

## Applying Multiple Intelligence Strategies on Diverse College Level Vocabulary Instruction

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**Abstract:** Today's teachers have more students in their classrooms, and they learn in diverse ways. Teachers are being held accountable for their teaching, but they lack the tools to address the diversity in their classrooms and often are limited in resources. The one-size-fits-all educational model does not produce results in all students. Multiple Intelligences (MI) and Differentiated Instruction (DI) are different ways of instruction that utilize the individual needs and abilities. The main focus of this project was to determine learning styles of a university English class learning vocabulary and to develop strategies that work best for the individual differences. The sample were 30 university students that were divided into a control group(traditional instruction) and experimental group(differentiated instruction using multiple intelligences) which consisted of 15 students each. The students were of both genders and between 18-22 years old. The results lead to the belief that second language acquisition requires much longer than 8 weeks of proper differentiating in lessons. Although implementing multiple intelligences in everyday student learning process demonstrates improvement in learning, there are other factors to consider in ascertaining an effective learning environment.

### Chapter 1

#### General Introduction of the Topic Area

Students in university classrooms must learn English vocabulary within a given time period. Students come from different backgrounds, represent both genders, and have been shaped by class and culture. This produces different learning styles among the diverse students in the classroom. Research has shown that standard curriculum and teaching using only lectures and reading can create poor performance on tests and ineffective instruction for many students in the diverse classroom. Students often fail to learn and feel like failures in classrooms. Multiple intelligence surveys can provide the teacher with a good understanding of the learning styles brought into the classroom. This information can then be used to provide differentiated learning strategies for students to learn the same content in ways that benefit each student. Armed with these teaching tools, an English teacher should be able to improve the learning outcomes of vocabulary instruction in university level English classes.

#### Statement of the Problem

A main concern in our school systems is that for generations, schools have focused on teaching through *Standardized Teaching* or *Testing* (ST) An important study by Michigan State University in 1983, concluded that "The proportion of topics presented on a standardized test that received more than cursory treatment in each textbook was never higher than 50 percent" (p. 509), allowing educators to see all students through the same light. Although research available

on the ineffectiveness of *Standardized Teaching or Testing* (ST) is limited, some research suggested that ST caused anxiety and fear of failure on tests. Even children in elementary schools experienced high levels of anxiety and worry (Triplett & Barksdale, 2005).

Multiple Intelligences (MI) and Differentiated Instruction (DI) help teachers become more effective instructors in a highly diverse classroom. Gay talks about the importance of taking diversity into consideration because *culturally responsive teaching* (CRT) is a collection of best teaching practices to enhance the academic success of students who are culturally different in classroom settings (Gay, 2000; Ladson-Billings, 1994, 2001). Ladson explains a journey of transforming teachers and their teaching methods with the utilization of essential knowledge and support to effectively educate diverse students in urban classrooms. These articles provided insights to solve some of the problems of the diverse students in classrooms.

Knowing the MI of the population allows educators to choose the DI strategies needed for instruction. Students possess different ways of thinking, and their abilities to learn come in different shapes and colors. Multiple Intelligences are the different ways of thinking and abilities used by students to learn. These categories of intelligences or learning styles are: Verbal/Linguistic, Visual/Spatial, Bodily/Kinesthetic, Linguistic, Logical/Mathematical, Musical, Naturalistic, Auditory, Interpersonal, and Intrapersonal. Differentiated Instruction, on the other hand, is the incorporation of Multiple Intelligences in classroom instruction to meet the individual needs of each student. For example, strategies that address a student who learns through Bodily/Kinesthetic style could use dance, acting, and other forms of movement.

The failure of ST to address the diversity of student learning styles shows the need for using other tools and strategies to help individual students learn more effectively within the diverse classroom. Multiple Intelligences and Differentiated Instruction can become those tools and strategies needed by today's teachers.

### **Description of Project**

The researcher began the study by administering a Multiple Intelligence Survey to determine each student's learning style(s). These learning styles included Verbal/Linguistic intelligence, Visual/Spatial intelligence, Bodily/Kinesthetic Linguistic, Auditory intelligence, Interpersonal intelligence and Intrapersonal intelligence. In the first class (Action group), the researcher administered the Multiple Intelligences survey which identified each student's learning abilities/styles. In the second class (control group), no survey was given, and standard teaching strategies such as lecturing, group discussions, recitations, and small group activities using the same tasks and reading aloud were used. Both classes used the same level of content. All English classes were based on a university English placement test, and students were from different backgrounds and spoke different languages. The control group was taught vocabulary in a traditional direct instruction manner. The experimental group was taught using differentiated instruction according to their results on the Multiple Intelligence survey. The research lasted a total of eight weeks; 2 lessons per week and one hour per lesson. A pre- and post-assessment was done in each group at the beginning and end of each week to determine vocabulary proficiency. The action group included introducing a set of ten new vocabulary words during the first lesson of each week and included introducing differentiated activities that showcased the individual abilities in the classroom during the second lesson of each week. At the beginning of these lessons, the researcher gave the students a Vocabulary Rating Chart to fill out. This chart contained four columns; one column (the word), one column (whether or not they know the word), one column (whether or not they have seen the word), and one column (whether or not

they have never seen the word). The students checked the box that described their knowledge of the word.

Once all tactics of differentiated instruction had been tested individually, the researcher put the students together in a lesson to see if the combination of methods were effective or ineffective. Both qualitative and quantitative results from pre-surveys/post-surveys and the rubrics were utilized and considered while calculating the results. Group work rubrics, written work, and performance results of the students were a part of the evaluative materials including factual questions, behavioral questions and attitudinal questions. The students' achievements and results of all group work were recorded throughout the lessons in the grid. Results were compared to their beginning MIS self-report survey. A final evaluation about the consistency of choices made by each university student in each group was compared to the level of achievement of objectives to determine if the differentiated strategies achieved more effective learning outcomes.

The main focus of this project was to determine learning styles of a university English class learning vocabulary and to develop strategies that work best for the individual differences. Using a control group that received standard teaching and testing techniques, the researcher compared the experimental group receiving the MI survey and differentiated instruction in testing results and in attitude about the learning experience.

### **Potential Benefits**

According to Tomlinson, "Differentiated instruction (DI) is one way that educators have recently begun to provide academic instruction to children with special needs mainstreamed into general education classrooms" (Tomlinson, 1999, 2000). Howard Gardner's (1991) research talks about how students possess different types of minds and can learn differently. The key to learning is finding what works best for the individual student. Every individual is intelligent in his/her own way. However, Gardner (1993) also emphasizes the need for continuous investigation on the importance of experimental evidence on the effectiveness of MI "While the Multiple Intelligences theory is consistent with much empirical evidence, it has not been subjected to strong experimental tests. . . . Within the area of education, the applications of the theory are currently being examined in many projects. Our hunches will have to be revised many times in light of actual classroom experience" (p. 33).

The main goal of this research was to determine the MI in the researcher's highly diverse university classroom and develop DI strategies to help the students learn vocabulary. Graves (2007) emphasized the importance of learning vocabulary for all students; natives and non-natives "Learning English vocabulary is one of the most crucial tasks for English learners" (p. 13), Proficiency in learning vocabulary and using the English language is indeed becoming a global necessity for people to communicate and prosper. Lack of that knowledge cannot assure students success.

