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Brain Compatible Teaching and Learning Classroom Practices for Secondary English Learners

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Abstract

The changing demographics in today's classrooms continues to influence school practices and programs as accountability for academic achievement of all students continues to grow. The number of students who speak another language other than English continues to grow exponentially along with the unique learning needs of this population. Students enter the classrooms with varying levels of language proficiency and learning needs. A newcomer student is typically defined as a student who has been in the United States less than 2 years and whose English proficiency levels on initial placement inventories result in a pre-primer or beginning proficiency level. Students that have been in country for many years and have not attained English proficiency continues to grow. Teachers must be able to incorporate learning strategies that meet the educational needs of these students. Brain compatible strategies complement the learning styles and socio-emotional needs of many of the English learners and will help them to be successful leaners.

Keywords: Bi-Culturalism, Language Acquisition, ELLs, Diversity, Culturally Responsive Teaching, Newcomer Centres, Bilingual Education

1 Introduction

English learners (Els) in secondary schools face considerable and special challenges. The cognitive and linguistic demands are greater in secondary schools. Students must be able to understand, integrate, and communicate complex concepts and expected to show their knowledge on state assessments that require advanced English skills. They have less time to catch up with their native English-speaking peers. In addition, some students entering secondary schools have little or no schooling in their native countries and thus face an even greater challenge to their academic success. The pressure to "fit in" is great for secondary students and those that stand out as "different" are many times stigmatized at a time when they need to feel part of a group (Lucas, 2000). Brain Compatible (Based) Learning is a comprehensive approach to teaching and learning based on current research in neuroscience and the brain. Neurons in the brain communicate via axons and dendrites. The axon is the sender of information and the dendrites are the receivers of information. 100 billion neurons, 30,000 neurons on the head of a pin.

The changing demographics in today's classrooms continues to influence school practices and programs as accountability for academic achievement of all students continues to grow. The number of students who speak another language other than English continues to grow exponentially along with the unique learning needs of this population. Students enter the classrooms with varying levels of language proficiency and learning needs. A newcomer student is typically defined as a student who has been in the United States less than 2 years and whose English proficiency levels on initial placement inventories result in a pre-primer or beginning proficiency level. Students that have been in country for many years and have not attained English proficiency continues to grow. Short & Boyson, (2004) identified three main categories of newcomer students: *Literate newcomers: 1)* students with on-grade-level educational backgrounds who have literacy skills and academic schooling in their own language; 2) *Newcomers with limited formal schooling* (also known as Students with Interrupted Formal Education or SIFE students): students with disrupted or weak educational backgrounds and below-grade level literacy in their own native language and 3) *Late entrant immigrant newcomers:* students who enter after first quarter or semester of the schoolyear.

2. Methods

Six newcomer programs were selected from a list of newcomer programs published by the Center for Applied Linguistics and/or recommendations by the Texas Education Agency. Permission for campus visits were secured from the school districts and a one day on site campus visit was conducted. Classroom observations were held with visits to every classroom at the newcomer centers. Interviews were conducted with faculty and administrators at the schools. Student interviews were also held as part of the visit. Additional data was collected through a survey. The survey data, interview and classroom observations were analyzed and triangulation of the data was applied to formulate the commonalities of the educational brain based practices at the two centers. As students from diverse cultures come to the U.S., it is argued that there is a sense of urgency for the creation of programs that can help English learners build academic skills and move into the mainstream of the educational system, especially at the secondary level. We must insure that these students do not become victims of an educational environment that can end up leaving certain populations of students behind. Equally as important are the implications of the socio-emotional development of the students in these programs, and how teacher practices are able to support the transition of second language learners into students that appreciate and respect their own culture and language and develop an understanding of other cultures through multicultural perspectives.

To explore the characteristics and qualities of Brain Compatible Classroom Practices, this study employed a qualitative case study design to gain an in-depth view of the practices and learning strategies that are part of the teaching and learning. The analysis of the data gathered in a naturalistic inquiry began the first day the researcher arrived at the setting. The collection and analysis of the data obtained went hand-in-hand as theories and themes emerged during the study. This process can be clearly seen through the researcher's description of the on-site visits (Harris, 1991).

The data for this article was derived through a qualitative method, including in-depth interviews with students, faculty, and program administrators as well as student survey responses from various aspects of the newcomer programs as a way to provide the researchers and readers of the research a better understanding of what occurs when newcomer English learners participate in a newcomer program as they enter Texas school systems. Interviews and observations were recorded on legal pads and I-pads, which were later transferred with data from documents to 3x5 note cards with separate units of information placed on separate cards. Data analysis occurred throughout this research project. The sources of the data were interviews, documents, nonverbal cues, and other qualitative or quantitative information pools.

