spelling errors are frequent and may cause misunderstanding. Little or no control of word forms.		Vocabulary is sometimes appropriate, but there is little range and flexibility and there may be noticeable repetition. Spelling errors in target vocabulary are common. Word forms and singular and plural nouns may be faulty.		Vocabulary is appropriate and usually used correctly. Range and flexibility are limited, but unnecessary repetition is avoided. Spelling of target vocabulary is mostly correct. Word forms and singular and plural nouns are mostly correct.	Text is very well organized. Ideas are well developed, ordered logically, and clearly connected to one another. Cohesive devices are used appropriately and there is a clear progression throughout.  Vocabulary is well chosen, used correctly and exhibits flexibility and range. Target vocabulary (at this level) is spelled correctly. Word forms, singular and plural nouns are used correctly, i.e. child/children.
<b>Sentences</b>	A very limited range of structures is used. Sentences (simple and compound) are sometimes correct. Complex sentences not attempted and/or used incorrectly. Meaning may be lost due to faulty word order or lack		A limited range of structures is used.  Simple and compound sentences are often correct; complex sentences are rarely correct or attempted Word order may be faulty. There		A range of level appropriate structures is used. Simple and compound sentences are almost always correct; complex sentences are attempted but may be faulty. Word order is mostly correct and there are few double	A wide range of appropriate structures is used with flexibility and accuracy. Word order is correct and there are no double subjects. Punctuation

	of punctuation.		may be frequent double subjects. . Punctuation and capitalization are sometimes correct; run-ons and/or fragments are evident.		subjects. Punctuation and capitalization are mostly correct, although there may be a few run-ons or fragments.		and capitalization are correct and there are no run-ons or fragments.
<b>Grammar</b>	Very few (if any) grammar structures are used correctly. Meaning may be lost due to inaccuracy.		Recurrent errors in grammar.		Grammar items are mostly used correctly.		Level specific grammar is used correctly, but there may be occasional, nonsystematic errors.
<b>Verbs</b>	Very few (if any) verbs are used correctly.		There are recurrent errors in verb uses, or excessive repetition.		Verb tenses and forms are mostly used correctly.		Level specific verb tenses and forms are used correctly, without unnecessary repetition.

#### 4. Process (Individual) 10%

	1 Beginning	1.5	2 Developing	2.5	3 Meets Expectations	3.5	4 Exemplary
<i>group participation; research; time management; task completion</i>	<ul style="list-style-type: none"> <li>Failed to participate in group work;</li> <li>Found no source about their topic;</li> <li>No required drafts were completed or seen by teacher;</li> <li>Never used project time well; did not work on tasks assigned for the ISP in class</li> <li>Deadlines were not met;</li> <li>Never showed work to teacher or peers so got no feedback; never asked for help</li> </ul>		<ul style="list-style-type: none"> <li>Somewhat participated in group work;</li> <li>Found one written source, but failed to submit the notes and the source to teacher;</li> <li>Sometimes worked on tasks assigned for the ISP in class; some, but not all deadlines were met; some required drafts were completed;</li> <li>Gave little/no feedback to peer; rarely showed work to teacher and made little revisions based on feedback; feedback form submitted too late or not submitted at all</li> </ul>		<ul style="list-style-type: none"> <li>Mostly participated in group work;</li> <li>Found one mostly relevant and appropriate written source, made notes from it and submitted the notes and the source to teacher;</li> <li>Usually used class time effectively; most of the time worked on tasks assigned for ISP in class; almost all deadlines were met;</li> <li>Most required drafts were completed fully;</li> <li>Gave feedback to peer; submitted the feedback form; submitted most work to teacher for feedback when required and made necessary changes based on feedback.</li> </ul>		<ul style="list-style-type: none"> <li>Participated actively in group work;</li> <li>Found one relevant, appropriate written source, made notes from it and submitted the notes and the source to teacher;</li> <li>Always used class time effectively to work on the ISP; all deadlines were met throughout the project;</li> <li>All required drafts were completed fully;</li> <li>Gave feedback to peer; submitted the checklist to teacher; submitted all work to teacher for feedback when required and made necessary changes</li> </ul>

## Appendix B – PowerPoint Presentation

5/12/2015

### Design Project 2014–2015

#### Where can I find information?

- Design magazines like **InsideOut**
- Shop catalogues like **Ikea's catalogue**
- Search engines like **Google**- Put your keywords like: *How do I design a child's bedroom?*
- Download an app called **Houzz**. This has information and images about design.
- Go to the **library** and ask the librarian for sources.

