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Second-Grade Teachers' Brain-based Teaching Strategies for Struggling Readers

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Walden University
2018

Abstract

Second-Grade Teachers' Brain-based Teaching Strategies for Struggling Readers

by

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MACP, Argosy University, 2012

MDiv & MATh, Oblate School of Theology, 2008

BA, Dominican University College, 2000

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Psychology

Walden University

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Abstract

In the era of this 21st Century, there are numerous known and unknown causes of reading impairments which have destructively affected elementary school students. Some causes are linguistic, and others are nonlinguistic. Lack of research on how previous teaching methods and experiences in implementing brain-based teaching (BBT) strategies became critically important, and were the concerns for this study. Developed by Hart's brain-based learning (BBL) theory together with other BBL theorists such as Jensen and Caine, the purpose of this qualitative study was to observe and explore the implementation of BBT strategies from 4 distinct second-grade participant teachers/subjects, located at the school district of a southwestern state. With the research questions focused on brain-based knowledge, BBT paradigms and brain-based implementation of teaching strategies, data from the cross-case synthesis and analyses of participant subjects' interviews, classroom observations, interactive journals, and other sources related to the study were processed and analyzed to address the research questions. Findings indicated that participant subjects perceived positive experiences of the implementation of BBT strategies in a way that enhanced their teaching qualities and improved students' reading impairments. The results of this study will likely contribute to positive social change by raising awareness for effective teaching and learning as well as promoting implementing BBT strategies in all teaching and learning environments. The results of this study may promote positive change in education, aim to improve brain-based teachers' enthusiasm and self-efficacy, and reduced students' reading impairments.

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Dedication

This dissertation is dedicated to my beloved mother, Mrs. De Thi Nguyen, and my deceased father, Mr. Huan Ba Nguyen. With much love and care, they have given me everything they could. A special thanks to my brothers – Hanh, Phuc, Thanh, and my sisters – Yen, Van for their long support, encouragements, and prayers. I want to thank each and all of them for being a part of my life.

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Chapter 1: Introduction to the Study

Reading plays a vital part in learning. Second grade is an important time for students to learn how to read and read for comprehension. Second grade is a period that students' cognitive abilities and functions begin to develop and be further open up to the world of learning (Harrison, 2011). Reading abilities help students complete their home works on reading and they also have a tremendous impact on obtaining academic achievements. Many American second-grade students lack the full developmental skills to read and read below grade level (Sousa, 2014). Most second-grade students are struggling to read because of lack of reading comprehension and skills. Many teachers do not know how to teach their students to read effectively that affect not only students' learning but also their future (Jensen, 2000; Liwanag, Fahrenbruck, & Koomi, 2015; Mercer, 2015).

I aimed to encourage and assist teachers utilizing brain-based learning (BBL) strategies to improve second-grade students' reading skills. While poor reader may struggle to read for many reasons, BBL strategies provide teachers with various positive reinforcement techniques so that struggling readers can read comfortably, comprehensively, and effectively (Caine & Caine, 2010; Payne &Welch, 2015). Struggling readers need teacher's clear instructions and guidelines that are important to students' learning success and brain development. The purpose of this study was to examine teachers' implementation of BBL strategies through their training, implementations of BBL strategies, and teaching experiences in the classroom. Through BBL strategies, teachers assist and encourage struggling readers to involve more in all

literary exercises inside and outside the classroom in order to read independently and effectively.

Background

Literacy (the ability to read, write, and understand the written language) is a fundamental skill for a child's early education. To obtain literacy skills, it often requires students to have formal instruction or special training, and teachers need to provide students the basic literacy skills in elementary school (Borg, 2015). At least 20 - 30% of the American elementary students have a great difficulty in learning the basic elements of reading (National Institute of Child Health and Human Development, 1997; National Reading Council, 1998; North Carolina Reading Association, 2015). The findings from neuroscience research showed that there is a significant link between neuroscience with learning and memory strategies that improve young learners' capacity to learn and read (Brier & Lebbin, 2015; Calhoon, 2005). Yet, the findings from literature review in neuroscience research, particularly in learning and memory, have not answered the needs of struggling readers in elementary schools (Blachman, 2014; Chall, 1967; Therrien, 2004). It is gap in the neuroscience research.

Problems with reading are often rooted in the insufficient training or knowledge of early childhood education (McNamara, 2012). Early childhood education is always critical in preparing children to succeed in reading and future (Gulpinar, 2005; Hart, 1999; Liu & Huang, 2015). In recent years, there has been a national push for state and federal policy to address the elementary students who do not have enough basic academic skills for reading comprehension and learning disabilities (Flood, Heath, & Lapp, 2015; National Reading Council, 1998). Reading fluency is important because it provides a

bridge between word recognition and comprehension. Reading fluency enables students to analyze, interpret, draw conclusions, and infer the meanings from texts (Calhoon, 2005; Therrien, 2004). In this regard, reading fluency in early childhood education is important to children's learning, and therefore it requires teachers to provide clear and formal instruction or special training to struggling readers.

Improving reading fluency or reading skills for struggling readers is an important task that needs to be considered by all educators and teachers to promote maximum student reading and learning. Having adequate education is the need that is best suited for early childhood education because adequate education provides an opportunity to help children develop to their full potential (Bell & Perfetti, 1994; LaMar, 2015). This includes immediate and continuous literacy interventions that teachers will provide for students.

According to the National Institute of Child Health and Development (NICHD, 1997; National Reading Council, 1998; North Carolina Reading Association, 2015), brain-based research offers new information and discoveries that will be used and applied to teaching and improving reading skills in elementary students. The new discoveries are the practical tools and techniques of BBL strategies that urge teachers to explore and implement BBL strategies in the classroom. Moreover, brain-based researches on BBL strategies are examined for teacher efficacy and for the effects on students' reading abilities and academic performance (Alfassi, 2003; Brier & Lebbin, 2015). In order for students to become effective, lifelong readers, teachers will provide students with both reading skills and the will to read, that is, the role of teachers is so important to provide struggling readers the literacy activities and strategies to urge students to read effectively

(Bell & Perfetti, 1994; Kim, Petscher, & Foorman, 2015). Without adequate reading skills, poor readers are likely to fall behind, as their difficulty with reading increases. Consequently, poor readers often become so frustrated that they may drop out of school (Dombrowski, 2015).

Problem Statement

There is a gap in the literature as to how elementary teachers utilize brain-based teaching (BBT) strategies for reading in the classroom (McCall, 2012; Myers et al., 2014; Samuels & Farstrup, 2006). It is essential that teachers understand why students do not like to read and read below the grade level. Many classroom teachers are not trained or prepared to teach their students to read effectively due to either a lack of training on teaching or poor perceptions of teaching skills (Forlin, Kawai, & Higuchi, 2015; Hawk, Coble, & Swanson, 1985). Classroom teachers may feel unqualified to teach students who exhibit difficulties with reading and understanding because of a lack of teaching training (Emmer & Evertson, 2012; Smith et al., 2015). In many cases, classroom teachers fail to provide students with proper reading skills because teachers are not trained to specialize in teaching students' literacy activities or adequately receive BBT strategies in their training (Coffman & Klinger, 2014). Those teachers who lack BBL strategies in teaching or inappropriately implement BBL strategies in class may have a challenge in either class management or teaching behaviors (Borg, 2015; Bowen, 2011; Sousa, 2014).

Purpose of the Study

The purpose of this qualitative study was to explore and observe the second-grade teachers who utilized their BBT strategies for reading. A major goal and objectives of

BBL strategies in education was to provide teachers with various techniques to teach students to read effectively and obtain their academic achievements in reading. This study had a purpose to develop a deeper understanding of the selected elementary teachers as they attempted to orchestrate BBL strategies for learning in their classroom, and by better understanding what contributed to or impeded their implementations of BBL strategies. Through teachers' implementation of BBL strategies, teachers instructed students to utilize the activities that supported students' executive functions such as group collaboration and open-ended discussions so that students could better learn their reading skills and read at grade level.

Research Questions

1. What types of training and education have second-grade teachers received in utilizing BBT strategies for reading?

2. How do second-grade teachers utilize their training in BBT strategies in the classroom?

3. How do second-grade teachers utilize their training in BBT strategies for student engagement in the classroom?

4. What do second-grade teachers like or dislike about BBT?

Theoretical Framework

The theoretical framework for this study is BBT strategies, which are grounded in Hart's BBL theory, a pioneering work in neuroscience as applied to education. Hart (1983) was the first to propose the comprehensive model of teaching strategies based on known cognitive functions and structure of the brain. The approach provides educators and teachers the benefits of neuroscience as applied to the classroom, with particular

interest to struggling readers (Anderson, Love, & Tsai, 2014). The BBL theory allows early education teachers to develop strategies and individualize them for particular students, depending on their specific learning possibilities (Roe et al., 2011). BBL is a practical tool for teachers in the classroom as based on the understanding on how human knowledge acquired and on characteristics of various learning difficulties of students, and therefore the teachers develop activities to facilitate and motivate struggling students' interest and performance (Richardson, Morgan, & Fleener, 2011). Hart (1998) contended that increasing the struggling students' engagement level in literacy is the most important aspect of teaching strategies and that BBL may be the most effective method to achieve the learning goals.

The comprehensive model of teaching strategies of Hart's BBL theory has been tested and supported in several BBL and constructivist learning approaches and models in education (Gulpinar, 2004; Ragin, 2014). According to Jensen (2000) and Farrington-Flint (2015), BBL will be widely implemented in any kind of environmental teaching setting available and emotions play a critical role in learning. BBL requires educators and teachers to incorporate students' attitudes and motivations into their teaching practice (Hart, 1969, 1975, 1983). Jensen (2000) described the role of emotions in BBL as holistic learning to acknowledge learners' emotions, feelings, beliefs, cravings, problems, attitudes, and skills that are the important aspects in the learning process.

This study is BBL strategies which informs the study of engaging struggling readers by exploring second-grade students' perspective on reading engagement and develop strategies that meet the needs of students. I assessed the students' reading engagement, through teachers' implementation of BBL strategies, by analyzing the

participants' questions, open-ended interviews, feelings, emotions, thoughts, knowledge, experiences, and social interactions regarding teaching strategies. By discovering students' perspectives on reading engagement, teachers endeavor to understand how their struggling readers learn best and implement their brain-based teaching strategies to engage their struggling readers in literacy activities. Student engagement in literacy activities is seen as an indicator of effective BBL strategies in classroom (Mercer, 2013; Urhahne, 2015; Wiggins, 2009). BBL is defined as the orchestration of student learning through the utilization of ample BBL strategies that address BBL principles listed below:

- Comprehensive Model of Teaching Strategies

- Literacy Teaching Styles

- Implementation of Brain-based teaching Strategies

- Neuroscientific Knowledge and Implications of Brain-based Learning

- Data Collection Procedure

- Data Analytical Process

- Student Engagement

- Novelty and Challenge

Nature of the Study

This study was designated as a qualitative, descriptive multiple-case methodology designed to comprehend the many possibilities of the BBL in the education of struggling readers, with focus on effective methods of engagement in literacy in diverse classrooms. According to Yin (2014), an individual case participant played an important role in the study and represented a significant contribution to a unit of study. The data of each unit of analysis, the second-grade teacher, within a multiple case study design would derive

from in-depth questions, open-ended interviews, and yielding quotations from the participants about their feelings, opinions, thoughts, knowledge, and experience regarding BBL teaching strategies (Ragin, 2014; Yin, 2014). The qualitative multiple case study design was selected for the study because it allowed the researcher to accumulate data through interviews, observations, and archived documents, and draw relevant conclusions based on a multitude of observations and experiences acquired during the teaching process. The multiple case study research design also allowed the researcher to explore the similarities and differences within and between cases (Yin, 2014).