It was expected that MI would produce better results in learning and more positive feelings about the learning experience. My overall expected outcomes included higher grades. Grades were retained through qualitative methods and compared to the grades of the Control group. The affective domain of outcomes showed students enjoying learning and reducing their fear of testing.

### **Key Terms:**

Henry (2007), an English teacher from Minnesota published an article called "The Case Against Standardized Testing" in the Minnesota English journal explaining and examining the

ineffectiveness of standardized teaching and testing. According to Henry, *standardized teaching* is reducing successful teaching to a single measure on a multiple choice instrument and *standardized testing* as an examination made up of the same items that can be imitated for use by all students. The questions could include multiple choice questions that can be easily scored by machines.

*Stereotype threat* is “a situational threat—a threat in the air—that, in general form, can affect the members of any group about whom a negative exists” (Steele, 1997, p. 614)

In Gardner’s book “The Unschooled Mind” (1991), Gardner explains *multiple intelligences (MI)* as the ability for individuals to learn in different ways. He says that “we are all able to know the world through language, logical-mathematical analysis, spatial representation, musical thinking, and the utilization of the body to solve problems or to make things, an understanding of other individuals, and an understanding of ourselves. Where individuals differ is in the strength of these intelligences - the so-called profile of intelligences -and in the ways in which such intelligences are invoked and combined to carry out different tasks, solve diverse problems, and progress in various domains.”

Hall, (2002) explains *differentiating instruction (DI)* as acknowledging student backgrounds, readiness levels, languages, interests and learning abilities. Mulroy and Eddinger (2003) add that differentiated instruction developed within the context of an increase of diversity of students’ in classrooms. Within the learning environment created by differentiated instruction, teachers, support staff and professionals work together to create the best learning experience for students (Mulroy and Eddinger, 2003). Moreover, each student is valued for their unique strengths in learning and being offered different chances to demonstrate skills through a variety of assessment techniques (Mulroy and Eddinger, 2003; Tomlinson and Kalbfleisch, 1998; Tuttle, 2000).

*Vocabulary* is one of five main components of reading instruction that are crucial to successfully teach students how to read. These components include phonemic awareness, phonics and word study, fluency, vocabulary, and comprehension (National Reading Panel, 2000).

A *learning outcome* is a statement of what the learner is expected to know, understand and/or be able to do at the end of a period of learning. (Donnelly and Fitzmaurice, 2005)

## Chapter Two: Literature Review

### Introduction

This research investigated whether student learning styles and adaptive instructional techniques enhance learning and the process of learning English vocabulary for university students in a diverse classroom. The current study explored the effectiveness of using multiple intelligences to teach vocabulary skills and the different learning strategies for English language development across the curriculum through determining students’ learning abilities. Vocabulary skills are important for different stages in life such as higher education or jobs. Educators play an important role in skills development, and this study helps educators develop these strategies by adopting multiple intelligences to help every student grow and learn given an equal opportunity in learning.

Students are targeted for academic failure at an early age, demonstrating a lack of conversational skills and a lack of concepts related to English language. They face difficulties in reading and conversation. Past studies indicate that the number of students that have experienced

vocabulary and language problems later affects their communication and reading skills. Many teachers reported that there is an increase in the number of students who exhibit delays in language development and vocabulary skills that are needed for engaging in communication. Students' language development decreased due to changes in their life styles, inadequate care of the child and the amount of television watching. Application of Multiple Intelligences in daily lessons is considered as an appropriate strategy to face these daily challenges. The results from the study by Kornhaber show positive results and indicate an improvement in students' receptive and expressive English language learning with intense daily intervention through the use of multiple intelligences (Kornhaber et.al, 2004).

### **Failure to address diversity: Standardized teaching and testing**

Today's classrooms are characterized by academic diversity. Larger numbers of students in a classroom increase in the throughout the world every day that results in a highly diverse environment. According to the Human Development report (2013), the human population has increased from 3.6 billion to 7 billion people between the year of 1970 and 2011. With the rise in the world's population there has been a decrease in the number students enrolling into schools as they get older and move up to different stages in their lives. The report gives statistical analysis of the number of students enrolled in the educational system from Primary to Tertiary showing the United Arab Emirates a gross enrollment ratio of 104.0 % for Primary Education (ages 5-13), a 92.0% for Secondary Education (ages 13-18) and a very low 22.5% for Tertiary Education (Post-Secondary education) between the years of 2002 and 2011. These numbers are an indication of students' motivation to continue education has decreased from Primary to Secondary and from Secondary to Tertiary. A review of various studies on achievement motivation found that as a general rule, motivation steadily decreases as a student's age increases, up until mid-high school. This steady decline is punctuated by drastic declines during transition periods, most significantly as students move to middle school (Eccles, Midgley & Fadler, 1984).

Disputes between researchers and educators on the issue of standardized teaching and mixed abilities have been ongoing for the longest time. David Hawkins, professor of philosophy at the University of Colorado and formerly director in an article called "Messing About in Science," which appeared in the February 1965 issue of *Science and Children*, of the Elementary Science Study, wrote "Maybe you can do that, but you ought to try it in my class of 43! I want to be the last person to belittle the importance of small classes. But in this particular case, the statement ought to be made that in a large class one cannot afford not to diversify children's work--or rather not to allow children to diversify, as they inevitably will, if given the chance."

Instructional guidance with little or no emphasis on human cognitive skills is ineffective for many students, who learn differently than through lecture (auditory) and writing. The ultimate goal for instruction is benefiting students in the long run. Standardized instruction offers minimal guidance in a classroom leaving students with varied learning abilities restrained and undiscovered. Minimal guidance put up educational barriers through instructional tasks available on the same level for all students. This view of standardized teaching and the expectation to "teach to the test" appear to frustrate teachers' and hinder their efforts to differentiate learning and contradict what they have been trained to do. (Phelps, 2011)

In 1830s, when Horace Mann established a test to a group of students, his intentions were in making judgments regarding the way students are doing at their present level and decide whether they have the capability to advance to a higher level (Holmes, 2009). The success of



students on the tests had no negative consequence but served the purpose of answering a question that whether the student should stay at the current level or move to the next level of academic intensity and difficulty. At that time, these tests were a necessity as the idea of public education was still being developed and adjusted, and these tests were the only way through which the progress of students could be measured (Holmes, 2009).

In the beginning of 1930s, the president of Harvard University, James Conant decided to form a test for admissions. He wanted an objective and reliable method of measuring the achievement of a student without consideration of the test taker or his background (Holmes, 2009). He believed that by administering the same tests to every applicant for admission various factors such as wealth of family, elite or private academy that a student might have attended and any other type of benefits which they will bring to university, will be detached from the process of decision making. His colleagues believed that it will make a rationale for not including those who did not want to enter into Harvard. They were proved wrong because the individuals from humble beginnings started to score very high on tests, which resulted in their being accepted in the university (Holmes, 2009).