#### What do I do after I find a source?

- Collect all the information and images that you need and create a folder for your resources. You can take screen shot using your ipad.
- Make sure you copy the internet source because you need to add it at the end of you CBB or iMovie.

#### How do I use the sources?

- Avoid plagiarism because plagiarism is a serious offense for a university student.
- Make sure you do not just copy and paste in your final product.
- Cite the different sources at the end.

1



## Appendix C – Students’ Research Questions / Essay Prompts

### Design

*How can you design a new romantic and comfortable bedroom for newlyweds?*

*How can you design a restaurant for female students that is educational and fun?*

*How can you renovate an old traditional Emirati style kitchen into a new modern one?*

*How can you design a kid’s playroom (9-15 yrs) that is fun, educational and encourages healthy living?*

*How can you design a high school classroom (Grade 10-12) that motivates the students?*

*How can you design a nursery that is fun, educational and safe for boys and girls aged 1-3 years?*

*How can you design an activity room for Down syndrome children aged 2-6 years that is educational, fun and safe?*

*How can you design a teenage girl’s room that is fun and comfortable?*

*How can you design an educational game for children aged 6-8 that teaches them healthy skills?*

*How can you design a new baby’s room (boy or girl) that is comfortable and safe?*

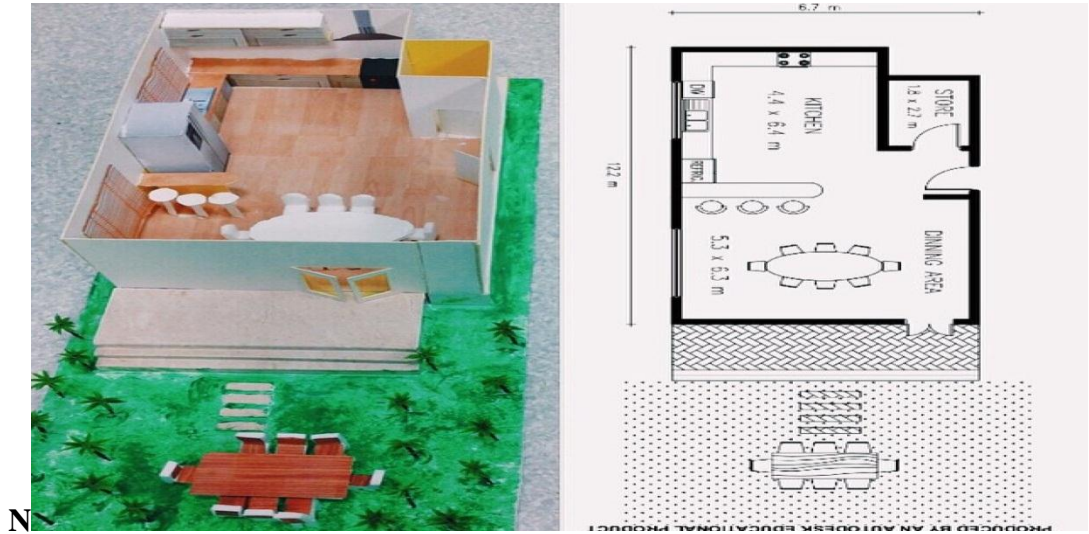
*How can you design a classroom that is attractive and fun for children aged 4-6 years?*

*How can you design an old bedroom into a modern bedroom for a teenage girl aged 17-19 years old?*

*How can you design a library to encourage and make the students excited to read?*

## Appendix D – Miniature Design

### New Kitchen Design



## Appendix E - Project-Based Learning Student Survey

### استبيان مشروع تعلم الطالب

The aim of this research is to explore the implicit acquisition of vocabulary through projects with the use of technology. Your input will provide insight into student perceptions regarding this topic. Your input will also help improve the teaching and learning process. This survey will take 5-7 minutes of your time. Your participation is voluntary and completely anonymous. Thank you for your participation.