This research seeks, as described by Kincheloe (2008), to construct information that will be helpful to school districts in Texas that want to establish a newcomer program to assist newcomer English learners to become familiar with their new school environment while embarking quickly on the process of learning English. Case study is regarded as a method for gaining insight to a specific situation through an up-close and firsthand understanding (Yin, 2006). Researchers involved in case studies dedicate an extended amount of time at the research site and are involved in personal contact with the activities of the case, as well as engaged in reflection and reconsideration of the meanings of the processes of the case (Stake, 2008). Case studies can provide new meanings, contributing to a deeper understanding of a field's knowledge base (Merriam, 1998).

3 Conceptual Framework

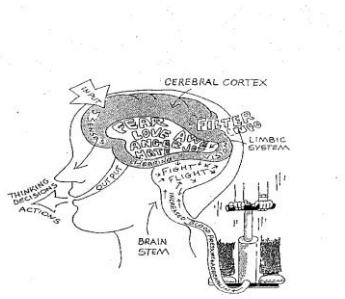
Qualitative inquiry is not a single think with a singular subject matter. Jacob (1988) has observed that the effort to differentiate the qualitative/naturalistic (holistic-inductive) paradigm from the quantitative/experimental (logical-deductive) paradigm has created the impression that there are only two methodological alternatives. However, when one looks more closely at individual discussions, the apparent unity of the qualitative approach vanishes, and one sees considerable diversity (Jacob, 1988: 16). The qualitative research's conceptual framework was developed based on the research problem, objective & question(s). The goal of the conceptual framework is to illustrate the study's research approach by way of pictorial and text forms to ease readers' understanding of the research approach. Qualitative research can produce detailed information from where one can identify a number themes and patterns. The conceptual framework was then developed by summarizing the mental images of the themes and patterns that emerged from the data. A constant comparative method of data analysis was employed (Glasser & Strauss, 1967). The constant comparative method described by Glaser and Strauss (1967) was utilized in this study as a means for deriving (grounding) theory in the analysis process. From the categories, grounded theories; that is, theories that follow from data rather than preceding them, were developed.

The analysis of qualitative data is best described as a progression, not a state; an ongoing process, not a one-time event. Marshall and Rossman (1989) explain:

> Data analysis is the process of bringing order, structure, and meaning to the mass of collected data. It is a messy, ambiguous, time-consuming, creative, and fascinating process. It does not proceed in a linear fashion; it is not neat. Qualitative data analysis is a search for general statements about relationships among categories of data; it builds grounded theory. (p.112)

Brain Compatible Based Learning

The figures below illustrates how neurons communicate between the axon and the dendrites as a sender and a receiver of information, respectively. Brain compatible teaching and second language acquisition are two processes that complement each other. The Brain is made up of three basic systems/parts: (1) Limbic system=emotions/feelings; (2) Cerebral Cortex=where learning occurs and (3) Brain Stem (Reptilian Brain)=controls unconscious functions-fight or flight.



Brain science is a burgeoning new field, and we have learned more about the brain in the past 5 years than in the past 100 years. Nearly 90 percent of all the neuroscientists who have ever lived are alive today. Nearly every major university now has interdisciplinary brain research teams. But almost all scientists are wary of offering prescriptions for using their research in schools. Joseph LeDoux from New York University and author of The Emotional Brain (1996) says, "There are no quick fixes. These ideas are very easy to sell to the public, but it's too easy to take them beyond their actual basis in science." Susan Fitzpatrick, a neuroscientist at the McDonnell Foundation, says scientists don't have a lot to tell educators at this point.

The current position of the field of experiential education within mainstream education places at a premium attempts to significantly broaden and deepen experiential pedagogy beyond mere "learning by doing." This article will explore one such attempt—the Brain Compatible Approach—and its potential linkages with experiential education. An overview of the Brain Compatible Approach will be outlined, followed by a discussion of several key principles. Linkages between these principles and experiential education will be discussed, as well as several "Quick Tips" on possible practical applications of the research. Finally, the benefits of aligning experiential education with the Brain Compatible Approach will be explored (Brandt & Wolfe, 1998).

Brain Compatible Teaching and Learning

In ESL or dual language classrooms, teachers "demonstrate and model, use manipulatives and realia consistently, use visuals and graphic aids, involve the students in "hands-on learning, use film, video, or multimedia presentations, use role-play to ensure student-centered instruction." (Cloud, Genesee. & Hamayan, 2000). All of these strategies help students to develop both their semantic memory, episodic memory, and emotional memory which are part of brain compatible classrooms (Sousa, 2006). The multiple intelligences BCBL incorporates, but

not limited to, include Musical, Linguistic, Logical, Logical/Mathematical, Bodily/Kinesthetic, Spatial, Intrapersonal, Interpersonal, Naturalist, and Spiritual.