### **Addressing Diversity: Historical Attempts to Address Multiple Intelligences**

One of the world's most well-known psychologists, Dr. Howard Gardner from Hayward University identified nine different intelligences that individuals exhibit while learning (Gardner & Moran, 2006). The basic aim of this theory was to encourage educators to employ different teaching skills that engage learning through different intelligences: Musical Rhythmic Intelligence (enjoys sound and music), Linguistic Intelligence (good with words and language), Mathematical Intelligence (logical and critical thinkers), Interpersonal Intelligence (sensitive to others), Kinetic and Bodily Intelligence (bodily motions), Spatial Intelligence (visual), Intrapersonal Intelligence (deep understanding of self), Auditory intelligence (learning through listening) and Verbal/Linguistic intelligence (learning through reading and writing). There are different techniques through which Multiple Intelligences can be effectively and efficiently used to enhance student learning of vocabulary. For example, the teacher may present the material to students who may choose to create either personal family tree story books with the pictures (verbal, intrapersonal, visual), chant or sing about their own family (musical) or encourage students to a role play with who can discuss present their family (interpersonal, verbal, kinetic).

The educational research exploring issues related to academic achievement or success has moved beyond the issues of prior academic achievement and intelligence. There are many learning related concepts such as achievement motivation and academic control that have been a focus of attention in an attempt to determine the factors which affect the learning related performance (Cassidy & Eachus, 2000). One main concept that has offered some important insight in learning is learning styles. General acceptance exists in terms of the matter in which students choose to approach a certain learning situation that has a major impact on the achievement and performance of learning outcomes.

MI offers alternative classroom teaching methods. These methods have been put into educators hands for the purpose of creating a variety of educational programs for the different learners (Shore, 2004) Moran, Kornhaber, and Gardner (2006) explain why MI is an effective way of teaching and a sufficient strategy of evaluation, labeling and planning education programs. The three researchers compared their research building a successful education to building with LEGO's. Building with one type of LEGO will not create any balanced shape. Therefore, it requires the use of all shapes and colors to create something successful and

beautiful “If we have only one kind of block to play with, we can build only a limited range of structures.” (p.26). The authors show how the limited resources and tools available to teachers combined with the growing number of students in the classrooms, produces a situation where the limited numbers of teachers find it difficult to cater to the individual abilities and needs that each student presents. The article addresses these problems. The educational system tends to employ more teachers that focus on areas that are nonacademic resulting in limiting at least half a day resources that are not measured by standardized testing. These certain limitations cause teachers to becoming responsible for classes that are 30 or more students and responsible for over 125 students. Developing certain skills such as of linguistic and logical-mathematical intelligences happened at the expense of the other abilities. Over 71% of school districts are reducing time spent on other subjects such as social studies to focus on reading and math. In addition, 60% of school districts require a certain amount of time spent on reading especially in elementary schools.

Saricaoglu and Arikan (2009) conducted a study testing the MI of 144 university students; 78 female and 66 male. The students’ MI was being measured by Armstrong’s (1994), Likert-type scale with 70 items measuring types of intelligences that assessed the seven learning abilities. Research results revealed that the logical mathematical intelligence had the highest mean of (3.88), followed by spatial intelligence mean of (3.67), bodily-kinesthetic mean of (3.66), interpersonal intelligence mean of (3.61), and intrapersonal intelligence mean of (3.54). The two intelligences with the least results were linguistic intelligence mean of (3.19) and musical intelligence mean of (3.18). In this study, gender also played a role. Although results were very close, female results were slightly higher than male results. The only intelligence that the female results were notably different than the male results was the linguistic intelligence ( $p < .02$ ).

In 2017, the researcher conducted research for a university Research and Advocacy course. The researcher examined the use of differentiated instruction (DI) in fourth grade grammar lessons and the impact DI activities would have on student learning in a highly diverse classroom. The class consisted of 25 students with different learning preferences. The purpose of introducing differentiated instruction was to tailor the learning process for each student as much as possible. First, the learning styles of these students had to be determined. An existing tool already developed for this purpose: the Multiple Intelligences Survey (Pearson, 2010) was used to determine the preferred learning style for each student as a pre-assessment. Observations included improvement in students’ behaviors, an increase in students’ achievements and an increase in students’ classroom engagement. Students’ achievements included results from student group work and student quizzes that were compared with previous results and showed improvement from past results. The students managed to use their skills successfully in their work with a high level of creativity. Group work was the most successful part of the lesson according to their engagement, participation and rubric results for group work for both lessons.

All students showed a minimum of 0.50 improvement from their previous learning through a non-differentiated lesson given prior to the AR differentiated lessons. Even though the beginners’ group demonstrated the least amount of improvement compared to the other groups, the improvement level range between 0.50 and 2.00, it still counts as a major improvement. The first intermediate level improvement ranged from 2.00 to 2.33, the second intermediate group improvement averaged between 1.50 and 2.33 with three remaining a high 10/10 on the DI quizzes. The third intermediate group all improved by a high of 2.33 all at the high of 10/10 on the DI quizzes and finally advanced group showed an improvement of 2.17 and 2.33 before and

after DI with 4 out of 5 students receiving 10/10 on both DI quizzes. This suggests that the beginners benefited the most on the written quizzes from the activities allowing them to choose their learning styles. Those that benefited the least number of points were the advanced and intermediate students showing improvement of 1-2 points at best. The advanced students had learning styles rewarded by school systems Verbal/Linguistic, Interpersonal/Social. All students gained or remained at perfect levels so DI would still be preferred to keep education interesting and to reach those students having lower scores prior to DI activities.

### **Significance of Building Vocabulary**

Building English vocabulary is significantly needed for communication purposes. Vocabulary is needed to read and understand newspapers, short stories, articles or even books. English vocabulary helps students build other skills such as writing shopping lists, school assignments, daily dairies and reports. Listening skills also highly depend on vocabulary for native and non-native speakers who listen to the news broadcasts, watch TV, make orders or go shopping. Armstrong, (2009) indicates that from teacher perspectives, oral communication skills are considered difficult to develop in students. He found that the reason of some of these difficulties with speaking lie behind the lack of native speaking environments and the apprehension of learners. He recommended that using the alternative strategies that are based on brain instruction and various intelligences, aptitudes and abilities may help develop the vocabulary skills needed for students.

Visser, et.al, (2006) found that having a strong vocabulary background creates fundamental skills that allow a person to enjoy life. Having a strong vocabulary covers a wide range of ways to enjoy life such as engaging social activities including a simple conversation to formal speaking. Speaking well with good vocabulary for English language learners (ELL) generates a good impression. Developing communication skills through vocabulary instruction is considered one of the most significant sources of motivation for ELL's. Therefore, vocabulary instruction plays a vital role in communication. There are also important linguistic activities that help in developing speaking skills. Shearer, (2004) suggests that building a strong vocabulary is an important linguistic activity in becoming a better communicator.

Goals for learning listening skills are similar to those of the speaking skills. Listening skills are a complicated skill that involves different processes or operations working together. Speaking involves social, cultural, psychological and different cultural components. ELL's have to learn how to use their vocabulary in the right situation. Shearer, (2004) talks about the difficulties that teachers and students have using the proper vocabulary for the right situation. He found that learning and teaching vocabulary in English language classrooms is a significant problem especially ELL's. Teaching techniques and strategies need to be improved to develop better vocabulary instruction. Student's passive attitude is a significant problem and became a major obstacle for educators to teach vocabulary effectively. He also indicates that there are some psychological factors also involved that become obstacle for student to learn vocabulary.