The question of how many cases to include in a multiple case study and at what point data saturation is achieved was a point of much discussion in methodology literature (Pani et al., 2014). The sample had to be large enough to collect all the data necessary to answer the research questions, but not so large as to create redundancy and go beyond saturation (Gulpinar, 2005). Despite the fact that many researchers gave vague guidelines as to what constitutes saturation (Bell & Perfetti, 1994), others gave more specific numbers (Caravolas et al., 2012). Yin (2014) stated that four or more subjects were appropriate for multiple case studies, while Morse (1994) discussed using six. Four participant teachers were the purposeful sample recruited for this study chosen from central school district in public school directory of southwestern state. This number seemed to be an appropriate number to allow for replication (Yin, 2009), and the necessary in-depth analysis of data needed for qualitative case study inquiry (Chall, 1967; Dombrowski, 2015).

After obtaining permission of the school district's superintendent, I sent an e-mail invitation to all teachers who participated in the school district's professional development training program on BBL strategies. Interested teachers then contacted me to find out more information about the study. I screened the teachers over the phone to ensure they met the following inclusion and exclusion criteria. The recruitment criteria for the teacher participants included 5 years of full-time teaching experience with knowledge of BBT for learning in the classroom. The teaching experience of the participants included previous training seminars from the school district's professional development training program on BBL teaching strategies. The participants were be full-time teachers, and were also implementing BBL teaching strategies in the classroom to help the struggling readers at the time of study recruitment. The participants selected for the study had experience with BBL strategies and working in diverse second-grade classrooms. I was not a teacher or employee within this school district.

The interviews with the participants were conducted on the school grounds where the participants were employed. I was open to have the interviews with the participants either during the hours or afterschool, depending upon the convenience of the participants. The interviews were scheduled for an hour for each participant, but some lasted longer when necessary. Interview questions covered different aspects of BBT strategies to ensure that the data addressed the study goals. The questions asked the teachers to describe the training they had received in BBL strategies, what strategies they used with struggling readers, and what they did to increase student engagement. I developed a list of guiding questions for the interview, then field tested the questions to ensure the appropriateness of the interview questions for answering the research

questions. The field test involved obtaining feedback on the guiding questions from my dissertation committee members as well as a faculty member with expertise in qualitative research.

Definitions

Academic achievement: Refers to the level of student's proficiency or actual accomplishment in a subject area taught in the classroom (Alfassi, 2003).

Academic performance: Refers to a student's level of academic achievement with respect to the understanding and application of subject content that reflected upon the test scores in classroom or in nationally standardized assessments (Lefly &Pennington, 2000).

Brain-based learning: Involves in acknowledging the brain's rules for meaningful learning and organizing teacher with those rules in mind. BBL allows educators and teachers to structure the classroom environments to assist students to learn effectively (Calhoon, 2005).

Brain-based education: The purposeful engagement of learning strategies that apply to how human brain works in the context of education (Chapman & Turner, 2014).

Brain-based learning strategies: Known as nontraditional, educational strategies, which are designed based on a scientific knowledge of neural physiological/biological processes that affect cognitive functioning. The goal of utilizing these strategies is to improve student's ability to learn, retain, and retrieve information by creating academic conditions thought to be congruent with how the brain processes and stores information (Caine & Caine, 2010).

Brain-based learning theory: A conceptual framework for the study and it is also known as a theory that is used as the fundamental principles to instruct and guide educators and teachers to teaching and learning (Olson et al., 2014).

Motivation: The reason, incentive, inspiration, or driving force that strengthens one's goal-oriented behavior that leads to academic performance (Alfassi, 2003). The use of motivation is the potential source that educators and teachers observe and use to urge students to engage their individual effort to achieve learning goals.

National Reading Panel (NRP): An organizational group that assesses the effectiveness of different approaches and methods which are used to teach learners' reading (NRP Report, 2014).

Neuroscience: Known as neural science which is the study of how the nervous system develops. Neuro-scientific structure and neuroscientists focus on the brain and its impact on behavior and cognitive functions (Alfassi, 2003).

Reading achievement: Refers to reading abilities measured by the Iowa Test of Basic Skills (ITBS), which provides an accurate estimate of students' instructional reading level, percentile, standard scores, and grade equivalence. Normally, students who function at or below the 49th percentile in reading are considered below the average (Gardner, 2014).

Struggling readers: The students' whose reading comprehension and literary performance are below the average (Harrison, 2011).

Traditional learning strategies: The learning strategies which are based upon one's experiences of how individual learning take place. Traditional learning strategies

signify one's learning repetition or learning experience which generally reinforces one's memory (Brier & Lebbin, 2015).

Assumptions

Topical Assumptions

I assumed that teachers and students were truthful and honest to the questions raised in the interviews, surveys and they fully incorporated with me in the analytical process. It was assumed that the teachers understood the terminology and conditions of the research topic used in the process of interviews and surveys. Another assumption was that the research topic was well-known and easily recognized by the participants.

Theoretical Assumptions

The assumption of this research included that BBL theory would provide teachers with valid and reliable information and data for their teaching curriculum. Another assumption of this study was that teachers use BBL theory to strengthen their own teaching skills. It was also assumed that BBL theory allows teachers to customize their own teaching environments.

Methodological Assumptions

Underlying assumptions of the research included that BBL assisted me to locate and access the information sources which were based on the participants' teaching methods. It allowed me to work with the details and specific information before generalizing. It was assumed that the information collected from the participants' teaching methods was accurate and valid. Teachers were assumed to use their effective teaching strategies and methods for their students. It was assumed that teachers' teaching methods worked for all or most students.

Scope and Delimitations

The scope of this study explained and explored the second-grade teachers' whose knowledge, practices, and challenges of brain-based strategies were utilized in the classroom. This study was delimited to several second-grade teachers at selected elementary schools in central school district in southwestern state. A delimitation of the study was that not all elementary teachers in the central school district were selected for the study. For this reason, those who were not to be chosen for the study might view differently regarding reading performance and students' engagement.

Another delimitation would be the lack of feasibility regarding the possible inclusion and findings of additional areas of research due to the choice of questions, objectives, and variables of interest that might be adopted other research questions and test instruments (Simon, 2011). The coverage of this study was designated to help teachers teach their struggling readers to read at grade level. This was a scope of the study which identified the boundaries of the research in terms of the subject matters and the participants that were related to the study.

Limitations

A possible limitation to this research study was that due to the teachers' busy schedules that they might not have sufficient time to participate in answering the interviews, survey questions. Another limitation was that some teachers were opposed to brain-based education since they personally believed that the research study might not be beneficial to their teaching careers or struggling readers. For this reason, some teachers might refuse to participate in the survey. Another limitation was that the data collected

for this study was limited to several selected participating teachers. The small group sizes which were used for the study will likely limit its general application to other groups.

Significance of the Study

This research study was unique as it addressed a literature gap in understanding the perceptions of second-grade teachers regarding the BBT strategies designed to improve struggling readers in elementary school. The results of this study might provide an educational teaching model for the elementary school teachers which might contribute to creating a high-performance environment through the implementation of the practical concepts of BBL. According to some analysts, the understanding and implementation of BBL techniques had not been widely used in elementary school (Brier & Lebbin, 2015). I attempted to provide a basic comprehension of the practice of BBL in the classroom as viewed by the teachers themselves, providing new insights in the implementation of the BBL techniques and principles.

This research was significant in that it addressed in particular the students' reading performance, a factor that played a vital role in contributing to academic achievements. Studies showed that there was a significant relationship between reading at grade level and overall academic performance (Cummings, Stoolmiller, Baker, Fien, & Kame'enui, 2015; Samuels & Farstrup, 2006); at least to the degree that reading fluency contributes in a major way to high grades and high scores in exams (Trapman, Gelderen, Steensel, Schooten, & Hulstijn, 2014). In addition, researchers concurred in that struggling readers who did not comprehend language easily obtain lower grades, which ultimately affected overall academic achievement (Kim, Petscher, & Foorman, 2015).

The implementation of BBT strategies was a way to increase the reading skills of struggling students through a variety of personalized activities in the classroom (Harris, Graham, & Adkins, 2015; McNamara, 2012). This research study was undertaken to determine the results and recommendations to prove the efficacy and benefits of BBL, and encourage second-grade teachers to use BBT in the classroom. This study was significant because I gathered information about the perceptions of the second-grade teachers who had implemented BBL in the classroom with struggling readers.

Summary

Teaching performance played a vital role in the success of second-grade struggling readers. This study provided teachers BBL strategies to increase students' cognitive functions and literary activities in the classroom. Chapter 1 was the background, theoretical framework, problem statement, and purpose of the study. I explained the nature of the study, significance of the study, assumptions, the scope and delimitations, definitions of terms, and the conclusion. Chapter 2 is a review of literature which relates to reading, brain research, the importance of teachers' implementation of BBL strategies in diverse classrooms, and students' engagement with struggling reading. Chapter 3 is a description of the research method and design together with the study samples, instrumentation methods, data collection, and analysis. Chapter 4 details the findings and results of the study. Chapter 5 is a summary of the findings and conclusions of the study, and its recommendations for future research.

Chapter 2: Literature Review

Introduction

This chapter is an overview of the research literature that relates to the use and

benefits of teachers' BBT strategies for struggling readers in the classroom. The literature

review includes BBL research, BBT strategies, theoretical framework, and factors that

relate to the struggling readers' motivation during the literary activities. Besides the

introduction and literature search strategy, literature review includes a review of research

studies which are related to the following topics: (a) a brief introduction and history of

BBL theory and its pioneers in neuroscience research on BBL, (b) contemporary research

of neuroscience research on BBL and its influences in teaching and learning, (c) teachers'

responses to struggling reading, and (d) implementations and trainings of BBL strategies

in the classroom. The intent of the literature review and its concluding sections was to

provide support for the need of the study.

Literature Search Strategy

There were several search strategies used for the literature review. I searched for

literature from Walden University library; the databases included EBSCO (Academic

Search Complete/Premier, including PsycINFO, SocINDEX, PsycARTICLES, and

PsycEXTRA), Academic Search Complete, ERIC, Education Research Complete,

ProQuest Central, Education: A Sage Full-Text Database, PsycINFO, SocINDEX, and

PsycArticles. In addition to these databases, search engines from the Internet such as

Google, Google Scholar, and Google Books were also used. The main key words and

phrases used in database searches for peer-reviewed articles included: BBL theory, BBT

strategies, neuroscience of BBL in teaching, second-grade teachers' implementation of

BBL, factors of struggling readers, teachers' perceptions of struggling reading, teachers' responses to struggling reading, reading skills, and academic achievement.

Theoretical Foundation

Brain-Based Learning Theory

Hart (1969) emphasized the importance of educational reform in the classroom by exploring and understanding the brain functions impinging on the learners. To this end, Hart developed a BBL theory with the focus on the implications of the brain development of children as related to instructional strategies in education. Hart presented a series of methods which were used in the instructional process, in the light of the current understanding of the neurophysiology of the learning process (Jensen, 2000; Sulayman, 2014; Willis, 2009). Hart outlined a completely distinctive teaching approach fully based on understanding a brain-based education in order to show educators and teachers the important connection between brain-based teaching strategies and students' cognitive functions (Chawat et al., 2016; Degen, 2014). Hart (1983) urged teachers to observe their students' learning progress through teachers' supervised implementation of BBL strategies. According to BBL, teachers should become aware of the students' brains, as an effective tool in learning and recognize the dominance of brain because brain is the one that has evolved in skulls, an apparatus to marvel at and approach in awe (Sulayman, 2014).