Research shows vocabulary to be a critical component of reading proficiency across K-12 continuum. Adolescent ELLs may often encounter words they do not fully understand impeding their comprehension of material being presented. Strategies which employ cognate awareness, concept definition maps, words walls, word analysis and semantic maps can contribute to language acquisition in a positive way. Some examples of how they can be incorporated into the lesson preparation, instruction and assessment:
Word walls – Key vocabulary and concepts which will assist students in the learning and understanding of daily content and classroom activities.
Cognate Awareness – Cognates are vocabulary terms in two language that are similar in both spelling and meaning. Focusing on cognate awareness can help foster student's understanding of English text.

Spanish	English
Actor	Actor
Admirable	Admirable
Agenda	Agenda
Alcohol	Alcohol
Altar	Altar
Animal	Animal
Area	Area
Artificial	Artificial
Auto	Auto

Word Analysis – learning to analyze the structure of words helps students identify the meaning of words and also builds their vocabulary.
Concept definition maps – help students expand their understanding of a given concept. Can be done with pictures or without.

The use of graphic organizers is an effective way of building schema for ELLs. The use of graphic organizers and visuals are an effective way of assisting adolescent ELLs to organize information. Strategies such as semantic attribute matrices, Writing frames, Word banks, Story banks, Story Maps, Double Entry Journal and Semantic Attributes Matrices contribute positively to second language acquisitioners' academic and acquisition success. Teaching for meaning provides ELL students meaningful opportunities to acquire language proficiency. Teaching for meaning allows teachers and students to focus on "key issues" and "big ideas" in the learning segment. Some strategies and activities include:
Quick writes – Open ended or specific prompts that allow students to generate thoughts and practice or apply specific skills.
Thematic Units – Provide opportunity for integrating oral and written language production that is meaningful and provide a framework for learning experiences that can be scaffolded to support and encourage social interaction and cooperative learning.
Use of Role Play – Provides an opportunity to engage in authentic conversations that focus on developing both social and academic language.

Cognitive/Metacognitive help learners develop an awareness of "how to" approach academic content. Such strategies/activities include Pre-reading guides, Reciprocal teaching, Visualization, Summarization, Preview-Review and Think Alouds and Think Pair-Share:
Pre-reading Guides – a graphic organizer intended to prepare the English learner for a given reading selection. Useful in helping students prepare to read text selections in content areas.
Synthesis – students combine information received from (multiple) sources to demonstrate understanding of a concept. Fosters the student's ability to infer relationships between learning segments.
Think Alouds – verbalizing thoughts aloud to help student's monitor reading comprehension and help them to recognize strategies that could aid in comprehension of text.
Use of Visualization – employs generating a mental image of a given text. Allowing students to describe/illustrate the image provides opportunities for authentic use of language and demonstration of learning.
Think Pair-Share - Think independently about the strategy that you have been assigned. Pair to discuss your strategy with a partner and Share your ideas with pair of partners.

Educators can inventory their own teaching and learning IQ by asking themselves a few reflective questions and then informing their planning, instruction and assessment based on the answers to those questions:

- Do you design your lessons with your customer in mind?
- Do you ensure "active" not "passive" instruction?
- Are my lessons Hands- on but not necessarily minds-on?
- Do I allow my students to filter information (explain, interpret, apply, perspective, empathize, self-knowledge)

- Do my lessons Engaging lessons keep students from flight or fight
- Believe in your students abilities

Brain Compatible Teaching and Second Language Acquisition

The monitor is that part of the second language learner's internal system that consciously processes information (Burt, et.al., 1987) ESL or dual language classrooms that are brain compatible provide many opportunities for second language students to develop their listening, speaking, reading, and writing so that they are able to monitor their language development. ESL and Dual Language language classrooms that are brain compatible provide opportunities for "active processing of learning experiences creating optimal ways to consolidate learning," (Caine,et. al., 2005).

3. Educational Challenge

Scientists have recognized that more has been learned about the brain in the last two decades than in all the time preceding. In the 1960's researchers saw the brain and intelligence as fixed. However, Fred Gage, a neurobiologist at the Salk Institute for Biological Studies showed in a groundbreaking experiment that neurons are constantly being born, particularly in learning and memory centers in the brain (Park, 2000). New, less invasive technologies such as PET scans have helped scientists determine various ways people learn and how to facilitate learning through brain-based teaching techniques. This new educational discipline unites the knowledge of neuroscience, psychology, and education, with the objective to make language learning and teaching optimal (Tabibian, 2018). Teachers have been using strategies that are brain based long before proven to be so (Herrmann, 2016).

Many learning techniques compatible with brain focused techniques are compatible to some the language acquisition approaches (Lombardi, 2008). Krashen's language acquisition approaches contain elements that are brain compatible, especially the acquisition-learning hypothesis and the affective filter hypothesis. According to Krashen (1987), developing academic English consists of making instruction comprehensible and developing literacy in the first language. Krashen stated "it is easier to learn to read in a language you understand. And better reading in the first language leads to better reading in the second language." Krashen values and validates students' native language by recognizing the important foundation it provides to acquiring the English language.