Nolen, (2003) revealed the importance of educators needing to focus on the enrichment of their students through vocabulary through speaking. The more speaking practice L2 students get, the more in helps transfer an L2 student to the L1 language. In French speaking L1 classrooms and English speaking L2 classrooms, students have minimal exposure to the English vocabulary. English is only practiced inside the classroom which requires intensive practice to reach a certain level of English literacy.



### Teaching Vocabulary Instruction through Multiple Intelligences strategies

Moran, Kornhaber, and Gardner (2006) indicate that if students are partnered with other students that are learning English and L2 to L1 transitioning, their learning process becomes faster. Creating such an environment is a learning strategy that educators propose to help ELL's improve. Students being independent learners and choosing the techniques that work best for their learning abilities is called Multiple Intelligences (MI). Gardner's theory of MI helps reduce the dominance of researchers for the sake of their learners. This theory indicates that educators have to discuss the positive strengths of children and create appropriate learning styles that are effective for the individual ELL.

There are different studies investigating the positive effect of using multiple intelligence based instruction from teachers to students to developing vocabulary. Shearer (2004) conducted a 2-phase pilot study (2004) on the effect of multiple intelligences assessment to facilitate teacher development (MIDAS). During the first phase, Shearer was capable of gathering research over a period of seven years. The results gathered on studying adults and college students learning illustrated that the highest mean scores for the students with the linguistic ability were the creative writing students and the students with the lowest mean scores for the same ability were the math groups. Shearer's second phase investigated the effect of implementing MI in classrooms by teachers. This phase was facilitated over the course of one year in collaboration with several teachers from several public school districts. Results indicated that the program had a great effect of the building students' abilities and results in a difference between pre- and post-administration of the test on teachers' and students' abilities. The results also indicated that learning MI implementation provides students and teachers with a richer learning environment.

Another study (Fogarty & Stoehr, 2008) investigated the effectiveness of using MI in vocabulary development on preparatory school first graders. They revealed that the implementation of this program created positive results and proved its usefulness in developing first year preparatory graders for their next stage.

Armstrong, (2003) also investigated the use of strategy-based multiple intelligences to develop and assess the vocabulary skills. The sample of his study was second year primary school students. The study instrument was a training program (student books and guidance from teacher); a scale for multiple intelligences became a checklist for the study that showed training program usefulness based on the theory of multiple intelligences.

Research on teaching vocabulary through MI is limited in university-level students. However, Ruddell (2005), talked about teaching vocabulary to adults through a self-collection strategy (SCS) saying that new words help promote "long-term acquisition and development of the vocabulary of academic disciplines" with the goal of incorporating "new content words into students' working vocabularies" (Ruddell, 2005, p. 166).

Effective methods that help children learn new vocabulary could be through different reading strategies according to students' learning abilities. No one specific strategy is considered a "good" or "bad" strategy. What is effective for one reader is not necessarily effective for other readers (Kern, 1997). Certain strategies have been proven to be effective. These include prediction, text structure recognition, vocabulary, and activating schema by discussing students' knowledge of topics (Farrell, 2005). "Bottom-up" and "Top-down" strategies must be taught for EFL/ESL students to become proficient readers (Carrell, Pharis, & Liberto, 1989; Palinesar & Brown, 1989). While bottom-up deals with letters and words to extract meaning from the text, the top-down processes deal with prior knowledge, experiences, and various other strategies such as inference and prediction. "Deep reading" is another strategy that gives intense practice with

syntax and vocabulary used in various topics. “Subtechnical” vocabulary that relates to the specific field or subject is provided to students to dig deeper into the topic (Cowan, 1974).

It may be common sense that the more time educators spend in word exposure strategies, the faster the increase in students’ English literacy occurs. A study by Armstrong, (2003) shows that repeated exposure of the same words being learned is necessary to becoming familiar with them and that any word has to be heard several times before acquiring it. Unfortunately, repeated exposure to new vocabulary is either stopped or ignored because of the thought of repetition causing confusion in a student’s mind. (Armstrong, 2003).

### **Onion Model**

One method in which the cognitive or learning style can be measured is compared to the layers of an onion as a model for learning behavior (Curry, 1983, 1987). Initially three layers were proposed but later on a fourth layer was included called the social interaction. An instructional preference which is the outermost layer is the preferred choice of an individual for a learning environment. It is the most observable layer and also most vulnerable to influence. The social interaction is the next layer which relates to the preference of individual for the social interaction at the time of learning. The third layer is the information processing style and is referred as the intellectual approach of individual to process the information. The last layer is the cognitive personality style and is considered as the most robust style which is a relatively permanent dimension of personality. It is apparent only when behavior of an individual is observed in various learning situations. All these layers must be taken into account for teaching a subject effectively to individual learners.

### **Fundamental Dimensions**

A broad categorization of the style has been proposed based on the two fundamental levels which represent the way information is represented and processed. They are verbalizer-imager and holistic-analytic (Riding & Cheema, 1991). The dimension of holistic-analytic refers to the manner in which individuals process information as a whole or as being broken into parts. This dimension is mainly associated with terms like creative, diffuse, informal, divergent, unconstrained, expansive and inductive for holistic (synthetic, critical, formal, convergent, constrained, rigorous) and deductive for analytic (Riding & Cheema, 1991).

The dimension of verbalizer-imager explains the degree to which the individuals represent information as images or words. There are many models of cognitive style which can be placed in these dimensions (Riding & Cheema, 1991). It has also been emphasized that the styles which are identified are not based on heavy empirical work and attention has been given to only small number of styles. Though very little research has been done on some styles, they can be placed in these main categories. These two basic cognitive styles exist independently and are not dependent on one another (Riding & Cheema, 1991). The table for the various models is present in Appendix.

## **Chapter III: Methodology**

### **Research question**

"What effect does teaching Vocabulary Instruction using Multiple Intelligences strategies have on highly-diverse university-level students?"

### **The diversity of the participants**

The participants of this research consisted of two groups; the control group and the research group. The control group was the group in which standard teaching methods would be used in the lesson and the research group was the group in which multiple intelligences (MI) would be applied to their learning. The first group was the control group that consisted of 15 students; two from Nigeria (both females), one from Syria (female), two from Jordan (one male and one female), two from Palestine (both males), five from the United Arab Emirates (three males and two females), two from Egypt (one male and one female) and one from Iraq (one male). The second group was my Action group (Experimental group) that consisted of 15 students; one from Somalia (one male), seven from the United Arab Emirates (five males and two females), three from Jordan (two males and one female), one from Palestine (one girl), one from India (one male) and two from Syria (one male and one female). Gender was also a contributing factor in learning. Males and females learn differently which was analyzed in this research. The students ranged in age from 18-22 years old.

### **The environments from which the student's came were different.**

There are significant steps that needed to be taken in order to gather information on students' backgrounds. Based on university policies, all students are required to fill out a student information form upon entrance. As a result, I requested permission to look at these forms from the admissions department. My request was granted for this research. Student's background results revealed that the majority of the students come from wealthy families. However, there were two students from each group who were refugees. Refugees have stories to tell and might be affected physically and mentally in their learning process throughout the years. Their past learning situations might affect their current learning situations. The environment in which a person grew up is a factor that will be a positive or negative affect. The questions in the student information form that were included contribute and influence students' learning abilities are:

- Where are you from and where did you grow up? Depending on the country and the environment, students could be adapted to certain learning strategies or in some countries no strategies at all. Some students might be coming from countries that were living in extreme circumstances such as war. In such circumstances, students could be mentally damaged and learning will be a challenge.
- How many languages do you speak? Speaking two or more languages at home could either delay the students learning process at school or help them learn faster depending on the languages learnt and how often they were spoken.
- What language do you speak at home? If the language spoken at home is not English, student's efforts to speak and learn the language at school should be developed.
- Why do you want to learn English? Students' motivations make a big difference in their learning process. The more motivated, the more effort and the more time students put into learning, the faster they will learn. However, when students are less motivated, the teacher has to put more effort into developing the right strategies that get students interested and more motivated to learn.