According to Hart (1983) and Caine and Caine (2010), students' brain growth rates might vary drastically, and each growing state was affected by the learning environment. In order to stimulate the brain growth, according to BBL theory, teachers need to be equipped with brain-based strategies to activate brain functions and devise

gradual, but concrete learning goals. There is a critical stage of brain growth that relates to reading performance and most struggling readers show a poor or inadequate stage of brain development (Diamond & Hopson, 1998). Nonetheless, according to Chall (1967), neuroscience studies showed that a 'molecular' emphasis method at the beginning stage of reading is superior to the holistic approach. Teachers needed to provide a learning environment in which students' brain could grow and develop to the fullest in order to help students obtain a better reading performance (Chall, 1967; Fletcher, 2014; Kayalar & Turkan, 2016).

Hart (1975, 1983) had named his proposed teaching strategy a brain-compatible approach, which others had dabbed a combination of brain science and common sense conceived to bring forth effectiveness in learning. According to the analysis of Chipongian (2004) and Demirhan et al. (2014), Harts saw the structure of the traditional approach in teaching as being brain-antagonistic that prevented effective teaching rather than enhanced it. BBL theorists such as Kay (2014) put emphasis on the immediate learning environment. Criticizing the prevailing learning methods, Hart (1983) used the analogy of the brain-antagonistic learning with a glove designed without the knowledge of the shape and the function of the hand. Hart contended that teachers should learn how the brain was designed to learn in order to teach students effectively.

The Pioneers in Scientific Research on BBL

BBL proponents and researchers emphasized that reading fluency, especially for struggling students, was a critical aspect of the entire learning process; it is a gauge of future educational success (Gardner, 2014). BBL strategy focused on the awareness of how the brain functions in learning; however, it might not be the final say in the

educational process, as according to Chall (1967), it did not address certain social and cultural aspects proven to be impediments to learning. Nevertheless, the theory, when integrated with other proven methods of teaching, could be a valuable foundation for an effective educational strategy. BBL, employing the latest science in brain functions, had improved considerably the prospects of educational success. It was significant to understand that the findings of the pioneers in scientific research on BBL had played a significant impact on learning success and BBT strategies were the tools for success (Sousa, 1995, 2014).

Students' levels of reading engagement were correlated with many aspects of student's psyche, life, and environment, such as emotion, culture, physical environment, self-perception, parental and peer attitudes, and social interactions (Harris, Graham, & Adkins, 2015). BBL theory required teachers to be aware of those aspects in order to enhance students' engagement and implement meaningful literary instruction (Wiznia, Korom, Marzuk, Safdieh, & Grafstein, 2012). Regardless of age, gender, cultural background, brain has an unlimited ability to process and make patterns and learn from learning experiences (Caine & Caine, 1994).

Caine and Caine (2014) presented BBL in 12 principles, which emphasized the importance of learning patterns, used as the learning strategies of BBL for elementary students with different learning skills such as poor reading and other learning impediments (Caine & Caine, 1995). Caine and Caine's approach of BBL in 12 principles provided teachers different teaching techniques designed to enhance the students' initial perceptions of engaging in literacy activities (Connell, & VanStelten, 2013; Frey, 2005). Such approach helped second-grade teachers identify the predictive

factors of their struggling students' engagement through one-on-one interviews and communication, including the adjustments which could be made in the classroom environment in order to increase the effectiveness of the engagement strategies used (Bell & Perfetti, 1994; Reis, McCoach, Little, Muller, & Kaniskan, 2010).

Influences of BBL Theory in Teaching

One of the most important aspects of BLL was the creation of an environment that benefited maximum teaching capacity. According to BBL theory, teachers had to put students to be fully part of the learning process and experience it actively, rather than as passive spectators (Gulpinar, 2005). Another brain-based requirement in teaching the students was relaxed during the teaching and learning process. Neurophysiological studies showed that the particular brain wave frequencies characteristic to the relaxation state were the most favorable to attention and acquisition of knowledge and memorization (Byrnes & Vu, 2015; Darling-Kuria, 2010).

BBL proposed a constructivist model in the classrooms, with the full participation of the students. Every aspect of knowledge should be a meaningful challenge for students rather than presented as mandatory rote memorization task (Coffman & Klinger, 2014). Furthermore, BBL required teachers to motivate students by challenging them with complex problems and issues. BBL was currently an accepted theory in education research and practice and many educational entities had developed curricula that attempted to apply the neuroscience of learning to the classroom setting (Doolen & Cates, 2014). Researchers expanded insights into BBL to encompass both regular classroom and the special education setting (Edelenbosch et al., 2015).

Hart's BBL concept of learning had become accepted far and wide, and its influence had been supported by further advances in psychology of learning and neuroscience (Edelenbosch et al., 2015; Saleh, 2011). BBL research continued to bring about new insights into the brain and how they could be applied in instructional settings. Among the scholars who brought an outstanding contribution to BBL application were Caine and Caine, who expanded Hart's theory of brain-compatible or BBL with a list of twelve 'brain/mind learning principles' (Caine & Caine, 1991, 1997). According to LeMar and Burgess (2015), these principles of the Caines synthesized the knowledge in neuroscience as applied to learning, and represent an outstanding contribution to the theoretical foundation of brain-based education. Over the years, the Caines' well-researched and insightful principles of brain-compatible learning have been employed as a frame of reference and practical guidelines in various classroom settings (Wiznia et al., 2012).

Today, BBL theory has expanded and adapted to a wide range of learning environments (Jensen, 2000). Jensen (1995)'s learning approach emphasized an integration of Hart's BBL theory with the practical approaches of Caines' brain/mind learning principles. According to Caine and Caine (2013), such integration method improved learning outcomes. To improve reading performance, Jensen (2013) urged teachers to demand intellectual rigor from students and he identified five steps that were demonstrated to maximize reading performance: (a) maintaining high expectations, (b) teaching in different learning styles, (c) using alternative forms of assessments for those learners who learn differently, (d) providing a climate of respect for learners, and (d) utilizing multi-status, multi-age, and multi-ability teamwork (Jensen, 2013).

In the domain of acquisition of knowledge, Jensen emphasized the use of practical methods known to activate the neuronal functions related to memorization.

Contemporary Research of Neuroscience on BBL

Numerous researchers have proposed that neuroscience had a unique role in transforming education to a considerable degree and that the outcomes of learning depended drastically on the application of brain-based knowledge in teaching (Connell, & VanStelten, 2013; Liu, & Huang, 2014; McCall, 2012; Tokuhama-Espinosa, 2015). Özgül & Necdet (2012) examined a group of elementary teachers utilizing their teaching views on mind mapping in order to improve their effective teaching and assist students' learning outcomes. The study group of the research was composed of 24 elementary school teachers, including 18 females and 6 males, in several elementary schools and it was conducted by a qualitative research design. In order to investigate the participating teachers' views on mind mapping for teaching, the researchers provided the teachers the sample mind maps presented in details and each teacher was asked to prepare a mind map, which was presenting himself/herself individually. Then the participants were enabled to analyze each other's mind maps by presenting the studies of mind mapping and the use of his/her own techniques through six open-ended questions. According to the researchers, the results showed that using mind maps in teaching helped all the teachers improve their instruction, planning, and evaluating lessons, as well as making the teaching became more efficiently. As a result, students learned more effectively. Without mind mapping, the teachers were easy to get lost in instructing and had difficulty keeping track of organizing thoughts and implementing teaching techniques. Consequently, teaching without mind mapping became less effective and students' learning results were

poor. The results of the researchers are significantly related to the study because they showed that the application of the mind mapping technique was a technique of brain-based teaching strategies that assure teachers and students to recall knowledge and to show the relations between different thoughts and concepts (Özgül & Necdet, 2012). As such, mind mapping was a brain-based education that highlighted the important role of neuroscience in teaching and learning (Malekzadeh & Bayat, 2015; Saleh & Salmiza, 2011).

Gehris, Gooze, and Whitaker (2015) studied a group of 37 elementary school teachers located in Allentown, Easton, and Bethlehem, PA on teachers' perceptions about students' movement and learning in early childhood education. The study was conducted in a qualitative research design, and it aimed at gaining teachers' insights, explore the further depth, richness, and complexity that are inherent in the phenomenon of teaching environments. The qualitative design allowed the researchers to focus on the holistic, subjective interviews, communication, and observation that are derived from the basics of knowing, allowing meaning and discovery of uniqueness and individual interpretation from the participants. The researchers divided the participating teachers into six small focus groups with the guide of lead teachers (20 lead) and assistant teachers (17 assistant).

Each focus group discussion lasted approximately 70 minutes and the data were generated through the interactive group processes such as interviews, discussion, and open-ended prompting questions in order to explore teachers' perceptions about the following subthemes: (a) how teachers' teaching movement experiences influence students' learning results, (b) what types of teaching experiences of BBL are most

beneficial for students, and (c) what challenges exist related to supporting students' learning and what BBL strategies might be used to overcome those challenges? The participants provided written informed consent and no data were collected without the signed consent form. The survey was analyzed by tallying the responses from the teachers concerning their knowledge and experiences of the study. According to the researchers, the results indicated that 21 teachers who implemented BBL strategies in the classroom through movement activities, knowledge, and experiences of BBL strategies greatly assisted their students to learn more affectively. Sixteen teachers who did not implement or utilized less knowledge and less experience of BBL strategies in class made their students achieve less effective outcomes of learning. As the results indicated, it was important to conclude that neuroscience had a unique in teaching because BBL, which drew insights and perspectives from neuroscience, required educators and teachers to engage fully in the process of enabling students to raise their academic self-efficacy and academic performance (Liu, & Huang, 2015; McCall, 2012).

Educational neuroscience had a major goal in education and it was to bridge the gap between teaching and learning through the use of teaching techniques that highlighted the important aspects of brain functions (Connell & VanStelten, 2013). Caine and Caine (2010) extended 12 principles of BBL, which were the unique and holistic methods of teaching and learning for educators, teachers, and students that combined of body, brain, mind which were conceived of as dynamic unity, and applied them to various learning environments in order to improve effective teaching and learning outcomes. The purpose the Caines was to utilize theoretical foundation for BBL in class through the participation of teachers in order to offer guidelines and a framework for

teaching and learning. The Caines used a qualitative approach for the study and their method was to collect and analyze the data from a group of participating teachers from different school settings through interviews, questionnaire, and natural observations. The results indicated that teaching and learning could not be separated from attention, emotion, or senses which were the important parts of cognitive functions. Brain was pre-wired to teach and learn. Teaching and learning abilities and its functionality depended on all the brain functions and brain was a social organ that teachers had a unique role in implementing their social brains in teaching and stimulating students' cognitive functions through class activities (Caine & Caine, 2010). Moreover, researches showed that the educational neuroscience research in recent years has contributed widely to the practice of brain-based education raising new possibilities for the struggling students and their teachers (Caine & Caine, 2012). The findings of neuroscience research on BBL had many facets and each of these facets reinforced the role of BBL in transforming education (Hughes, & Baylin, 2012; McCandliss, 2003).