يهدف هذا البحث إلى استكشاف عملية اكتساب المفردات بشكل غير مباشر من خلال مشاريع تستند إلى استخدام التكنولوجيا. ستساهم الأجوبة التي ستقوم بتقديمها في توفير نظرة معمقة لتصورات الطلاب حول هذا الموضوع. كما ستساعد أجوبتك في تحسين عملية التعليم والتعلم. تستغرق هذه الدراسة مدة 5-7 دقائق من وقتك. إن مشاركتك فيها هي مشاركة طوعية بشكل تام ولن يتم الإفصاح عن هويتك الشخصية. شكرا على مشاركتك.

### Part 1 - Answer the following questions by giving your answer on a 1 to 5

scale

الجزء الأول – أجب عن الأسئلة التالية باختيار القيمة من 1 إلى 5

(1 being the lowest and 5 the highest).

(حيث 1 القيمة الأقل و 5 القيمة الأعلى)

1.2.3.4.5

1- I liked the project.

1- أعجبنى المشروع.

5-4-3-2-1

1.2.3.4.5

2- The project helped me improve my English?

2- ساعدني المشروع على تحسين لغتي الانجليزية؟

5-4-3-2-1

1.2.3.4.5

3- Extensive reading and listening throughout the project helped

me

learn new vocabulary.

3- ساهمت القراءة والاستماع المكثف طوال المشروع في تعلمي

5-4-3-2-1

مفردات جديدة.

1.2.3.4.5 4- I enjoyed using the iPad for this project.

5-4-3-2-1 4- استمتعت باستخدام جهاز "الأي باد" لهذا المشروع.

1.2.3.4.5 5- I stayed motivated throughout the project.

5-4-3-2-1 5- كنت محفزا طوال المشروع.

1.2.3.4.5 6- This project was a good use of class time.

5-4-3-2-1 استثمر هذا المشروع الوقت المخصص للحصص بشكل جيد.

1.2.3.4.5 7- I enjoyed working in pairs during the project.

5-4-3-2-1 استمتعت بالعمل مع شريك في هذا المشروع.

**Part 2 - Answer the following questions using as much information as possible:**

الجزء الثاني – أجب عن الأسئلة التالية بأكبر قدر من المعلومات:

8- What did you **like** about the project?

8- ماذا أعجبك في هذا المشروع؟

9- What did you **NOT like** about the project?

9- ما الذي لم يعجبك في هذا المشروع؟

## Appendix F – Answers to the Survey’s Open-ended Questions

Project-Based Learning Student Survey استبيان مشروع تعلم الطالب

SurveyMonkey

### Q8 What did you like about the project? ماذا أعجبك في هذا المشروع؟

Answered: 9 Skipped: 4

#	Responses	Date
1	العمل التعاوني	2/14/2015 6:49 PM
2	Group work, and gaining new information.	2/3/2015 12:51 PM
3	Everything!	2/3/2015 12:07 PM
4	"Spend alot of time with my friend "Learning alot of new words " I learned how to present and be confedent of myself "how to use new app that i dont know before "that topic helped me to focus on important things that I need to create my new bedroom.	2/3/2015 11:54 AM
5	- fugerout data about it . - learn how to communicate with others .	2/3/2015 11:00 AM
6	It was a good project everything I like it.	2/3/2015 10:52 AM
7	العمل المشترك وتعلم بعض الاتياد الجيده	2/3/2015 9:34 AM
8	---	2/3/2015 9:24 AM
9	Everything about this project	2/3/2015 9:03 AM

Project-Based Learning Student Survey استبيان مشروع تعلم الطالب

SurveyMonkey

### Q9 What did you NOT like about the project? ما الذي لم يعجبك في هذا المشروع؟

Answered: 9 Skipped: 4

#	Responses	Date
1	ضيق الوقت	2/14/2015 6:49 PM
2	That we were in hurry.	2/3/2015 12:51 PM
3	-	2/3/2015 12:07 PM
4	No thing :)	2/3/2015 11:54 AM
5	- nothing	2/3/2015 11:00 AM
6	There is nothing that I didn't like .	2/3/2015 10:52 AM
7	عرض المشروع على الطالبات	2/3/2015 9:34 AM
8	---	2/3/2015 9:24 AM
9	Nothing	2/3/2015 9:03 AM