The diversity of learning styles is determined by a Multiple Intelligence Survey. For the purposes of this research, the following categories will be used: Verbal/Linguistic intelligence (VL) for students who learn best through reading and writing; Visual/Spatial intelligence (VS) for students that are visual learners; Bodily/Kinesthetic (BK) for students who learn through bodily motions; Linguistic (L) for students who learn through words and language; Auditory intelligence (A) for students who learn through listening; Interpersonal intelligence (IE) student

for students who are sensitive to others; and Intrapersonal intelligence (IA) for students who have a deep understanding of self.

### **Action/intervention**

There were two vocabulary lessons a week for the duration of eight weeks. Each class lasted one hour. Both groups received the same amount of instruction time. The Action group was taught based on their intelligences and the control group was taught through traditional instruction. Lessons were tailored based upon the students English proficiency level. Lessons included a charades game, cutting and pasting, classroom discussions, writing, observations, drawing and listening. On the other hand, there was the control group. Each lesson included the same activities done by all students. Some of the activities were done individually such as the pre-tests and post-tests. Some were done in groups such as the classroom worksheets and book exercises, and some were done in pairs such as writing up sentences that best describe the vocabulary learned. However, there was no differentiation in the control group lessons. The final assessment for each vocabulary lesson was the same for all students and they didn't have a choice in how to demonstrate their answers. The tests were a group of sentences, and the students had to fill in the blanks with the correct answers.

### **Stage one**

The lesson began with a Multiple Intelligence Survey describing the ways the students learn. Craig Ferch, School Psychologist at the Shawano School district in WI constructed many different Multiple Intelligences Surveys that determine the diversity of learning styles. The MI survey constructed for adults is based upon Howard Gardner's eight learning styles. This survey took the students about 20-30 minutes to complete. This was done prior to the beginning of the first class. I read the students the questions out loud and briefly explained to them in order to save time. In the meantime, I devised a grid on which I placed the names of the students, the 7 categories of learning and lastly highlighted the top two scores for each student. The Multiple Intelligences survey helped determine the different learning preferences that might work best for each individual in this diverse class. The following day, I analyzed the results and the top categories of learning. The lessons were included, and these learning options were based on the results. The activities in each lesson are shaped based on the survey results.

### **Stage two**

Throughout the course of these eight weeks, I experimented with teaching vocabulary using strategies that addressed the different Intelligences. For both the Action group and the Control group, each week consisted of two lessons. For the Action group, the first lesson of each week consisted of a pre-test of their knowledge of the ten new vocabulary words for that week. Students checked the box whether they knew the word, heard of the word or haven't heard the word at all. After that, the teacher talked about the words individually, introduced images, sentences and then grouped the students for activities. The class consisted of three groups. Each group had students demonstrating the different abilities. In the second lesson, students were required to be in groups that included introducing differentiated activities that showcased the individual abilities in the classroom. At the beginning of these lessons, I gave the students a Vocabulary Rating Chart to fill out that included four categories; one column for the word, one column for the whether or not they know the word, one column for whether or not they have seen the word and one column for whether or not they know the word. The students checked the

box that described their knowledge of the word. The chart took approximately five minutes to complete. After the students completed this task, the lesson began. I asked the students to orally tell me what vocabulary words they knew and gave me examples from their own lives. The conversation continued while I wrote some of the familiar vocabulary on the board. I explained one word at a time, showed them pictures and gave them examples. I divided the students into three groups asking each group a set of questions that involved their homes and asked them to converse with each other. In the meantime, I went around the groups recording in my observations in my journal. (who did the most talking, who might have been listening rather than talking, who asked questions, who seemed confused and so on) The second class of each week included a post-test activity sheet. The activity sheet included five questions that were differentiated according to the different abilities; writing a sentence, cutting and pasting, playing a game of charades in pairs and observing student learning. The following weeks included similar activities.

The control group was also given the same Vocabulary Rating Chart at the beginning of the first lesson of each week. However, the post-test was standard for all students. There was a table with the words that were taught and ten sentences that required the students to fill in the correct vocabulary word.

- a. During this time, all observations were recorded in a journal. The purpose of the journal included recording the results of using their abilities, keeping record of the students' achievements, responses, reactions and any difficulties any of the students might have had.
- b. Students were assessed through pre-assessments, post-assessment, observation of group work, grade scale for quizzes, and a self-assessment rubric. The activities were differentiated according to their abilities.

### Stage three

Students worked in groups during the lessons to see how the combination of methods and abilities were effective or ineffective; combining qualitative and quantitative results from pre-surveys/post-surveys and the observations were considered to calculate the results. Group work observations, performance results and written work of the students were all part of the results. The research consisted of results from assessments consisting of factual questions, behavioral questions and attitudinal questions. Through group work, each individual should be able to demonstrate their work adequately through their own ability. The purpose of the classroom observations was to record the effectiveness or ineffectiveness of the use of mixed abilities on their learning outcomes. Students' performances and written work would assist in attaining clearer results of the students' learning abilities and whether they were improving or not using these strategies and abilities.

All tactics of mixed abilities were tested individually. Students were tested individually on the pre-tests and performances on their classroom activities and tasks. The students were also asked to work together in groups, and their work was assessed based on researcher's observations based on how well they performed, their classroom discussions, their questions, and their difficulties and how well they handled the task. At the end of each week, the students were asked to choose from a list of five questions to demonstrate their knowledge of the 10 vocabulary words learned that week. Some chose to work alone, and some chose to work together. However, they were assessed on this post-test based on their individual work.