Influences of Neuroscience Research of BBL in Teaching and Learning

The influences of neuroscience research of BBL in improving reading were varied and they had brought significant changes to theoretical and practical strategies in education that impacted both teaching and learning. Deligiannidi and Howard-Jones (2014) studied how neuroscience research of BBL influenced teaching and learning by surveying 217 elementary school teachers (155 females and 62 males) in Greece from various primary school education programs. The researchers utilized the findings of neuroscience research on BBL in order to reduce the prevalence of neuromyths in education. Analysis revealed that Greek school teachers held many misconceptions and

misunderstandings about the brain that influenced teachers' ideas and thoughts on teaching and about students' mind-brain relationship. Greek teachers often failed to provide students' learning experiences and the prevalence of neuromyths among Greek teachers contributed to poor theoretical and practical strategies in education. As the results indicated, the great majority (87%) Greek elementary school teachers believed that neuromyths brought negative impacts on the brain and they were hampering teaching and learning. The findings of neuroscience research on BBL significantly helped Greek teachers understood the benefits from accurate knowledge of the brains that enriched both teaching and learning. As such, the findings of the researchers on BBL were crucial to the study because they brought significant changes to teaching. The results played an important role in reducing the prevalence of neuromyths in education, which were often associated with poor or unevaluated teaching and practices in the classroom (Deligiannidi & Howard-Jones, 2014).

Influences of brain research on learning continued to impact on teachers utilizing BBL strategies in improving readers. New biological and physiological discoveries on how human brain learns to read and grows to the fullest in the field of neuroscience in recent years have brought significant changes and implications for teaching and learning and that required educators and teachers to utilize and apply new methodologies of BBL strategies in classroom instruction (Becattini et al., 2015; Sprenger, 2002). Price et al., (2016) examined a group of 50 first and second grade students on mathematical and numerical competence through teachers' instructional strategies on using different standards-based mathematics curricula. In their studies, the researchers observed how teachers instructed and incorporated their BBL strategies into the classroom and

measured how students built math skills through exploration, active participation, and imitation. The results showed that teachers utilizing BBL strategies helped students with mathematical and numerical concepts and applications achieve higher success in developing mathematical skills and numerical competence than those teachers who did not. Students obtained better reading performance and other learning skills in learning. As a result, influences of brain research on teaching did not aim at transforming and reforming education, but also met the needs of learners (Yildiz et al., 2015).

There was an increasing need of improving struggling second-grade readers in elementary schools and teachers need to understand the important role of neurological explanations and explorations for second-grade students through brain's response to visual and audible stimuli (Marzano et al., 2001). Mitchell et al. (2016) studied a group of 42 second-grade students at several elementary schools by implementing teachers' visual and audible teaching styles in classroom. Students from birth were inundated with a lot of visual, audible information, and kinesthetic means through touching, feeling, experiencing the material at hand. The results showed that through teachers' visual and audible teaching strategies, 42 second-grade students were able to learn quickly and fast, and students read more effectively. The results further indicated that repeated reading had a tremendous impact on struggling second-grade readers because it was not only effective for improving reading fluency, but also assisted readers in developing their vocabulary, grammar structures, and syntax (Mitchell et al., 2016). As such, it was important for teachers to engage students in visual and audible literacy activities. Effective teachers knew how to institute teaching lessons with clear demonstrative teaching methods to stimulate the brain of students (Fischer, Holmes-Bernstein, & Immordino-Yang, 2007).

Teachers also needed to organize in utilizing and implementing BBL strategies in order to teach their instructional approaches relevant and adjustable to the needs of struggling readers (Battro et al., 2008).

Teachers' Responses to Struggling Reading

Teachers played a vital role in assisting students to learn comfortably and effectively and teachers' role of BBL strategies could be seen as the potential of role-model education. Rose (2014) studied 150 students between the ages of 10 and 18 from Austria and Germany, 53% girls, and students in each country attending different elementary schools. The researcher used a qualitative method to conduct the studies and the data was collected in the form of questionnaires, including open-ended questions and surveys. The purpose of the studies was to examine the teachers' role-model education within both formal education, concerning with the imparting of knowledge and information in class, and informal education, regarding the opportunities where teachers played a more natural informal role such as educational trips and visits, and recreational events. The results showed that teachers' role-model education was not merely important in the classroom, but also outside classroom activities in which teachers subjectively facilitated students in instructing the lessons and guiding students to involve in the activities so that both teachers and students achieved their set goals. It was the aim of BBL strategies because teacher's role was seen as effective when it integrated teacher's teaching role with student's learning experiences (Rose, 2014).

Studies showed that teachers play a significant role in students' reading comprehension (Fletcher, 2014). Teacher's role in students' reading comprehension was to implement brain-based strategies in classroom to meet the various needs of learners

and reach students' learning goals. To this end, teachers employed brain-based strategies by explaining and demonstrating in detail BBL strategies to their students, brain-based reading instruction to help students understand it. Teachers modeled brain-based strategies by reading aloud to students and assist them to clearly comprehend it. Piper and Zuilkowski (2016) administered 4385 elementary school students in 125 formal and informal elementary schools in sub-Saharan Africa by asking students to read aloud and/or repeating what teachers read. The purpose of the researchers was to maximize the effectiveness of read-alouds which could yield important academic benefits for struggling readers through teachers' instruction and repeating patterns of BBL strategies in class. Methods for reading aloud allowed teachers to encourage students to use their background knowledge to develop understanding of the text and ask questions that keep students engaged as well as to teach students the repeating patterns by finding the score of a pattern. The results showed that reading aloud helped over 75% students become a more efficient and effective reader because reading aloud builds comprehension and it was the foundation for literacy development. As teacher model reading lesson, students observed teachers' thought process, and this included the discussing reading strategies to help students be fully aware of thought process during the reading (Piper & Zuilkowski, 2016). Moreover, BBL strategies allowed teachers to calculate the percentage of words that students read correctly and analyzed the miscues of errors (Vlachos & Papadimitriou, 2015). BBL strategies also required teachers to monitor students' reading progress and inspired them to read and reread for better comprehension because reading in a lively, engaging way, using voices, gestures, and expressions could enhance students understanding. As such, teachers' read-aloud strategies played a central role in reading

comprehension and reading skills and teachers assisted students' comprehension, reading skills, and succeeded literary experiences with carefully executed lesson plans and reinforcement (Chaplain, 2016; Piper & Zuilkowski, 2016).

It was the role of teachers, especially for second graders, to assist students to comprehend the text when it did not make sense to them. Teachers needed to discuss the comprehension strategies with students for pre-reading, during reading, and post-reading (Yildiz et al., 2015). According to these researchers, for instance, teachers helped students to do the individual comprehension checklists with specific steps and teachers might show visual picture cues and drawings to students who read below the grade level. Comprehension checklists helped students read independently and increased one's confidence, self-motivation, and self-monitor (Wiggins, 2005b). Suyasti and Sada (2016) established a new learning model which aimed to overcome students' reading weaknesses and disabilities. The model required teachers' comprehension checklists which were led and guided by a Student Teams Achievement Divisions (STAD) cooperative learning, which consisted of five major components: class presentation, teamwork, quizzes, individual improvement score, and team recognition. The results indicated that students' third circle of reading average reading score increased significant to 81.71, compared to the first circle (49.57) and second one (70.43). The researchers concluded that the use of STAD improved the students' reading comprehension and their involvement in active learning. The role of teachers in teaching BBL strategies was to engage students in reading lessons (Hoiland, 2005), to make connections with reading learning materials such as age-appropriate books, periods, magazines that drew students' general interest, engagement and motivation (Wolfe, 2001), as well as oral retelling strategies which

included verbal stories derived from small reading groups and social discussions (Jensen, 2003b).

Implementations and Trainings of BBL Strategies into Classroom Reading Skills

Reading was important for a variety reasons and importance of reading skills in elementary students would be very helpful to their future. According to Fitzsimmons (1998), brain-based reading instruction played a central role in implementing BBL strategies for struggling readers because it was essential that teachers emphasized on connecting students' brain and cognitive mastery to students' reading skills. Bates et al. (2016) examined the reading achievements of 1,806 students in 225 schools throughout the state of South Carolina in several years through the yielding of four components - interest, challenges, collaboration, and self-efficacy that aimed to enhance students' cognitive mastery learning. The researchers found that teachers' implementation of BBL strategies in place of reading recovery had brought the significant effects on students' motivational levels which contributed to their cognitive mastery to their learning achievements. The results highlighted how important it was for teachers' early reading interventions to consider teachers' role of reading instruction played in literary acquisition. Teachers encouraged students to continue in maintaining an interest in reading and also prepared them to understand more challenging texts that students read as their word skills improved. Through the practice of reading skills, students came to understand a different way of thinking and learning strategies that enabled them to construct and maintain reading skills (Bates et al., 2016; Ganske et al., 2003). This included social and interactional learning in classroom through modeling teaching

strategies in reading, previewing and predicting activities as preparation for in-class or out-of-class reading, exercising vocabulary items, and encouraging students to develop and approach reading assignments (National Capital Language Resource Center, NCLRC, 2013-2014).

Reading Fluency

Fluency was defined as the ability to read fluently whether it was read aloud or silently. Essential to comprehension and necessary component, reading fluency was a multifaceted skill with different concepts such as speed, accuracy, smoothness, and expressiveness (Worthy & Broaddus, 2001). Teachers through BBL strategies taught students to read with rhythm, flow, phrasing, intonation, and smoothness. Allinder et al. (2001) examined the reading fluency of 50 students in several literacy activities with special focus on teachers' oral reading instruction. The researchers learned that students who followed teacher's special oral reading instructions and guidelines made a significant progress in reading fluency than those students who did not. The results further indicated that there were the basic qualities of oral reading fluency as an indicator of reading fluency so that students knew the goal of reading and develop ease, rate, and understanding when they read silently (Allinder et al., 2001; Therrien, 2004). According to these researchers, most elementary readers did not read fluently because they failed to decode the meanings from the texts such as sentences and paraphrases. Teachers instructed struggling students to decode the meanings of the text and emphasize reading for meanings. For this reason, teachers' BBL strategies had a significant impact on their students' reading fluency and they provided students with specific instructional

recommendations so that students had opportunities to practice fluency in all reading activities (Allinder et al., 2001).

Reading Experience

According to Lyons (2003), students' reading experience was significantly connected to and widely interacted with their everyday experiences and this included the activities inside and outside the classroom. Teachers played a vital role in motivating and urging their students to use the reading experiences for reading achievements. Vlachos and Papadimitriou (2015) investigated 287 second-grade students (146 boys and 141 girls), ranging from 7 to 8 years old and older, on how their daily reading experiences affected their reading performance. The materials and procedure for all participants were that each student was individually tested in a two 10-minute session by reading accuracy, reading fluency and reading comprehension. The results showed that the older children's reading fluency had better scores than younger ones and gender was not found to play an important role in reading performance. The results also indicated that students' daily social and interactional experiences, either from reading for pleasure, for information, or for a purpose, greatly contributed to the learning reading environments which increased students' brain development and cognitive functions. Students' social and environmental experiences inside and outside the classroom had an influential role in increasing reading skills. Students were intrigued to open their minds and thoughts to dwell into all learning literary circumstances in order to master their reading performance (Vlachos & Papadimitriou, 2015). Teachers of BBL strategies instructed and direct their students by encouraging and assisting students to identify and interact their reading skills of comprehension and reading mastery between literacy activities and real-life situations -

school, home, public and social environments (Wiggins, 2005a). Moreover, reading from self-selected books, magazines, or texts provided students with a significant remembrance and opportunity to succeed in education and strengthen their reading skills (Kay, 2014).