## Appendix G – Raw Data Statistics

### T-Test and CI: Pre K1 Families\_1, Post K1 Families\_1

Paired T for Pre K1 Families\_1 - Post K1 Families\_1

	N	Mean	StDev	SE Mean
Pre K1 Families_1	27	83.884	4.143	0.797
Post K1 Families_1	27	86.480	3.342	0.643
Difference	27	-2.596	4.990	0.960

95% CI for mean difference: (-4.569, -0.622)

T-Test of mean difference = 0 (vs ≠ 0): T-Value = -2.70 P-Value = 0.012

### Paired T-Test and CI: Pre K1 Types\_1, Post K1 Types\_1

Paired T for Pre K1 Types\_1 - Post K1 Types\_1

	N	Mean	StDev	SE Mean
Pre K1 Types_1	27	84.703	3.606	0.694
Post K1 Types_1	27	86.901	3.070	0.591
Difference	27	-2.199	4.383	0.843

95% CI for mean difference: (-3.932, -0.465)

T-Test of mean difference = 0 (vs ≠ 0): T-Value = -2.61 P-Value = 0.015

### Paired T-Test and CI: Pre K1 Total %, Post K1 Total %

Paired T for Pre K1 Total % - Post K1 Total %

	N	Mean	StDev	SE Mean
Pre K1 Total %	27	83.734	3.965	0.763
Post K1 Total %	27	81.172	3.289	0.633
Difference	27	2.562	3.711	0.714

95% CI for mean difference: (1.094, 4.030)

T-Test of mean difference = 0 (vs ≠ 0): T-Value = 3.59 P-Value = 0.001

### Paired T-Test and CI: Pre K1 Anglo %, Post K1 Anglo %

Paired T for Pre K1 Anglo % - Post K1 Anglo %

	N	Mean	StDev	SE Mean
Pre K1 Anglo %	27	19.384	4.646	0.894
Post K1 Anglo %	27	17.167	4.099	0.789
Difference	27	2.217	4.948	0.952

95% CI for mean difference: (0.260, 4.175)

T-Test of mean difference = 0 (vs ≠ 0): T-Value = 2.33 P-Value = 0.028

### Paired T-Test and CI: Pre K2 Families\_1, Post K2 Families\_1

Paired T for Pre K2 Families\_1 - Post K2 Families\_1

	N	Mean	StDev	SE Mean
Pre K2 Families_1	27	9.596	3.615	0.696
Post K2 Families_1	27	8.759	3.412	0.657
Difference	27	0.837	4.688	0.902

95% CI for mean difference: (-1.017, 2.691)

T-Test of mean difference = 0 (vs ≠ 0): T-Value = 0.93 P-Value = 0.362

### **Paired T-Test and CI: Pre K2 Types\_1, Post K2 Types\_1**

Paired T for Pre K2 Types\_1 - Post K2 Types\_1

	N	Mean	StDev	SE Mean
Pre K2 Types_1	27	8.843	3.166	0.609
Post K2 Types_1	27	8.299	3.385	0.651
Difference	27	0.544	4.385	0.844

95% CI for mean difference: (-1.190, 2.279)

T-Test of mean difference = 0 (vs ≠ 0): T-Value = 0.65 P-Value = 0.524

### **Paired T-Test and CI: Pre K2 Total %, Post K2 Total %**

Paired T for Pre K2 Total % - Post K2 Total %

	N	Mean	StDev	SE Mean
Pre K2 Total %	27	6.280	3.630	0.699
Post K2 Total %	27	6.004	2.379	0.458
Difference	27	0.276	3.249	0.625

95% CI for mean difference: (-1.009, 1.561)

T-Test of mean difference = 0 (vs ≠ 0): T-Value = 0.44 P-Value = 0.663

### **Paired T-Test and CI: Pre K2 Anglo %, Post K2 Anglo %**

Paired T for Pre K2 Anglo % - Post K2 Anglo %

	N	Mean	StDev	SE Mean
Pre K2 Anglo %	27	3.673	3.151	0.606
Post K2 Anglo %	27	2.612	1.690	0.325
Difference	27	1.061	3.009	0.579