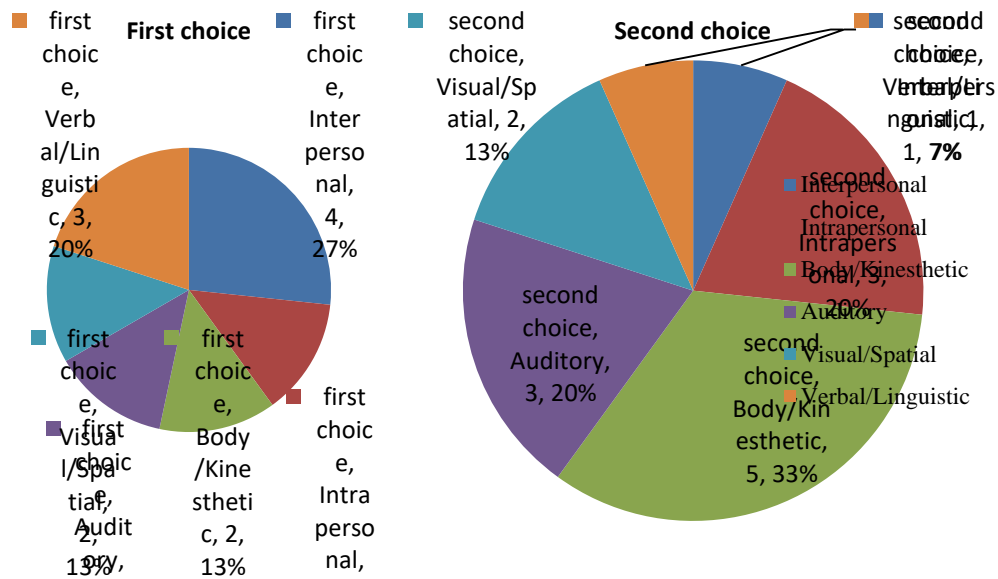


- The results of students’ progress were displayed in graphs that included the multiple intelligences survey results and the comparison results between the pre-tests and post-tests for both the reach group and the control group. After evaluation, methods which worked best were chosen by comparing these methods to each student’s multiple intelligence survey on their learning styles given to them before beginning these lessons.
- The journal was a report on all the students’ achievements and the exploration of the research process to understand the students’ learning abilities better.
- The students’ achievements and the results of all group work (research group and control group) were recorded throughout the lessons in tables showing the average improvement during each week. Results were compared to the beginning MIS self-report survey. A final evaluation about the consistency of choices made by each student in each group was compared to the level of achievement of objectives to determine if the differentiated strategies achieved more effective learning.

### Chapter IV: Results and discussion

Before beginning any lessons for the action research project, students were given a Multiple Intelligences (MI) survey. The MI survey contained a group of different skills along with their definitions for the students to choose their preference in learning. The highest score on the survey was 40 points. In the end, the highest two choices for every student were taken from each survey. Figure 1 demonstrates the results of the first highest and second highest results for the chosen abilities by the students in the research group only. The learning abilities that received the highest points for both choices were: Interpersonal (IS), Intrapersonal (II), Body/Kinesthetic (BK), Auditory (A), Visual/Spatial (VS) and Verbal/Linguistic (VL).

Figure 1: Multiple Intelligence Survey Results



	<b>First choice</b>	<b>Second choice</b>
<b>Interpersonal</b>	4	1
<b>Intrapersonal</b>	2	3
<b>Body/Kinesthetic</b>	2	5
<b>Auditory</b>	2	3
<b>Visual/Spatial</b>	2	2
<b>Verbal/Linguistic</b>	3	1
<b>Total</b>	15	15

The results of the MI survey show the students becoming more independent and more responsible by choosing their own activities; leadership and cooperative skills have emerged and increased; students achievement throughout the lessons have also improved significantly compared to the use of standardized teaching methods. The MI results for all students have been gathered and used to prepare the lessons according to their abilities and help reinforce student learning through the skills chosen by each of the students. Overall, the choices made by the students showed true reflection of how they want to learn. According to the MI survey results, the majority of the students made choices in their activities that chose the way in which they wanted to execute their work and demonstrate their understanding of the lesson. However, not all chose the activity that demonstrated their learning ability. Some ended up making poor choices.

Gathering the qualitative and quantitative data began from the first day of teaching vocabulary. Students from both groups (the research group and the control group) were asked to fill out a pre-test on their vocabulary knowledge of the 10 new words that they were going to learn weekly throughout the eight weeks of this research study. The pre-test was a table that contained all 10 vocabulary words including three answers; know, have seen or don't know. After gathering all results into the table, lessons and activities began. Each lesson was differentiated according to students' abilities allowing students to demonstrate what they have learned through multiple intelligences.

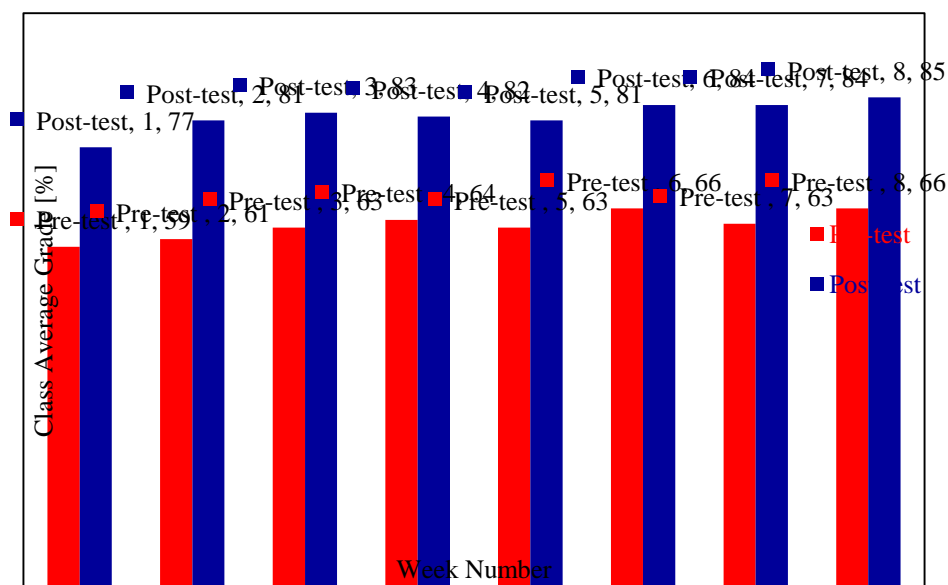
During the eight weeks, the action research group students were grouped according to their learning ability of their choice. There were three groups; five students with different abilities in learning in each group. Each given assignment incorporated different tasks for the different types of learners and abilities; VS, BK, IS, II, A, VL. The tasks for each group included students who were cutting out pictures, labeling them using the vocabulary word learned, students who participated in class discussions, those who lead class discussions, those who enjoyed writing sentences, those who enjoyed acting out their words, those who learned by listening, those who learned by observing others, those who enjoyed visuals and those who enjoy learning through drawing their words. The activities tested their mixed intelligences. The main focus of the activity, however, was for the students to grasp an understanding of new vocabulary words in their own ways. Outcomes of students' performances were recorded through classroom observations.

The results of the classroom observations for the research group and control group demonstrated a big learning gap between learning through standardized teaching strategies and the use of multiple intelligences. Furthermore, during the eight weeks of vocabulary instruction, the researcher gathered classroom observations on each of the students including notes for lesson one and two of each week. The majority of the students from the research group demonstrated