Training for BBL Strategies

Training teachers for utilizing BBL strategies was a vital step of effective teaching and the implementation of BBL strategies in classroom would be applied to all teaching subjects to meet the needs of students (Jenson, 2008; Tokuhama-Espinosa; 2014). There were different trainings for BBT strategies and each of which had its own implications and effectiveness. For instance, Lavis et al. (2016) examined a group elementary school teacher and the researchers designated a 20-month training program for teachers to receive training on using brain-based teaching strategies in class. The component of the training program included annual teaching, learning workshops, reading and discussion groups based on what teachers had learned during the training which integrated with pre/post surveys administered during the program and a qualitative culmination survey of a subset of all participants. The results revealed that the participating teachers benefitted from the training and from each other's insights, diverse teaching experiences and skills. The results showed that using BBL strategies in class was a must in a situation in which students learned and read below expected levels (Lavis et al., 2016). In addition, the results further suggested that for the best learning outcomes of students, elementary teachers needed to become, and they were encouraged to receive training on BLL strategies to meet the needs of students today, especially novice teachers

and inexperienced teachers who were hesitant to adopt and utilize BBL strategies in the classroom (Jensen, 2014; Sprenger, 2015).

Summary

The literature had reviewed that teachers had a tremendous role in assisting students' reading competency which had an essential impact on struggling second-grade readers. Through teachers' implementations of BBL strategies, teachers improved struggling readers in diverse classrooms and BBL strategies allowed teachers to instruct struggling readers to engage more in reading activities at various learning environments. Influences of neuroscience research of BBL in improving reading were important to teachers' implementations of BBL strategies and neuroscience research had served as the base to support BBL strategies in all learning purposes.

It was imperative that teachers implement brain-based teaching strategies for struggling readers and direct students to involve in literary environments. BBL strategies required teachers to help struggling readers meet their needs and encourage them to involve in all reading opportunities that took place inside and outside the classroom. The effect of encouragement of BBL on improving reading was a must that teachers were required to assist struggling readers to read with comprehension and fluency. Teachers' BBL strategies helped students obtain both reading skills and reading abilities for future. It was important for students' engagement in all literacy elements inside the classroom.

Chapter 3: Research Method

Introduction

This chapter is an explanation of the methodology which was used to collect data for the study. The benefit of educational research method was that it attempted to increase the knowledge and understanding about teaching and learning in order to incrementally contribute to the development and improvement of educational purposes (Gall, Borg, & Gall, 1996; Wellington, 2015). Methods of this study included interviews, classroom observations, reflective journals, surveys, implementations, and experiences of teaching strategies in the classroom. I explored the engagement of the classroom teachers' implementation of BBL strategies and their perceptions as well as the conditions and factors that were contributed to or impeded their teaching progress in order to assist struggling readers. Given the evolving nature of the study, the following research questions were addressed:

1. What types of training and education have second-grade teachers received in utilizing BBT strategies for reading?

2. How do second-grade teachers utilize their training in BBT strategies in the classroom?

3. How do second-grade teachers utilize their training in BBT strategies for student engagement in the classroom?

4. What do second-grade teachers like or dislike about BBT?

This chapter included a description of research design for the study and it clarified the rationale for the choice of the case studies as a vehicle for investigating how teachers adapted and experienced the implementation of BBL strategies in classroom. The chapter

also included a description of data collection instruments, the plan for recruitment

participants, data collection, and data analysis. In addition, trustworthiness of the study

was addressed and strategies for enhancing trustworthiness of the study and a discussion

of ethical considerations were presented.

Research Design and Approach

This study was designated as a qualitative, descriptive multiple-case methodology

designed to comprehend the many possibilities of the BBL in the education of struggling

readers with focus on effective methods of engagement in literacy in diverse classrooms.

Campbell and Ahrens (1998) defined a multiple-case study which enables the researcher

to explore differences within and between cases. The goal of multiple-case study was to

replicate findings across cases. Multiple-case study was important to this study because

each case participant played an important role in the study and represented a significant

contribution to a unit of study (Yin, 2014). In addition, the data of each unit of analysis,

the second-grade teacher, within a multiple case study design would derive from in-depth

questions, open-ended interviews, and yielding quotations from the participants about

their feelings, opinions, thoughts, knowledge, and experience regarding BBL teaching

strategies (Ragin, 2014; Yin, 2014). Multiple-case study was essential to the study

research questions because it allowed the researcher to analyze within each setting and

across setting (Stake, 1995). The qualitative multiple case study design was selected for

the study since it allowed the researcher to accumulate data through interviews,

observations, and archived documents, and draw relevant conclusions based on a

multitude of observations and experiences acquired during the teaching process. The

multiple case study research design also allowed the researcher to explore the similarities and differences within and between cases (Yin, 2014).

Research design for this study was a qualitative approach and the conceptual framework for qualitative study was a two-dimensional conceptual model that focused on meaning and understanding in which the researcher became the primary instrument for data collection and data analysis (Merriam, 2009). Qualitative approach was selected because this study was focused on the meaning and understanding of teachers' BBL strategies so that teaching could become effective toward struggling readers and learning purposes. The field study method was utilized in order to prepare for data analysis, conducting dissimilar analysis, and making an interpretation of the larger meaning of the data (Creswell, 2013; Merriam, 2009). The research type was the study of four second-grade teachers from southwestern state. The naturalistic inquiry data collection consisted of interviews, classroom observations, reflective and interactive journals between the participants and researcher, and documents reviews as supplement sources.

The research design selected for this study was a case study design. Qualitative research was multi-method in its focus, involving an interpretative, naturalistic approach to its subject matter. That means, qualitative researchers studied things in natural settings, attempting making sense of, or interpret phenomena in terms of the meanings of people bring to them (Denzin & Lincoln, 1994). The distinctiveness of case study, which looked at how teachers adapt and experience implementing BBL strategies in classroom, matched what Merriam (1998) and Yin (2015) depicted as the significant characteristics of case studies. That means, case studies did not only spotlight a particular situation and take a holistic view of how a particular group experiences and comprises a rich depiction

of multiple sources of data, but also illuminate the researcher's view and understanding of the phenomenon to bring about new methods and strategies for the study. For this reason, Yin defined case study as an empirical inquiry that investigated a phenomenon in depth and within its real-life circumstance. I investigated the multiple case study of the teachers in the context of adapting and implementing BBL strategies that occurred in the real-life context of their lives as classroom teachers.

Role of the Researcher

According to Nelson, London, and Strobel (2015), the role of case study researcher is that of teacher, advocate, evaluator, and biographer. Of all the roles, however, it was central for the case study for me to play a role of interpreter or gatherer of information and interpretations. For this study, I collected the data from four second-grade teachers in a public-school district in southwestern state. Appropriate working relationship between myself and participating teachers established by mutual respect, time, privacy. As a qualitative researcher, I followed the protocols for data collection and data analysis. The interviews with the participants were conducted in a private office and the participants were allowed to withdraw at any time. Because I was the only person who was responsible to collect, analyze, and interpret the data, there might be a potential bias. To avoid the bias, I committed myself to remaining open-minded and reflective regarding participants' responses either through their verbal comments and/or facial gestures. Flexibility of the researcher was a practical way to avoid and reduce the potential bias of the study (Gall et al., 1996). In addition, it was my role to conduct the study in an ethical manner that relied on the responses and agreements of the participants' informed consent and confidentiality (Appendix B).

Participants of the Study

The participants for this study were four second-grade teachers of brain-based teaching strategies in the school district of southwestern state. According to Patton (2014), participants are selected in order to give purposeful sampling to the study which was used to provide the richest data about the selected participants to benefit the study. The selection criteria of four second-grade teachers were based as follows: (a) teachers would have at least 5 years of teaching in elementary school, (b) teachers were certified as a full-time teacher and utilizing BBL strategies in their classroom, and (c) teachers were recruited through the roster lists provided by the school administration and they were willing to participate in the study. The participants might belong to any ethical group and gender. The recruitment agreement entailed to arrange the meeting with the researcher and potential participants to discuss the nature of the study.

The selection of four participating teachers for the study was primarily relied on their level of knowledge of adapting and implementing BBT strategies in their classroom. Each of the participants had been a full-time teacher or trainer in BBT and they had made a serious commitment to implementing it in the classroom in order to assist their struggling readers to achieve effective reading performance. Furthermore, the study of these four selected second-grade teachers was unique because (a) each of them fully implemented BBT for learning differently, (b) they were all trained in BBT frameworks or approaches, and (c) they all had knowledge and experiences about BBT in class. As such, each case of the participating teachers was exceptional but they all contributed to the common depth and breadth in their knowledge base about brain-based teaching strategies.

Multiple Data Sources and Data Collection

According to Merriam (1998) and Yin (2015), a major benefit of qualitative study is the use of multiple sources of evidence which were collected from the data collection. For this study, there were three ways to collect data: (a) interviews with four second-grade teachers, including one-on-once interviews, tape recorded or emails, as a primary source; (b) classroom observations; and (c) weekly reflective and interactive journals as well as teaching documents such as lesson plans or other instructional artifacts. Use of these multiple methods of collecting data would help to validate and enhance the validity and reliability of the study.

A field study approach was used in this study. A qualitative research design allowed me to explore social and human conditions of the study (Creswell, 2014). According to Nachmias and Nachmias (2007), field test was defined as the study of people acting in the natural courses of their social daily lives. The field test for this study was the field experiment of the second-grade teachers performing in their natural teaching settings. Field test was characterized by the location in which teachers were working and by the manner in which it was conducted. For instance, the participating teachers in this study were required to involve in the data collection process which explored how teachers experience implementing brain-based learning in their classrooms. Field test also included a way of empathizing and understanding the subjective meanings of participating teachers. Field test was the most central way of data collection and the researcher of this study conducted field test in natural settings in an effort to understand subjectively the teachers who were being studied. I examined the data collected from the study and used the grounded theory approach, which involved in identifying conceptual

themes or patterns of teachers who directly experienced from the immediate data collected.

In conducting this study, I created the teacher interview questions to interview four second-grade teachers in southwestern state. Teacher interview questions were created based on the research questions. In order to obtain the highest results from the study and the alignment with the research questions, I consulted the teacher interview questions with several BBL experts and professors in the field of BBL such as Dr. Johnson, Dr. Mitchell, and Dr. Parker (e.g., these are anonymous names) from a southwestern state. Teacher interview questions focused on the strategies that teachers implemented for struggling readers and for the perceptions of their students' performances before, during, and after a concentrated set of experiences. Teacher interview questions involved unstructured and generally opened-ended questions that were intended to elicit views and opinions from the participants (Creswell, 2014).

Teacher Interview Guide 1 primarily focused on teachers' perceptions of their struggling readers before the concentrated set of experiences was developed. Teacher Interview Guide 2 emphasized on teaching strategies that teachers implemented during the concentrated set of experiences to assist teacher's perception of students' performance. Teacher Guide 3 focused on the changes that teachers made in their reading lessons and their perception of struggling readers after a concentrated set of experiences. Thus, teacher interview questions for the participants were listed below:

Teacher Interview Guide 1

1. What teaching strategies do you implement for struggling readers?

2. How do your BBT strategies change or impact your old teaching styles?

3. What are the positive aspects of your BBT?

Teacher Interview Guide 2

1. How are your BBT strategies engaged in your teaching activities?

2. How are your BBT strategies beneficial to struggling readers?

3. Do you like the BBT strategies? What are the pros and cons?

Teacher Interview Guide 3

1. Describe the struggling readers' achievements after you have implemented your BBT strategies in class.

2. What are your perceptions of BBT strategies? How do the perceptions affect your practices in teaching?

3. Do you like or dislike your own BBT strategies? How do you compromise your own teaching styles with other teachers?

The study population was consisted of four second-grade teachers, during the years 2015-2016, who came from Oakham (e.g. anonymous name) school district in public schools directory of southwestern state. Oakham School District was composed of five elementary schools (K-5) and it had 2,886 students in grades K-5. Oakham School District had 132 classrooms, a multipurpose room, a library, a computer lab, special purpose rooms including those for special education, and a research lab. The staff and teachers consisted of more than 248 certified and classified employees, both full and part time. A student-teacher ratio was of 10:1 (Oakham School District Archives, 2016). All potential second-grade teacher participants for the study were recruited and invited, but not required, to participate in each data collection process, where a description of the study was provided (Appendix B).