The acquisition learning hypothesis makes the distinction between language acquisition and language learning. Krashen differentiates between acquired competence and learned competence. Acquisition takes place in day-to-day conversation and in natural communication or in informal settings. Language learning is a more purposeful processing of academic language that takes place in a more formal or "artificial" environment such as the classroom setting (Krashen, 1976). Krashen also posits that language acquisition in a natural setting is more effective for children while the formal setting for language learning is effective in adult language learning and that learning can proceed simultaneously in both natural and formal settings.

The affective filter hypothesis is described by Krashen as the effects of a speaker's attitude toward language acquisition dealing with motivation, self-confidence, and anxiety. This theory states that if a student is anxious and reluctant to speak English, a filter is created that prevents the learner from making the most of their language experience. It detracts the learner from comprehensible input and prevents the student from effective social interaction. Educators are tasked with creating an environment that is free of anxiety and stress so that students feel comfortable in taking risks with language. According to Krashen, a learner who is motivated to speak a second language will have greater success than an unmotivated learner. Self-confidence affects language acquisition, as well. A learner who is not self-confident may not be willing to take risks speaking a new language and will therefore have limitations in language learning. Finally, the level of anxiety the second language learner has may impede second language acquisition. Optimal learning conditions include high motivation, high self-confidence, and low anxiety (Krashen, 1987). This is the most compatible of Krashen's theories that connects with brain based compatible learning. The importance of the student's feelings and emotions can present a block to language proficiency development.

The input or comprehension hypothesis states that students can acquire language when they receive information they understand. Input hypothesis relies on understanding messages, and if there is no understanding, the learner will not acquire the language. Information provided needs to be interesting and relevant, focusing on the input and not the form or the grammar. This is achieved through natural communication where the target language is authentic and enhanced by contextual clues, background knowledge and non-linguistic cues (Peregoy & Boyle, 2017). Increasing comprehensibility by using nonverbal clues such as gesturing while demonstrating, displaying images, providing objects, and changing tone of voice can assist students to understand. As language abilities develop and increase, strategies may also include scaffolding vocabulary by accessing prior knowledge, using hands on activities, including visual representations such as graphic organizers and cooperative grouping. Krashen states that the quality is more important than the quantity when delivering comprehensible input and that during reading, more comprehensible input results in greater competence in vocabulary and spelling (Krashen, 1987; Krashen, 1989). Krashen theorized that learning another language depends on whether or not a learner understands what they are being presented (input). This is especially important for the learning of academic language. If the learner does not understand what is being conveyed they will not understand the academic concepts. It is important that learners are provided with comprehensible input so that they can progress to increased levels of knowledge and proficiency in the second language. This includes assessing the learner's language output to gauge understanding and language competency. Assessments such as the Student Oral Language Observation Matrix (SOLOM) are designed to evaluate the language performance of a student via observation in the classroom setting (Peregoy & Boyle, 2017). Assessment of content understanding, and language proficiency provides educators with valuable information on students' progress and language learning needs. Students need to be encouraged to participate and express themselves by interacting with peers and teachers in order that comprehensible input and language is demonstrated (Lucas, Villegas & Feedson-Gonzalez, 2008). Brain compatible learning is most closely connected with the comprehensible input + 1 hypothesis posited by Krashen, especially with secondary learners who need scaffolding as they come in contact with academic language while their language proficiency is at a beginner or intermediate level.

The students entering the U.S. public schools speak in excess of 60 different languages (Short & Boyson, 2004). The language barriers accounted for difficulties in communicating in English, associating with peers, responding to school expectations, and engaging in day to day activities inherent in a typical U.S. public school day. While the former contributes to the all-around success of a public school student, no more essential is the necessity to be able to understand the academic school language in order to succeed academically. Other attributes associated with U.S. public schools are also affected by not only a language barrier but also assimilation and acculturation (Thomas & Collier, 2002).

It is difficult to calculate exactly how many students can be considered newcomers to the United States schools. In the U. S. schools, the number of students who do not speak enough English to academically succeed in an English-only classroom are categorized as Limited English Proficient (LEP). This determination is also concluded if a student is unable to take a standardized test administered by the state (Friedlander, 1991). Limited English Proficient students are sometimes provided with special services within a school program, which are configured to assist them using an accelerated form of instruction designed to get them up to par with their English speaking counterparts as quickly as possible.

The idea that newly arrived immigrant students, especially adolescents, could be provided a set of experiences to help them become familiar with U.S. schools and to prepare them for the kinds of language and literacy needed to be successful in school was first developed in the late

1970s (Faltis & Coulter, 2008). Many adolescent immigrants enter secondary schools lacking or having interrupted schooling and gaps in their literacy development. Newcomer schools and programs can provide older students with a safe school environment and meet their educational needs, especially when they do not have to compete with students who are literate and accustomed to secondary school life (Faltis & Couter, 2008).