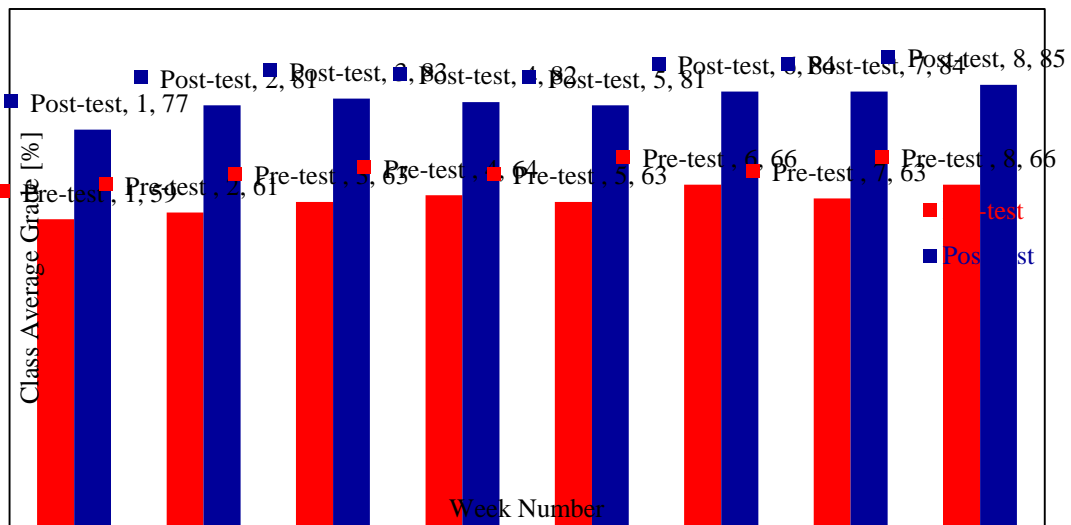
improvements and interest in learning. However, not all students showed interest or understood the tasks. There were two students that did not show much interest or participation in classroom discussions and one student that was unsure of his role in participating in the classroom activities. In the end, the hesitant student showed some interest by asking questions and trying to complete the task. On the other hand, the control group did not show as much interest or improvement in learning their vocabulary. Engaging the students in classroom discussions was difficult and challenging. There were several students that were yawning and showed signs of boredom such as doodling in their notebooks and continuously checking their watches. The students that were engaged in the classroom discussions and performed well on the classroom activities were the students that originally had mid-high vocabulary knowledge prior to the beginning of the class. The students that had little-no vocabulary knowledge prior to the beginning of the class were lost, confused and frustrated. Many of them would give up asking questions after the third week of vocabulary instruction.

At the end of each week both the research group and the control groups completed a post-test demonstrating their knowledge of the 10 new words they learned that week. The post-test for the research group included 5 questions; write a sentence using each word, cut and paste a picture that defines the word, playing a charades game in pairs where one student is acting and the other is guessing, observing and discussing and drawing a picture that best describes the word. Each question demonstrates a certain learning ability. The control group, however, received a standard test that all students had to answer. The test included ten sentences and the question was to fill in the blanks with the correct vocabulary word in the above box. The results of the pre-tests and post-tests for the eight weeks for the research group are shown below in figure 2 and the results for the control group pre-tests and post-tests and demonstrated in figure 3.

**Figure 2: Comparison of research group results of pre-test and post-tests**



**Figure 3: Comparison of control group results of pre-test and post-tests**



The qualitative results for this research study also included the average improvement of both groups (research group and control group) in their pre-test and post-test results. The minimum improvement in grades between the pre-tests and post-tests for the research group throughout the eight weeks of research was 27% in week 6. The maximum improvement was 34% in week 2 averaging the improvement throughout all eight weeks to a 30% improvement as shown below in table 1. Only one student in this group did not show much improvement. However, the majority demonstrated positive results and a lot of improvement in their learning. Students showed interest in choosing their activities and this reflected positively throughout the observations and tests. Being able to demonstrate personal understanding of one’s own abilities to learn allowed students to demonstrate creativity, leadership and skills. Students were highly engaged in classroom discussions and the majority enjoyed taking control of their own learning. They shared ideas with one another, and group work was highly effective allowing the students to complete each other’s ideas.

**Table 1: Average improvement between pre-tests and post-tests for research group**

	Pre-test	Post-test	Average
<b>Week 1</b>	5.93	7.67	29 %
<b>Week 2</b>	6.07	8.13	34 %
<b>Week 3</b>	6.27	8.27	32 %
<b>Week 4</b>	6.40	8.20	28 %
<b>Week 5</b>	6.27	8.13	30 %
<b>Week 6</b>	6.60	8.40	27 %
<b>Week 7</b>	6.33	8.40	33 %
<b>Week 8</b>	6.60	8.53	29 %
<b>Overall improvement average of all 8 week</b>			<b>30 %</b>

As for the control group, the minimum improvement in grades between the pre-tests and post-tests throughout the eight weeks of research was 9% in week 7 while the maximum improvement was 24% in week 2 averaging the improvement throughout all eight weeks to an 18% improvement as shown below in table 2. Over half of the class demonstrated little or no interest in learning vocabulary in the control group. Students were not participating much in classroom discussions and were lacking interest in completing tasks. Participation and engagement in classroom discussion were mainly by the students who scored highest in the pre-tests and were good listeners. However, not many students were auditory learners based on my observation.

**Table 2: Average improvement between pre-tests and post-tests for control group**

	Pre-test	Post-test	Average
Week 1	5.80	7.20	24 %
Week 2	6.33	7.73	22 %
Week 3	6.67	8.13	22 %
Week 4	6.60	7.80	18 %
Week 5	6.60	8.00	21 %
Week 6	6.93	8.13	17 %
Week 7	7.53	8.20	9 %
Week 8	7.00	7.93	13 %
<b>Overall improvement average of all 8 week</b>			<b>18 %</b>

At the end of the eight weeks of vocabulary instruction, students were given a self-assessment rating chart. The self-assessment rating rubric included six statements that demonstrated their self-assessment of how well they thought they have learned their vocabulary throughout the eight weeks of classes. Students were asked to rate their learning on a scale of 0-5; 5 indicating the best learning outcome possible and 0 indicating not at all. The statements on the rubric included the following: learning new content words, learning words on their own, using their word knowledge in their reading, using their words in discussion, using word knowledge in their writing and increasing their word knowledge. The average results of this self-assessment for the research group students was a 3.8/5 and a 3.29/5 for the control group. Although the average results from the research group were higher, there was not a significant difference. This could indicate that implementing what had been learned was not as easy as it may have seemed throughout the lessons and that transitioning from L2 to L1 is more difficult than just a few activities. These results lead to the belief that second language acquisition requires much longer than 8 weeks of proper differentiating in lessons. Although implementing multiple intelligences in everyday student learning process demonstrates improvement in learning, there are other factors to consider in ascertaining an effective learning environment.

## Chapter V: Conclusion

The strengths and weaknesses of learning styles can affect the achievement and success of the tasks. It is important for students to know their own strengths and weaknesses and how to use their strengths to compensate for their weaknesses. There are tools available that can be used for assessing these learning styles. These tools can help in providing clues to the personal styles



and are preferences rather than abilities or traits. The students should also learn to cope with different learning environments and how to generalize or modify these strategies to adapt to new situations. To use the appropriate strategy, one must have knowledge of that strategy, when to use it, and how to determine its success (www-tc.pbs.org).

When there is a mismatch in the learning and teaching styles, the students became discouraged, inattentive and hence perform poorly. As a response, the teachers become very critical and consider the poor scores as low ability (www-tc.pbs.org). Therefore, it is important for teachers to identify the teaching and learning styles and the methods to address these different learning strategies through their teaching. They should start using differentiated instruction which meets the needs of individual students. Flexible assessing and teaching helps the learners who utilize standards-based learning products and methods (www-tc.pbs.org).

Different strategies of teaching using Multiple Intelligences can improve vocabulary learning in students. Teachers can use several ways that help the readers to comprehend vocabulary more easily. Multiple intelligence-based instruction is becoming an effective way to learn vocabulary through focusing on the individual differences among students. This process also involves changes in the teacher role from being the lecturer to the facilitator, which enhances student success in life.