The following were four elementary schools of southwestern state, in which four second-grade teachers had been teaching. All the names of the school were anonymous.

School 1 had 534 students, including 5.1% in special education, 22.5% qualifying for English Language Learner support, and 68.9% qualifying for free or reduced-price lunch. Student enrollment by ethnicity and grade level 2015-2016 was as follows: 12.50 % African-American, 6.20 % Asian, 0.70 % Filipino, 58.20% Hispanic or Latino, 0.70 % Pacific Islander, 18.90 % Caucasian, 2.60% Multiracial, 5.10 % Students with disabilities, 68.90 % economically disadvantaged, and 22.50 % English learners.

School 2 had 532 students, including 7.1% in special education, 15.6% qualifying for English Language Learner support, and 55.1% qualifying for free or reduced-price lunch. Student enrollment by ethnicity and grade level 2015-2016 was as follows: 7.70 % African-American, 2.60 % Asian, 1.10 % Filipino, 62.00 % Hispanic or Latino, 0.20 % Pacific Islander, 25.20 % Caucasian, 0.90% Multiracial, 7.10 % Students with disabilities, 55.10 % economically disadvantaged, and 0.80 % English learners.

School 3 had 754 students, including 6.9% in special education, 14.7% qualifying for English Language Learner support, and 47.1% qualifying for free or reduced-price lunch. Student enrollment by ethnicity and grade level 2015-2016 was as follows: 15.60% African-American, 6.60 % Asian, 4.90 % Filipino, 41.80 % Hispanic or Latino, 0.30 % Pacific Islander, 28.20 % Caucasian, 2.50% Multiracial, 6.90 % Students with disabilities, 47.10% economically disadvantaged, and 0.40 % English learners.

School 4 had 582 students, including 8.4% in special education, 10.8% qualifying for English Language Learner support, and 51.9% qualifying for free or reduced-price lunch. Student enrollment by ethnicity and grade level 2015-2016 was as follows: 7.90%

African-American, 4.60 % Asian, 1.00 % Filipino, 49.00 % Hispanic or Latino, 1.00 %

Pacific Islander, 33.20 % Caucasian, 3.30% Multiracial, 8.40 % Students with

disabilities, 51.90% economically disadvantaged, and 10.80 % English learners.

Interviews

Data collection consisted of four second-grade teachers participating in two

interviews. The first interview focused on the background of the participants with the

intent to put the participants in context. Such kind of interview involves in building

rapport, signing the Consent Form, and gathering the information about the individual's

life. The advantage of the interview allowed me to have the opportunity to ask for

clarification and obtain more information from the participants as well as building trust

and rapport lending to the research subject (Merriam, 1998). The research questions for

this study served as the primary focus of the interviews. Transcribed interviews were

coded, sorted, and revisited frequently to identify the study focus. Open-ended questions

were the primary source of data collection and the teacher interview questions were

aligned with the research questions.

The second interview allowed the participants to describe and express the

meaning and experience of their BBT strategies in the classroom. The participants

depicted and shared the factors and conditions of their BBT strategies in the classroom

that were either contributed to or impeded their implementation of brain-based strategies.

By utilizing BBT strategies for teaching, the participants needed to look at how their

BBT strategies worked or did not work for students, how their training and teaching

experiences of BBT strategies supported their teaching and enhanced students' learning as

well as their personal experiences of BBT strategies related to other participants. In

addition, the interview entailed having the participants describe the personal experiences, feelings, accomplishments, motivations of subjects about BBT strategies. The interviews would be conducted in a location selected by the participants that was free from distraction and ensured privacy. The transcribed interviews and emails were also used for the research purpose and being kept confidently by the researcher.

Observations

Observation of subjects in the natural setting would be used as a supplemental source of evidence to support the study. Observational notes would be handwritten by the researcher during interviews to record participants' key responses, emotions, actions, and themes, which may not appear in transcripts (Marshall & Rossman, 2011). According to James (2016), observation allowed researchers to formulate their own version of what was happening in the observational process and independent of the participants. Observations provided an alternative source of data for verifying the information obtained by other methods. For this study, classroom observations were important because I had the opportunity to observe the teachers' instructional methods and teaching strategies in class. Observations helped me gather the concrete evidences collected in the classrooms which were valuable supplement to self-report methods, or it could be served as the main data source for the study. Observations allowed me to gain verbal portrait of the research participants, reconstruction of dialogue, description of the physical setting in class, accounts of particular events so that the observer might draw out a sketch of the layout of the physical setting in which the observed activities were occurring (Gall, Borg, & Gall, 1996). Besides, qualitative research traditions had developed disciplined procedures for effective observations that helped to address the challenges of gathering

data and minimizing inaccuracy and bias of the study (James, 2016). Observation was crucial for the study because the data collection gathered from the observational procedures did not only help the study, but also reduced the existence of bias which might happen during the collecting process (Gall et al., 1996).

Reflective and Interactive Journals

Reflective and interactive journals revealed the personal reflections of each subject on questions provided in part by the researcher (Wellington, 2015). According to Craig, Zou, and Curtis (2016), it was important to researchers to make sense of what they read from reflective journals and reflection was a natural inclination of humans to attempt to understand experiences and find patterns for learning from it. The researcher provided the journal questions that allowed the participants to reflect on the learning subjects (Kraemer & Blasey, 2015). Reflective and interactive journals included the individual thoughts, feelings, decision-making and experiences, as well as e-journals, as teachers implemented their brain-based teaching for learning.

For this study, reflective journal questions and e-journal questions were sent to the teachers before the interviews. The purpose of reflective journal questions and e-journal questions allowed the teachers to have some time to reflect upon their teaching strategies which were used in the classroom and positively responding to what they had implemented in class in order to achieve teaching goals. Reflective and interactive journals also included teaching instructions and teaching strategies. E-journals were the teachers' responses to topical questions related to the area focusing on brain-based teaching research and education. A list of questions/topics for e-journal responses were found in Appendix A.

Artifacts for Teaching

In many classroom situations, artifacts were teaching tools. The artifacts for teaching could be physical or cultural things that assisted teacher to teach effectively. Teaching artifacts could be audible or visible and teacher used the artifacts to illustrate and explain the lesson to students. The artifacts included but are not limited to the following: A famous photo and image of a hero or an artist, an inspirational video scrip of a special event, a verbal testimony from a teacher or a student, a common symbol used in science or mathematics…etc. Teaching artifacts were audible or visible objects that motivated and developed students' critical thinking skills and deepened their understanding of the teaching lesson.

<div align="center">

Data Analysis Plan

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Cross-case synthesis would be the analytical technique used to aggregate results across case studies (Yin, 2014). According to the author, cross-case synthesis applied to the analysis of two or more cases and it was launched by developing a comprehensive case study database necessary for replicating case study research and ensuring quality control (Yin, 2009). I used Microsoft® Excel spreadsheets for sole access and the storing, organization, and tracking of participants' contact information on the basis of the numerical classification system used to identify them. Microsoft® Excel spreadsheets were used to track schedules and meeting arrangements with participants so as to set up the four individual face-to-face interview sessions. The Excel spreadsheets were stored on a personal computer in a password protected file for the protection of data and files that had been electronically generated.

As a single investigator, I interviewed four second-grade teachers separately at their convenient time. I kept the contact notes, interview notes in a journal format, interview responses, reflective journal responses as well as district and school documents of the participants, which were analyzed separately for each case. I also kept track of the schedules and meeting arrangements with the participants so as to set up the individual face-to-face interview sessions. Most recorded interview sessions were expected to last about one hour and it took place at the school facility of the teachers, either before or after the class. Digitally recorded interview sessions would be transcribed into Microsoft® Excel spreadsheet software, organized by participant number, and uploaded into NVivo (Version 10) qualitative software for purposes of coding and analysis. NVivo was software that enabled qualitative researchers to easily code, track, organize, and analyze data (Saldaña, 2015). NVivo also benefited me in working with multimedia information and analyzing the required data. In addition, NVivo was used to assist in identifying the themes. Tables or matrices were developed to display the research themes and potential variations in data accuracy and errors would be identified and noted in the research.

The data collected from the interviews, classroom observations, reflective journals, and archived documents from the participants were analyzed inductively. All documents were analyzed by using a content analysis which involved in a description of the purpose of the study and the scope of the research topics. Qualitative data collected through content analysis of interviews would be thematically coded. To facilitate data management, the interview notes were organized by the research questions and sub-questions. Themes were organized by a number and letter combination, with the number

referring to the research question number and the letter referring to a distinct theme (Patton, 2014).

Triangulation

For Merriam (1998), triangulation was the process of validating the findings of a case study by drawing on supportive evidence from a variety of data sources to increase the trustworthiness of the study results. For Yin (2014), data triangulation was used to corroborate facts found within the multiple data sources. Triangulation was important in research because triangulation was used by collecting the information from multiple sources to support the facts and validate participants' intended meaning (Patton, 2014). Further triangulation took place in this study through member checking by providing participants with their interview transcripts and requesting their feedback regarding the accuracy and validity of the transcribed materials (Creswell, 2013).

Trustworthiness Through Validity and Reliability

Trustworthiness was crucial to a qualitative research because case studies were a type of qualitative research design and specific constructs were relevant to this study (Merriam, 1998; Yin, 2014). In order to maximize trustworthiness, validity, and reliability of the study, I collected the information and evidences from four participating teachers and triangulate the research findings as follows:

First, when utilizing the multiple types of data collection sources such as one-on-one interviews, classroom observations, reflective journal responses, archived documents from the participants as well as written notes and reflections from the researcher, I specified the data collection and strategizes the data sources. Secondly, by using multiple analysts and different techniques of data analysis, it helped me ensure transferability by

having a rich and multiple description of the context of the study that I collected from the participants. Thirdly, by using the grounded theory which identified concepts, themes, or between and across evidence sources that emerged within, its processes helped me minimize the data which were contradicted the study and increased the trustworthiness of the findings.

Ethical Considerations

In a qualitative study, ethical dilemmas were possibly occurred before or during the process of data collection and data analysis (Merriam, 2009). According to the author, three following considerations needed to be clarified, in order to avoid or reduce ethical dilemmas in a qualitative study.

The first consideration was a clarity and transparency of the purpose of the study. I clearly explained to the participants the purpose of the study, which was, a study to explore and understand the engagement of the second-grade classroom teachers' implementation of BBL strategies and their perceptions as well as the conditions and factors that were contributed to or impeded their teaching progress in order to assist struggling readers. The participants needed to understand the purpose of the study and they willingly participated in the study. The purpose of the study brought some influential impacts to teachers' current teaching styles and it urged the teachers to adapt and implement the BBT strategies in class in order to achieve effective teaching and students' learning goals.