Like most models and strategies, the ones geared toward meeting the needs of our English language learners are not immune from having their own set of strengths, limitations and weaknesses. The strengths are usually associated with responding to students' unique and individualized needs as well as high expectations and authentic teaching and learning. The weaknesses are typically found in programs and methods where there is little room or attention paid to differentiated instruction to take place. The expectations may also be set high, but little authentic and comprehensive support is provided to the student to meet the expectations set forth for them.

Deborah Short and Beverly Boyson (2012) articulated the following goals for assisting immigrants with limited formal schooling:.

1. Help newly arrived students develop beginning English language skills.
2. Develop appropriate content area instruction.
3. Assist students acclimate to U. S. school systems.
4. Build and strengthen students' native language.

4. Programming, curriculum delivery, and strategies

The models for instructional delivery (curriculum development) adopted by the districts emphasized the importance of planning and implementing quality instruction that integrated language and content, appropriate materials and highly trained teachers. Although models varied, coherence with regard to how academic content was delivered was pivotal to ensuring success and was evident. Commonalities between models included the following characteristics: language focus, quality classroom interactions, development of comprehension skills, and development of academic literacy that was reflective in nature.

One of the main strategies stressed in the programs was a focus on language. Educators were conscious of the language development level of the English language learners so classroom instruction could be tailored to the student's linguistic ability level. The importance of integration of all four-language skills (listening, speaking, reading, and writing) was stressed throughout the curriculum to insure that all aspects of language development was enhanced. All programs had ESL courses or English language development courses that could be the equivalent to a sheltered language arts class a designated period during the day for promoting the students' English acquisition (Short & Boyson, 2004). The development of brain-compatible teachers takes on new importance as education moves further into the Information Age . Educators need to build an adequate structure grounded upon the principles of educational psychology, biology, cognitive science, neuroscience, and pedagogy to bridge the gap from the outdated Industrial Era model of schooling to the Information Era model . It is no longer acceptable to continue the traditional lecture-based, controlling, fact-gathering approaches and to fill students' "empty" brains with unrelated, non-relevant information . It is difficult for teachers to relinquish control, power, and structure and change their perceptions of teaching and learning (Caine and Caine 1997) . Ever since President George H . Bush declared the 1990s the "decade of the Brain," educators have struggled to interpret the implications of current brain research for teaching and learning . Practicing teachers, often unaware of the research regarding how the brain learns best, intuitively teach in ways that "seem right" and incorporate group projects, multiple intelligences, and challenges into their lessons (Kovalik and olsen 1998) . Busy teachers seldom have the time and energy to research brain-compatible instruction and make informed choices . Marzano, Pickering, and Pollock (2001) acknowledge that moving teaching "from an art to a science" leaves many questions unanswered (p . 9) .

Quality classroom interactions was also a commonality among the programs visited. Curriculum development focused on learner-centered tasks that encouraged learners to speak in precise language that would allow them to develop academic language and maintain high academic rigor. Interactions were facilitated by establishing a positive rapport with students and between students with the presence of a non-threatening community in the classroom. Evolution of instructional methodologies is a dynamic process, thus in order to promote academic success, teachers have adjusted pedagogical practices to meet the needs of the students fostering experimentation with language and greater responsibility in learning. Interactions were strategic, purposeful and monitored.

Reading comprehension and literacy development is key for newcomer academic English language development so therefore it was the primary focus for the newcomer programs. Teaching for meaning is an essential component of instruction for English language learners and requires teachers to be knowledgeable about a variety of strategies that provide English language learners with meaningful opportunities to acquire language proficiency as they learn academic content. Teaching for meaning invites teachers and students to focus on the "big ideas" or "key issues" in the learning segment and engages learners in authentic contexts for developing academic knowledge related to the specific content area. Teaching for meaning helps the ELLs to build frameworks for comprehension and also provides opportunities for the students to engage in authentic conversations and participate in relevant learning experiences (Ovando & Collier, 1998; Echevarria, Vogt & Short, 2004; Saunders & Goldenberg, 1999). Instructional techniques in which teachers engaged the students in interactive activities complemented the curriculum development in both second language and content area classrooms.

Reflection and the development of cognitive and metacognitive strategies were also addressed in the newcomer programs. These strategies provided tools for learning that helped students develop an awareness of tasks necessary in approaching academic content and how these tasks can be monitored to gauge effective brain compatible learning. As such, they are important to consider in educating English language learners who are still in the process of developing proficiency in the English language. The strategies assist students by providing them the "know how" to approach academic tasks in a meaningful manner so goals of learning can be met (Jimenez, Garcia & Pearson, 1994; Wong, Fillmore & Snow, 2003; Vaughn & Klinger, 2004). Tasks were repeated and structured to ensure learners were provided with opportunities to access the lesson objectives. Focus was placed on not only supporting students during these tasks, but also bridging them to independence in reading, writing and thinking.