95% CI for mean difference: (-0.130, 2.251)

T-Test of mean difference = 0 (vs ≠ 0): T-Value = 1.83 P-Value = 0.078

### **Paired T-Test and CI: Pre 1K + 2K %, Post 1K + 2K %**

Paired T for Pre 1K + 2K % - Post 1K + 2K %

	N	Mean	StDev	SE Mean
Pre 1K + 2K %	27	90.014	4.252	0.818
Post 1K + 2K %	27	87.176	3.641	0.701
Difference	27	2.838	4.034	0.776

95% CI for mean difference: (1.242, 4.434)

T-Test of mean difference = 0 (vs ≠ 0): T-Value = 3.66 P-Value = 0.001

### Paired T-Test and CI: Pre AWL Families\_1, Post AWL Families\_1

Paired T for Pre AWL Families\_1 - Post AWL Families\_1

	N	Mean	StDev	SE Mean
Pre AWL Families_1	27	6.516	2.767	0.533
Post AWL Families_1	27	4.796	2.429	0.468
Difference	27	1.720	3.875	0.746

95% CI for mean difference: (0.187, 3.253)

T-Test of mean difference = 0 (vs ≠ 0): T-Value = 2.31 P-Value = 0.029

### Paired T-Test and CI: Pre AWL Types\_1, Post AWL Types\_1

Paired T for Pre AWL Types\_1 - Post AWL Types\_1

	N	Mean	StDev	SE Mean
Pre AWL Types_1	27	6.449	2.590	0.499
Post AWL Types_1	27	4.796	2.358	0.454
Difference	27	1.653	3.806	0.733

95% CI for mean difference: (0.147, 3.158)

T-Test of mean difference = 0 (vs ≠ 0): T-Value = 2.26 P-Value = 0.033

### Paired T-Test and CI: Pre AWL %, Post AWL %

Paired T for Pre AWL % - Post AWL %

	N	Mean	StDev	SE Mean
Pre AWL %	27	3.368	1.894	0.365
Post AWL %	27	5.188	2.108	0.406
Difference	27	-1.820	2.858	0.550

95% CI for mean difference: (-2.951, -0.689)

T-Test of mean difference = 0 (vs ≠ 0): T-Value = -3.31 P-Value = 0.003

### Paired T-Test and CI: Tokens Per Type Ratio (Pre), Tokens per Type Ratio (Post)

Paired T for Tokens Per Type Ratio (Pre) - Tokens per Type Ratio (Post)

	N	Mean	StDev	SE Mean
Tokens Per Type Ratio (P)	27	1.9681	0.2408	0.0463
Tokens per Type Ratio (P)	27	1.7137	0.3533	0.0680
Difference	27	0.2544	0.3931	0.0757



95% CI for mean difference: (0.0989, 0.4099)

T-Test of mean difference = 0 (vs  $\neq$  0): T-Value = 3.36 P-Value = 0.002

### **Paired T-Test and CI: Words in Text (Pre), Words in Text (post)**

Paired T for Words in Text (Pre) - Words in Text (post)

	N	Mean	StDev	SE Mean
Words in Text (Pre)	27	152.44	42.76	8.23
Words in Text (post)	27	171.22	44.05	8.48
Difference	27	-18.8	52.0	10.0

95% CI for mean difference: (-39.3, 1.8)

T-Test of mean difference = 0 (vs  $\neq$  0): T-Value = -1.88 P-Value = 0.072

## **Vita**

Oumayma Nasser graduated from The University of Toledo in the USA with a BA in Biology and a BS in Medical Technology. She worked in the medical laboratory field for six years in the US and two years in Lebanon.

She embarked on a teaching career in 2005, and has worked as an English Instructor at various higher education institutions in the UAE. She is CELTA certified, and has presented on the topic of E-learning as well as the iPad in the educational context at various conferences. She commenced her graduate studies at the American University of Sharjah in 2012, and was awarded an MA TESOL in 2015.