Another ethical concern was of informed consent. An informed consent was given to four second-grade teachers with a clear instruction and explanation from the researcher. The participants had some time to think about the regulations and conditions

of the consent and there was no pressure whether or not they participated in the study. Once the participants understood and agreed upon the regulations and conditions of the consent, the participants needed to sign consent form and followed it.

The third point of ethical concern was privacy and confidentiality. Informed consent assured the participating teachers to have a right to involve in the study and participate in all the specific procedures designed to ensure their privacy and confidentiality. The consent also assured the participants' right to withdraw from the study, if they changed their minds and discontinue their participation at any time. The consent also indicated the length and location of the interviews, the commitment to the study, and the participants' responses which would be held in confidentiality. Pseudonyms were be used for the participants' names. Both benefits and risks of participation in the study were also stated in the consent and there was no compensation provided for their participation.

Summary

Chapter 3 described the research method, including research design with the study samples, participant selection process for the study, data collection plan and data analysis plan. The study used a multiple case study design and the participants were the second-grade teachers selected from southwestern state. Research questions were used for the interviews and the chapter also included the strategies to enhance the trustworthiness and the discussion of potential ethical issues. The study results will be presented in Chapter 4. Chapter 5 summarizes the findings and draws the conclusions based on the results of the study. Recommendations will be offered for practical application of brain-based study and further research.

Chapter 4: Results

Introduction

This chapter is an analysis of the data that were collected for this case study. Data sources were e-journals, classroom observations, and interview evaluations. The purpose of the study was to develop a deeper understanding of the selected second-grade teachers as they attempted to orchestrate BBL strategies for learning in their classroom, and by better understanding what contributed to or impeded their implementation of BBL strategies. The questions used to guide the study were:

1.   What types of training and education have second-grade teachers received in utilizing BBT strategies for reading?

2.   How do second-grade teachers utilize their training in BBT strategies in the classroom?

3.   How do second-grade teachers utilize their training in BBT strategies for student engagement in the classroom?

4.   What do second-grade teachers like or dislike about BBT?

Setting

Four participant teachers worked at four different elementary schools in central elementary school district of southwestern state. During the time of the study, two elementary schools of the district experienced a disruption to staffing and teachers as a result of budget cuts from the federal funding. As part of the budget cuts, the schools were losing some experienced teachers and they were being replaced with inexperienced teachers. Four participant teachers in my research were still employed and they did not experience any trauma that might influence the interpretation of the study results.

Demographics

To protect the privacy of four participant second-grade teachers, I assigned each of them an anonymous name. The first subject was called Dayna (P1). The second subject was called Josie (P2), the third subject was called Raymond (P3), and the last one was called Veronica (P4). Each subject represented a specific group of population from which she/he represented for her/his own elementary school.

Table 1

Demographics of Four Subjects

Subjects	Ethnicity	Teaching Experience(s)	Classes Taught	Educational Backgrounds	Brain-Based Trainings
P 1	a single Caucasian	11 years	4th, 1st, 2nd	B.S. Degree in 2005	a 7-day workshop for brain-based educators/teachers
P 2	a separated Hispanic	6 years	3rd, 4th, 2nd	B.A. Degree in 2010	a 7-day training for brain-based education
P 3	a married Asian	12 years	5th, 3rd, 2nd	B.A. Degree in 2000 M.A. Degree in 2002	a 14-day workshop for brain-based education
P 4	a divorce Africa-American	28 years	4th, 3rd, 5th, 2nd	B.A. Degree in 1986	a 14-day workshop of brain-based education

Data Collection

Central School District geographically belongs to southwestern state. It is composed of four elementary schools (K-5), and all of which are located in the southwestern state. Four elementary schools of central school district in the southwestern state are the following:

1. A Elementary School

2.   B Elementary School

3.   C Elementary School

4.   D Elementary School

Data Analysis

Data analysis was the key to understanding the themes that emerge from the evidences of the participants. The case study approached employed for this research grounded in the data collected from the participants, as described in Chapter 3 (Yin, 2014). The technique for this explanatory case study was to identify the prevalent themes, which were both similar and dissimilar, that emerged from the participant testimony through cross-case synthesis. As Yin (2014) recommended, the use of predetermined codebook when analyzing data based on a theoretical framework and I divided the codes into different sections to benefit the study.

Once the interview was conducted, I coded it by reading the transcripts and I looked for the emerging themes related to the purpose of the study and research questions. Digitally recorded interview sections would be transcribed into Microsoft Excel spreadsheet software to benefit the results. In the same manner, I coded classroom observations and reflective journal responses from the participants by looking for the emerging themes that were related and relevant to the purpose of the study and research questions. As a result, I found the discrepant cases in response to the research questions and discrepant cases were important in analyzing case study data and cross-case synthesis. According to Yin (2014), discrepant cases helped the researcher determine the validity of the testimony and data collected from the participants.

Evidence of Trustworthiness

To improve the trustworthiness of this study, I used the strategies that Merriam (2009) recommended for a qualitative research. The following are the four factors that helped to construct this study's evidence of trustworthiness.

Credibility

I used the strategy of triangulation by presenting and explaining the data collected before and during the interviews, classroom observations, and reflective journals. This included the interview transcripts, notes from the classroom observations, and other reliable sources which were related to the study. The information and data from four subjects were plausible and relevant to the trustworthiness of the study.

Transferability

Merriam (2009) explained that transferability to some extent can be applied to other situations when it is accurate and reliable. I used the direct quotes and statements from four subjects, their teaching descriptions and explanations of BBT strategies to analyze and ensure the relevance and credibility of this study. Each subject's information and data were collected and conducted according to the policies and procedures of the school district and of the study requirements.

Dependability

Dependability, according to Merriam (2009), can be replicated to benefit the research findings. The way that I established dependability for this study was audit trail, which allowed me to assess and review the notes and data that were gathered before and during the data collection process as well as its analytical process. I also checked the documents taken from the field notes, archives, and reports to maintain and strengthen the dependability of the study.

Confirmability

To improve the confirmability and objectivity of the study, I used the strategy flexibility by maintaining my journals in which I recorded my own feelings and thoughts related to the study. This included personal bias, dispositions, or assumptions about four subjects that I might have before and during the data collection process and analysis.

Results

The results of this study were divided into five themes and each theme had a table that represented the multiple sources of data which were collected through the participant's interviews, e-journals, teacher documents, physical artifacts, and classroom observations. Each theme was a summary of the participant teacher's responses identified by salient point.

Theme 1: Teacher-As-Learner

The first theme was the concept of teacher-as-learner. "To teach is to learn" and "to learn is to teach" were the twin concepts of teacher-as-learner. Teacher cannot teach without learning and learning makes a learner become a teacher. Teacher-as-learner was central to the practice of teaching and learning, and therefore a brain-based teacher had to be a brain-based learner. Learning was a prerequisite and a demand for teaching. The Table below summed up the theme of teacher-as-learner from four subjects.

Table 2

Teacher-As-Learner

Subjects	Role of Teacher	Brain-Based Learning (BBL) Strategies
Dayna	Teacher-as-Learner	* Teaching is a learning experience for teacher * Learning requires time and commitment * Teaching & learning seems like theory & practice

		* There is always room for learning
Josie	Teacher-as-Learner	* Learning is an important educational concept * Tap into prior knowledge * Learning benefits teaching * Learning enhances reading skills
Raymond	Teacher-as-Learner	* Learning is an ongoing process * Teaching and learning go hand in hand * Teaching required learning
Veronica	Teacher-as-Learner	* Teaching and learning go hand in hand * Teaching is impossible without learning * I want to learn * Learning is a reminder of teaching

Subject # 1

In the interviews, Dayna described that "Teaching is a learning experience for teacher every day in class, just like students who come to class to learn." To teach is to learn and to learn in order to teach. Teaching and learning was like two sides of the same coin. Teacher of brain-based teaching strategies had to be open to any learning opportunities so that teaching became effective. Learning included time and commitment. Dayna explained that the combination of teacher-as-learner was like the combination of theoretical and practical knowledge. Educational theory without practice was empty and practice without theory was blind. A brain-based teacher had to implement both theoretical and practical knowledge in class. For Dayna, if "Practice makes perfect," "Learning also makes teaching perfect."

In the journals, Dayna wrote, "It is a common mistake for teachers to believe that there is no room for learning. Teacher is the first learner since teacher cannot teach what she/he does not know and does not understand." Dayna described that "If teacher does

not want to learn and is not open to learning what she/he needs to learn, teaching career is not suitable to that person." During my class observation with Dayna, I heard Dayna explained to her students that learning was more important than teaching since learning was the foundation of human knowledge. To be a human is first to learn, while teaching is an occupation. She stated: "It is not important to be a teacher, but it is so important to be a learner." Learning is possible without a teacher such as learning through one's personal experience or one's own efforts. On the contrary, teaching is impossible without first being a learner.

Subject # 2

Teacher-as-learner was an important concept for Josie's teaching career. In the interviews, Josie stated, "Teaching is to share one's own knowledge and ideas to students, and to transmit knowledge to young students is a privilege since transmitting knowledge from teacher to students is likely to build up a better and stronger future generation." Before introducing a new lesson, Josie often reviewed her students what they had already learnt. This technique was called "tap into prior knowledge" – reviewing what students already know before starting a new lesson. In the journal entries, Josie depicted that "I often put myself in the situation to learn rather than to teach because if I think I learn I will learn something. If I think I teach I do not learn anything." Josie continued, "Teacher is the learner and teacher is always the learner."

During my classroom observation with Josie, I heard Josie explained to her students that "If you are struggling with reading, it means, you do not learn enough. To read better and faster, you need to learn, and I will teach you how to read faster." To do

this, Josie spent more time with the struggling readers and she learnt why they were struggling with reading. Josie learnt from it.

Subject # 3

For Raymond, "Learning is a lifetime process and teacher never stops learning." In his interviews, Raymond elucidated that teacher of BBL was obliged to learn, and he said, "I will learn for the rest of my life, as a teacher." In his journal entries, Raymond pointed out that "Teacher somehow has to learn together with students, to learn what students like and what they do not like." Raymond claimed, "If teacher is incapable to learn, she/he is incapable to teach."

In the same journal entries, Raymond viewed that the efficacy of the implementation of brain-based teaching strategies was depending upon "the understanding of teacher to know her/his students' ability to learn, not her/his own ability to teach." For this reason, when I observed Raymond's teaching, I saw him providing the struggling readers a special reading assignment in order to meet their own needs.

Subject # 4

Coming from a strong educational background, Veronica stated, "Teaching and learning go hand in hand." She affirmed that "It is impossible for me to be a teacher without going to school. I am learning all the time." In the journal entries, Veronica wrote, "How can a teacher become a good teacher if she/he put away the books and avoids learning?" She continued, "If anyone does not want to learn and never wants to learn, life will be miserable, and that person will have a slower chance of success."

During my classroom observation, Veronica asked her students to repeat after her: "I want to learn, and I always want to learn." For Veronica, this statement would help

students remember that they need to learn all the time, no matter how much they know and understand. Veronica said, "It is never too late to learn and both teacher and students have to remember it."

Regarding Research Question #1, I found out that four above subjects had a significant way of understanding the implementation of their brain-based teaching strategies in the classroom. The subjects had different backgrounds of education, teaching experiences, and brain-based teaching strategies and that made them become unique in a way that they knew how to implement the brain-based teachings strategies to benefit their teaching-as-learning. Teacher-as-learner helped the subjects' teaching become effective and their uniqueness of implementation of brain-based teaching strategies answered the research question # 1.