The study revealed a gap in these teachers' ability to articulate their work. Comments from the theorists that support this concept include: The kind of brain-based teaching that educators should strive for is that which is informed by the most up-to-date research knowledge of the role of the brain in teaching and learning reading, writing, math, and other content domains . one needs a good introduction to awaken people to the fact that all learning comes from the brain, and give them an idea as to its magnitude . one comment reinforces the idea of articulation: Sometimes we [teachers] are not considered to be professional because we cannot articulate our craft and what we do . Should pre-service and practicing teachers understand how the brain learns, in addition to brain-compatible teaching and learning? Two theorists advocated formal pre-service training in neuroanatomy so prospective teachers can "learn where learning really begins ." one theorist, citing the need for concentrated training to master the knowledge base, cautioned that teachers should not rely solely on the media, popular books, or workshops for information about neuroscience . Two other theorists supported this idea: they stated that teachers should base their teaching upon biological findings of how the brain constructs knowledge . Another theorist addressed the practice of "rough draft" learning, in which teaching often sacrifices accuracy for simply getting something "close ." Teachers must know how to increase the importance and relevance of learning so they can upgrade rough drafts for improved meaning and accuracy .

The models for curriculum development supported district initiatives to increase student achievement and build capacity among teachers and administrators working with English language learners. Many of the strategies incorporated into the curriculum models can be used to address

a wide array of standards, depending on the particular situation in the classroom.

5. Results

Over the past two decades, America's classrooms have undergone an unmistakable demographic change. Anyone who has come in contact with the school system-whether as an educator, student, parent, policy maker, or service provider-cannot help but notice the rapid, profound, and continuous diversification of this country's student population in every sense of the word: racial, cultural, ethnic, religious, and social. The trend is hardly new in this country but its accelerated pace and overall impact on our society and education system is in many ways very different. The wave of immigration over the past two decades continues to have such a profound effect on our society that it can almost be regarded as the equivalent of a demographic revolution, and nowhere is that impact more obvious than in our schools.

According to findings of other studies, learning styles-based teaching (including brain-based teaching) increases students' achievement but this increases does not vary depending on learning styles (Bielaczyc and Collins, 1999; Whicker, 2001; Williams, 1990, Gencel, 2008). There are some studies showing that there is no significant relationship between learning styles and academic achievement. Williams (1999) compared the effectiveness of not taking with mind maps with that of traditional not taking and found that there is no significant relationship between the dominance of hemispheres and the performance of the participants and learning styles and dominance of hemispheres. Somyürek and Yalın (2007) reported that there is no significant difference among the academic achievements as a result of a study investigating the performance of the field-dependent and field-independent learners in computer-assisted learning environment.

Specific brain based strategies were selected using some of the twelve elements of the Caine and Caine (1994) research in brain-based learning.

1. The brain is a complex adaptive system. The brain can function on many levels and in many ways simultaneously. Activity shifting or changing activities during a class period and teaching to different learning styles stimulate thought and action. This was observed as students participated in hands-on activities and worked in small groups to accomplish academic tasks.
2. The brain is a social brain. The brain likes and responds well to social engagement and oral sharing. This was observed in the classroom through role playing activities. In one class the Diary of Anne Frank story was being role played by the students and involved the group in cooperative learning.
3. The searching for meaning is innate. Students like projects where they explore in kinesthetic projects. Students' work was displayed in many of the classrooms whereby they demonstrated parts of a story, developed graphic organizers with content being studied, and science experiments were involving the students in scientific inquiry.
4. The search for meaning occurs through patterning. When the brain encounters a new idea in searches for patterns. Activities displayed in the classrooms included: breaking down stories into sequences on a poster, and posters being used to teach content that was part of a unit plan.
5. Every brain simultaneously perceives and creates parts and wholes. Meaningful learning that includes both halves of the brain. Music and hands on activities also contributed to students' involvement in learning in many classroom activities.
6. Learning involves both focused attention and peripheral perception. Real-life activities, the importance of the teachers, students liked and respected the faculty and staff. Students were guided and supported by the teachers and staff, explain how.
7. Learning involves both conscious and unconscious processes. Like Krashen describes acquisition and learning. Acquisition happens unconsciously as the teachers model language and the teachers use metacognitive processes in providing the direct instruction.
8. Learning is developmental. Learning helps the brain grow. EL instructors apply different learning strategies for the different levels of language proficiency. Teachers explained the importance of having differentiated instruction and how they implemented this instruction based on the language proficiency level of the students.
9. Complex learning is enhanced by challenge and inhibited by threat. Classroom environment in all cases was warm and inviting. Students also commented on the importance of having positive mentors. Teachers worked with students at their language proficiency level.
10. We have at least two ways to organize memory. Help Els to record experience as important and not important by organizing activities into meaningful parts. Talk of the sentence stems, vocabulary charts, any multiple intelligent activities we say implemented. The students were engaged with projects, creative writing and art classes that were created for the school for gifted and talented students who had special talents in art and creative writing.