### References

- Armstrong, T. (2009). Multiple intelligences in the classroom. Alexandria, VA: Association of Supervision and Curriculum Development
- Carrell, P.L., Pharis, B.G. & Liberto, J.G. (1986). Metacognitive Strategy Training for ESL Reading. *TESOL Quarterly*: 23, 4, pp. 463-494.
- Cassidy, S. & Eachus, P. (2000) "Learning style, academic belief systems, self-report student proficiency and academic achievement in higher education". *Educational Psychology*, 20, 307-322.
- Cowan, J.R. (1974). Lexical and syntactic research for the design of EFL reading materials. *TESOL Quarterly*, 8(4), 389-400.
- Curry, L. (1983). An organization of learning styles theory and construct. ERIC document no. ED 235 185.
- Curry, L. (1987). Intriguing concepts of cognitive or learning style: A review with attention to psychometric standards. Ottawa, ON: Canadian College of Health Service Executives.
- Donnelly, R and Fitzmaurice, M. (2005). Designing Modules for Learning. In: Emerging Issues in the Practice of University Learning and Teaching, O'Neill, et al. Dublin : AISHE.
- Eccles, J., Midgley, C., & Adler, T. (1984). Grade related changes in the school environment: effects on achievement motivation. *Advances in motivation and achievement*, vol 3 (pp. 284-331). Greenwich, Conn.: JAI Press.
- Farrell, Thomas (2005) Teaching Reading Strategies: 'It Really Takes Time!' (pp. 71-81) SEAMEO Regional Language Center: Republic of Singapore.
- Fogarty, R., & Stoehr, J. (2008). Integrating curricula with multiple intelligences: Teams, themes, & threads. Thousand Oaks, CA: Corwin Press.
- Freeman, D. J., Kuhs, T. M., Porter, A. C., Floden, R. E., Schmidt, W. H., & Schwillie, J. R. (1983). Do textbooks and tests define a natural curriculum in elementary school mathematics? *Elementary School Journal*, 83(5), 501-513.
- Gardner, H. (1991). *The Unschooled Mind: How Children Think and How Schools Should*

- Teach. New York, Basic Books.
- Gardner, H. (1993). *Multiple intelligences: The theory into practice*. New York: Basic Books.
- Gardner, H., & Moran, S. (2006). The science of multiple intelligences theory: A response to Lynn Waterhouse. *Educational psychologist*, 41(4), 227-232, retrieved from: [http://www.tandfonline.com/doi/abs/10.1207/s15326985ep4104\\_2](http://www.tandfonline.com/doi/abs/10.1207/s15326985ep4104_2)
- Gay, G. (2000). *Culturally responsive teaching: Theory, research, and practice*. New York: Teachers College Press.
- Graves, M. F. (2007). Vocabulary instruction in the middle grades. *Voices from the Middle*, 15(1), 13–19.
- Hawkins, David (1965). Messing about in science. *Science and Children*.
- Henry, Peter. (2007). The case against standardized testing. *The Minnesota English Journal*. 43(1). Retrieved Jan. 30, 2012. <http://www.mcte.org/journal/mej07/3Henry.pdf>
- Holmes, E. S. (2009) “Standardized Testing and the No Child Left Behind Act: A Failing Attempt at Reform”. Data retrieved from [http://www.ecu.edu/cs-lib/reference/instruction/upload/Sarah\\_Holmes\\_First\\_Place.pdf](http://www.ecu.edu/cs-lib/reference/instruction/upload/Sarah_Holmes_First_Place.pdf) on October 3, 2013
- “How can different learning styles be addressed with consistent expectations?”. Data retrieved from [http://www-tc.pbs.org/teacherline/courses/rdlal30/pdfs/edth\\_learning\\_styles.pdf](http://www-tc.pbs.org/teacherline/courses/rdlal30/pdfs/edth_learning_styles.pdf) on October 3, 2013
- Howard Gardner’s Theory of Multiple Intelligences. Northern Illinois University, Faculty Development and Instructional Design Center. [http://www.niu.edu/facdev/resources/guide/learning/howard\\_gardner\\_theory\\_multiple\\_intelligences.pdf](http://www.niu.edu/facdev/resources/guide/learning/howard_gardner_theory_multiple_intelligences.pdf)
- Human Development Report. (2013). *The Rise of the South: Human Progress in a Diverse World*. United Nations Development Programme: One United Nations Plaza. New York, NY 10017
- Kern, R.G. (1997) L2 Reading Strategy Training: A Critical Perspective. Unpublished paper presented at the AAAL Conference, Orlando, Florida, March 10, 1997.
- Kornhaber, M. L., Fierros, E. G., & Veenema, S. A. (2004). *Multiple intelligences: best ideas from research and practice*. Boston: Pearson/A and B.
- Ladson-Billings, G. (1994). *The dreamkeepers: Successful teachers of African American children*. San Francisco: Jossey-Bass.
- Ladson-Billings, G. (2001). *Crossing over to Canaan: The journey of new teachers in diverse classrooms*. San Francisco: Jossey-Bass.
- Mulroy, H., and Eddinger, K. (2003). *Differentiation and literacy*. Paper presented at the Institute on Inclusive Education, Rochester.
- National Reading Panel (2000). *Teaching children to read: An evidence-based assessment of scientific research literature on reading and its implications for reading instruction*. Bethesda, MD: National Institutes of Health.
- Nolen, J. L. (2003). Multiple intelligences in the classroom. *Education*, 124(1), 115-119.
- Riding, R. J. & Cheema, I. (1991). Cognitive Styles: An overview and integration. *Educational Psychology*, 11, 193-215.
- Ruddell, M. R. (2005). *Teaching content reading and writing (4th ed.)*. Hoboken, NJ: Wiley.
- Saricaoglu, A., & Arikan, A. (2009). “A study of multiple intelligences, foreign language success and some selected variables”, in *Journal of Theory and Practice in Education*, 5 (2):110-122.

- Shearer, C.B. (2004). Using a multiple intelligences assessment to promote teacher development and student achievement. *Teachers College Record*, 106(1), 147-162.
- Shore, J. R. (2004). Teacher education and multiple intelligences: a case study of multiple intelligences and teacher efficacy in two teacher preparation courses. *Teachers College Record*, 106(1), 112-139.
- Steele, C.M. (1997). A threat in the air: How stereotypes shape, intellectual identity and performance. *The American Psychologist*, 52, 613–629
- Tomlinson, C. A. (1999). *The differentiated classroom: Responding to the needs of all learners*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Tomlinson, C. A. (2000). *Differentiation of instruction in the elementary grades*. Reston, VA: ERIC Digest. (ERIC Document Reproduction Service No. ED443572)
- Tomlinson, C. A., and Kalbfleisch, M. L. (1998). Teach me, teach my brain: A call for differentiated classrooms. *Educational Leadership*, 56(3), 52-55.
- Tuttle, J. (2000). *Differentiated Classrooms (Report)*. Woodbury: Cedar Mountain Academy.
- Triplett, C. F., & Barksdale, M. A. (2005). Third through sixth graders' perceptions of high stakes testing. *Journal of Literacy Research*, 37(2), 237-260.  
doi:10.1207/s15548430jlr3702\_5
- Visser, B.A., Ashton, M.C., & Vernon, P.A. (2006a). Beyond g: putting Multiple Intelligences theory to the test. *Intelligence*, 34, 487-502.