Beyond the brain compatible strategies, a positive school climate means having meaningful and collaborative relationships between teachers and students, teachers and administrators, teachers, administrators, and parents, and among students. A positive school climate is the first step toward school and student educational improvement (Grayson, 2016) as was stated by many of the English learners in the classrooms we visited. Like all students, English learners need to feel physically and emotionally safe. They must sense that student and adults around them care about them. When this type of environment is in place, they have a greater attachment, engagement and commitment to school, all resulting in better academic performance with less disruptive behavior (Grayson, 2016).

Nothing stands outside representation. Research involves a complex politics of representations. This world can never be captured directly; we only study representations of it. We study the way people represent their experiences to themselves and to others. Experience can be represented in multiple ways, including rituals, myths, stories, performances, films, songs, memoirs, and autobiography, writing stories, autoethnography. We are all storytellers, statisticians, and ethnographers alike (Angrosino & Mays de Pérez, 2000). Qualitative researchers study spoken and written records of human experience, including transcribed talk, films, novels, and photographs. Interviews give the researcher accounts about the issues being studies. The topic of the research is not the interview itself. Research usually naturally occurring empirical materials – tape recordings of mundane interaction, for example, constitute topics of inquiry in their own right. This is the topic of Anssi Peräkylä work (Peräkylä, 2002).

The findings have identified preliminary promising practices that appear to be commonalities among the most effective brain compatible teaching among Els and across the visits of newcomer programs. This research is ongoing and will require a continued effort of observing, evaluating and documenting data in order to produce data, which will be both practical and supported by the existing and developing research. The implications of this research are of importance and relevance. In addition, the timeliness of this study could not be more appropriate with the issues our nation is facing with regards to immigration and ensuring an equal educational opportunity for every student (U.S. Department of Education, 2011). A newcomer program is a clear effort to improve our schools and help promote academic success for our recent arrivals.

6 Conclusions and Future Study

Over the past two decades, America's classrooms have undergone an unmistakable demographic change. Anyone who has come in contact with the school system-whether as an educator, student, parent, policy maker, or service provider-cannot help but notice the rapid, profound, and continuous diversification of this country's student population in

every sense of the word: racial, cultural, ethnic, religious, and social. The trend is hardly new in this country but its accelerated pace and overall impact on our society and education system is in many ways very different. The wave of immigration over the past two decades continues to have such a profound effect on our society that it can almost be regarded as the equivalent of a demographic revolution, and nowhere is that impact more obvious than in our schools.

On the horizon are many more studies that may have implications for the education of the human brain from birth through old age. Current research areas include these:

* The role of nutrition in brain functioning
* How brain chemicals affect mood, personality, and behavior
* The connection between the mind/brain and the body

Rather than passively wait for research findings that might be useful, educators should help direct the search to better understand how the brain learns. James McGaugh of the University of California at Irvine has suggested that we educators need to be more proactive and tell the scientists, "Here's what we need to know. How can you help us?"

Should the Decade of the Brain lead to an enlightened Decade of Education? Eventually, yes. Along with cognitive research and the knowledge base we already have, findings from the neurosciences can provide us with important insights into how children learn. They can direct us as we seek to enrich the school experience for all children--the gifted, the creative, the learning disabled, the dyslexic, the average students, and all the children whose capabilities are not captured by IQ or other conventional measures (Newman & Buka, 1997). We can help parents and other caregivers understand the effects of maternal nutrition and prenatal drug and alcohol use and the role of early interaction and enriched environments. Brain research can also offer valuable guidance to policymakers and school administrators as they strive to focus their priorities.

One of the goals of this ongoing research is to investigate and identify the consistent and constant elements present in an effective newcomer program. In doing so, we have visited a number of school districts who have instituted a newcomer program on a home campus or on a separate campus devoted entirely to the newcomer population. It is clear that different campuses implement a different version of a newcomer program based on the perimeters that guide the implementation. The diversity of the student population, the number of newcomer students that arrive, the type of professional development and training of faculty and staff, and the allocated funds for a newcomer program are all variables that help determine the type of newcomer program that is instituted in each district.

The findings have identified preliminary promising practices that appear to be commonalities among the most effective implementations across the visits of newcomer programs. This research is ongoing and will require a continued effort of observing, evaluating and documenting data in order to produce a document, which will be both practical and supported by the existing and developing research. The implications of this research are of importance and relevance. In addition, the timeliness of this study could not be more appropriate with the issues our nation is facing with regards to immigration and ensuring an equal educational opportunity for every student (U.S. Department of Education, 2011). A program that uses brain compatible strategies and provides a welcoming environment for students will provide an opportunity for academic success.

References

Bielaczyc, K., & Collins, A. (1999). Learning communities in class rooms: A reconceptualization of educational practice. In C. M. Reige luth (Ed.), Instructional design theories and models,Vol. II. Mahwah NJ: Lawrence Erlbaum Associates.

Brandt, R., Wolfe, P. (1998). What do we know from brain research? Educational Leadership, 56(3), 8–13.

Caine, R ., and G . Caine . 1997 . Unleashing the Power of Perceptual Change: The Potential of Brain-based Teaching . Alexandria, Va .: Association for Teaching and Learning.

Caine, R. & Caine, N. (1994) Making connections: Teaching and the human brain, Somerset, NJ: AddistonWesley.

Fitzpatrick, S. (1995, November). Smart brains: Neuroscientists explain the mystery of what makes us human. American School Board Journal.

Gencel, İ. E. (2008). Sosyal bilgiler dersinde kolb'un deneyimsel öğrenme kuramına dayalı eğitimin tutum, akademik başarı ve öğren menin kalıcılığına etkisi. İlköğretim Online, 7 (2), 401-420. http://ilkogretim-online.org.tr adresinden 14 Eylül 2008 tarihinde edinilmiştir. Translation:Based on kolb's experiential theory of learning in social studies the impact of education on attitude, academic success and persistence of learning. Primary Online, 7 (2), 401-420. Acquired from http://ilkogretim-online.org.tr on September 14, 2008.

Grayson, Kristin. Positive School Climates and Diverse Populations. IDRA Newsletter, August, 2016, XLIII, (7), 5-6.

Kovalik, S ., and K . olsen . 1998 . "The Physiology of Learning: Just What does Go on in There?" Schools in the Middle 7 (4): 30–32 .

Krashen, S. (1989). We acquire vocabulary and spelling by reading: Additional evidence for the input hypothesis. *Modern Language Journal*, *73*(4), 440–464.

Krashen, S. D. (1987). *Principles and practice in second language acquisition*. Englewood Cliffs, N.J: Prentice-Hall International.

Krashen, S. D. (1984). *Second language acquisition and second language learning*. Oxford: Pergamon.

LeDoux, J. (1996). The emotional brain: The mysterious underpinnings of emotional life. New York: Simon & Schuster.

Lombardi, J. (2008). Beyond learning styles: Brain based research and English language learners. Retrieved from https://users.manchester.edu/FacStaff/vleastman/mywebsite/beyond learninglombardi.pdf

Lucas, T., Villegas, A., & Freedson-Gonzalez, M. (2008). Linguistically Responsive teacher education: Preparing classroom teachers to teach English language learners. *Journal of Teacher Education*, *59*(4), 361-373.

Lucas, T. (2000). Facilitating the transitions of secondary English language learners: Priorities for principals. *National Association of Secondary School Principals Bulletin*. 84, (619) 1-3.

Newman, L., & Buka, S. L. (1997). Every child a learner: Reducing risks of learning impairment during pregnancy and infancy. Denver, CO: Education Commission of the States.

Marzano, R . J ., d . J . Pickering, and J . E . Pollock . 2001 . Classroom Instruction That Works: Research-based Strategies for Increasing Student Achievement. Alexandria, Va .: Association for Supervision and Curriculum development .

Peregoy, S., & Boyle, O. (2017). *Reading, writing, and learning in esl : A resource book for teaching k-12 english learners* (Seventh ed.). Boston: Pearson.

Park, A. (2000). Old brains, new tricks. *Time, August 7.*

Richards, J & Rodgers, T. (2001): "*Approaches And Methods in Language Teaching*."

Short, D.& Boyson, B. (2012). *Helping newcomer students succeed in secondary schools and beyond*. Washington, DC: Center for Applied Linguistics.

Somyürek, S., & Yalın, H. İ. (2007). Bilgisayar destekli eğitim yazılımlarında kullanılan ön örgütleyicilerin alan bağımlı ve alan bağımsız öğrencilerin akademik başarılarına etkisi. Türk Eğitim Bilimleri Dergisi, 5(4). 587-607.

Williams, L. (1983). *Teaching for the two-sided brain. Englewood Cliffs, NJ: Prentice Hall.* Williams, M. H. (1999*). The effect of a brain based learning strategy, mind mapping, on achievement of adults in a training environment with consideration to learning styles and brain hemisphericity. Unpublished doctoral dissertation, University Of North Texas.*

Zadina, J. (2005). Principles and strategies to enhance learning. Paper presented at the Office of English Language Acquisition Summit, Washington, DC.