Theme 2: Evolving to a Deeper Understanding and Competency for Teaching

From BBL perspective, BBT strategies significantly provide engaging, brain-based activities that contribute to the qualities and characteristics of a competent teacher. This includes teacher's knowledge, teaching skills and behaviors (Darling-Hammond, 2016; Zayd, 2002). Potential strategies for deeper understanding and competency for teaching exist in both applying brain development research findings to the implementation of teaching standards and applying individual experience of BBT strategies in the classroom. Deeper understanding of BBT strategies has a profound impact on obtaining competency for teaching. The Table below showed the findings of four subjects which were collected from various sources. The findings can be used with teaching standards to optimize effective teaching in different learning situations.

Table 3

Strategies for Teaching Competency

Subjects	Teacher Competency Factors
Dayna	* Influence of first-grade teacher on teaching and learning * Role of school on evolving a deeper understanding of BBT * Friendliness of BBL teacher with students
Josie	* Understanding student's strengths and weaknesses * Teaching experience in competent teaching * Experienced and inexperienced teaching on student learning
Raymond	* Continuing BBL for teacher competence * Support from colleagues for a deeper understanding of BBL strategies * Teaching evaluation and teaching enhancement
Veronica	* Importance of student engagement in teaching competency * Efficacy of small groups of students in teacher competence * Student engagement in teaching competency

Subject # 1

In her interviews, Dayna answered that "First-grade teachers have a crucial role in contributing to the effective teaching of second-grade teachers since students can learn a lot in their first grade." For instance, compared with first-grade students, second-grade students would be able to tackle more in texts and learn to write a story with basic sentences and short narratives about a character or an event. Second-grade teaching was the continuing period of the first-grade teaching. "What students learnt in their first grade has a significant impact on their second grade." In the journal entries, Dayna explicated that "School administration plays an important role in evolving a deeper understanding and competent teaching for brain-based teachers since school administration provides the guidelines and curriculum for teaching and learning." Dayna

added, "She had a deep understanding of her BBT strategies because of the training and workshops which she attended, and they were all supported by her school." For this reason, Dayna strongly believed that she had gained more understanding of BBL and her teaching became competent.

During my classroom observation, Dayna interacted with her students by being friendly to them. To be friendly to students helped Dayna better implement her brain-based teaching strategies. Dayna said, "I am friendly to the students, but I do not be their friend." As such, "I would be able to maintain the professional boundaries between the students and myself. It helped me obtain a deeper understanding of my brain-based teaching and my teaching competency."

Subject # 2

In order to evolve a deeper understanding of BBT strategies, Josie answered in her interviews by pointing out two ways. First, "Teacher needs to understand the strengths and weaknesses of students." Those who read at their age level, Josie assigned the homework that maintained the students' adequate reading level. Those who read below their age level, Josie spent more time with them and she assigned the appropriate homework to meet their needs. Secondly, "Teaching experience has an important role in obtaining the competency for teaching." Josie believed that experienced teachers often were more effective than teachers with fewer years of classroom experience.

In her journal entries, Josie expanded her teaching experience by providing two scenarios of experienced and inexperienced teaching. The results showed that "Experienced teaching produced a higher result in learning, while inexperienced teaching

produced a lower result in learning." The results further indicated, "When the learning outcome was high, teaching became more effective and more competent, and teacher could learn from it." During my classroom observation with Josie, I saw her managed her class well. For this reason, her teaching lessons run smoothly, and it helped to prevent the students' disruptive behaviors. In other words, when teaching was effective, teacher learned a lot from it and it contributed to teaching competency.

Subject # 3

Raymond said, "Continuing education of BBL allows teachers to learn new things and reflect on the new knowledge which they have understood." To illustrate, Raymond attended the training and workshops for brain-based teachers, and he said, "I have learnt a lot from the workshop I attended and from the colleagues." Raymond disclosed in his journal entries that "Evolving a deeper understanding for effective teaching can be derived from the colleagues since exchanging teaching experience with other teachers is a great way to learn and to get a deeper and stronger understanding of what teacher wants to teach."

Raymond wrote in his journals: "Teaching has to be evaluated and it is always necessary to evaluate the teacher's teaching." He believed that teaching evaluation allowed teachers to learn from what they needed to change and improve. Raymond stated, "I am glad to learn from the evaluations because this is a great way I know myself and my teaching." Once teaching was evaluated, Raymond gained for himself a strong understanding of his teaching. Teaching evaluation did not only allow Raymond to obtain the teaching competency for himself but also the learning results for his students. During

my classroom observation with Raymond, I saw a visiting teacher who also observed Raymond's teaching. Evaluation was a great way for teaching competency.

Subject # 4

According to Veronica, brain-based teachers could gain a deeper knowledge and understanding of teaching through student engagement. To this end, Veronica asked her students to participate in an educational reading game, symbiotic relationships reading comprehension. She said, "It is a reading game and students will learn the new vocabularies and its meanings." Veronica continued, "I try to teach my students to learn to read faster in a competitive manner. Young students love to compete with each other and educational games are the way I teach my students. As a result, my teaching became more effective and more competent."

In the journals, Veronica expanded her competent teaching by dividing the class into small groups. She explicated that "When students are divided into a group of three or four people, the spirit of competitive learning is stronger and learning results become more productive for students rather than a big group." She also mentioned that "It is important for teacher to keep watch of the students and encourage them to participate in the learning games actively." In my classroom observation, I saw Veronica asked her students to participate in a reading game and they interacted with each other actively." For Veronica, "Student engagement has an essential role in making teaching becomes more effective and competent."

Regarding Research Question # 4, a deeper understanding of BBT and teaching with competence is generally necessary to all teachers of all levels. For brain-based teachers at elementary school setting, teaching became more urgent since it formed and

shaped the learning habit of students. Four subjects experienced their competencies in teaching through their own way of implementing the BBT strategies. Their inputs and participation in the interviews, journal responses, and classroom observations helped to answer the research question # 4.

Theme 3: Using the Artifacts for Brain-Based Teaching Strategies

When collecting the data from the subjects, I realized that there were different artifacts relevant to this study. The artifacts were the physical or cultural evidences which included social setting or phenomenon used by the subjects when implementing their BBT strategies in class. The artifacts aimed at enhancing and fostering teachers' effective teaching. The Table below indicated the physical artifacts that four subjects used in their classrooms.

Table 4

Artifacts for BBT Strategies

Subjects	Artifacts for BBT Strategies
Dayna	* Visible teaching objects: famous images of the American history * Motivating students' desire to learn to benefit the brain * Common symbols: additional sign (+) and the subtraction sign (-)
Josie	* Student engagement & learning mood * Students' learning and homework assignments * Student attention * Physical exercises
Raymond	* Start with a warm-up exercise & students' energy levels * Be aware of counterproductive results & student engagement * Prevent students getting hurt and injuries
Veronica	* Safe environment check: Bookcases, teaching supplies… * Multicultural classroom: White, Hispanics, African-American, Asian * Classroom temperature

Subject # 1

In the interviews, Dayna explained that teaching artifacts had significant impacts on teaching and learning. It was up to teacher to use the artifacts to enhance teaching and learning results. For instance, Dayna showed her students the painting of the first President of the United States, George Washington and Martin Luther King Jr. and she asked the students to recognize the person in the painting. "About seventy percent of my students recognized the characters in the painting and I am glad that they are able to tell the name of these characters." Dayna continued, "Teaching artifacts can be anything that aims at motivating students' learning mood and teacher should use the artifacts to benefit their BBT strategies."

In the journals, Dayna depicted that "Teaching artifacts are the visible teaching objects such as famous photographs or images of the U.S. history, the common symbols like American Flag, additional sign (+) and subtraction sign (-) and so on. Each teaching artifact has a significant impact on learning." For Dayna, it was necessary for brain-based teachers to use the available artifacts in the classroom to produce a great learning result. To illustrate, Dayna showed her students the geographical map of the U.S. and she particularly pointed out the geographical perimeter of the southwestern state and its features in details to let her students to learn. Geographical map was what I saw Dayna taught her students during my classroom observation.

Subject # 2

According to Josie, teaching artifacts were considered as the students themselves e.g. using students as a source of teaching artifacts to motivate learning. In

her interviews, Josie said, "Brain-based teacher needs to know the moment when students are anxious to learn and appropriately provides them with some learning assignments to respond to their active learning mood." Josie said, "A way that often boosted up my students' learning mood was to watch an inspirational video script, and this is how I get the students' attention and their concentration so that I can guide them to learn in a way that I want them to learn."

In her journal responses, Josie used physical exercises in class to boost up her students' desire to learn. For instance, Josie used the "icebreaker exercises and warm-up activities at the inception of the class to boost up students' energy and participation in class." Physical exercises were what I saw Josie used in her classroom during my classroom observation. Josie said, "Teaching artifacts are not always available in teaching environment. So, teacher should consider the student engagement as teaching artifacts to benefit both teaching and learning."

Subject # 3

Regarding teaching competency, Raymond answered, "I often ask my students to start with a brief warm-up exercise such as standing up, sitting down, and extending hands and legs. It works for me and my students." Raymond continued, "Safety is always important and teacher needs to check the space and class environment to ensure the safety of students before staring the physical exercises." In his journals, Raymond described that BBL offered various ways for teachers to use the teaching artifacts for teaching. Still, teacher should know what teaching artifacts work for the students. If not, teaching can be counterproductive. Raymond claimed, "I often ask my students to do the physical exercises at the beginning of the class when their energy level

is high and active. It can be counterproductive to ask students to do the exercise before the lunch time or at the moment when they are hungry."

In my classroom observation with Raymond, I saw Raymond asked his students to participate in the physical warm-up exercises at the beginning of the class. Raymond depicted that "physical exercises at the beginning of the class allow the heart pumping, even just jumping up and down. So, I ask my students to do it every day and they do it with excitement and enthusiasm. But I need to make sure that students will not fall and get hurt." Raymond utilized the student engagement as the artifacts for his teaching.

Subject # 4

For Veronica, teaching artifacts were teaching materials, teaching supplies or anything that drew students' attention and concentration to learn. Veronica continued, "I have a multicultural classroom and my students are the White, African American, Hispanics, and Asians. My concern is the classroom temperature since my school located is in the southwestern state where the weather is often changed during the day. So, classroom temperature has a great influence in teaching and learning, and it is my concern." She added, "If the thermostat is out of order, classroom temperature is often hot, and it is uncomfortable for me to teach and my students to learn."

In her journals, Veronica wrote, "Teaching and learning are not effective when both teacher and students stay in an uncomfortable condition." For Veronica, it does not matter how the lesson plan was prepared and teaching method was conducted, the classroom temperature has to be comfortable for both teacher and students. Veronica concluded, "Teacher is responsible to create a comfortable teaching and learning environment for students."

Regarding Research Question # 2, four subjects shared their own physical artifacts in the classroom that made their teaching become effective. Physical artifacts were the teaching instruments for the subjects, and their implementation of BBT strategies answered the research question # 2.

Theme 4: Using BBT Strategies for Non-Threatening Teaching Environment

To create a non-threatening classroom environment is a required condition of BBL. When observing the subjects in their classrooms, I realized that each teacher had their own way to maintain a safe teaching environment and each of which was unique and distinct. The Table below was the strategies of four subjects' non-threatening teaching and learning environment.

Table 5

Strategies for Non-Threatening Teaching Environment

Subjects	Categories	Implication for Non-Threatening Factors	Ethnicity
Dayna	*Classroom *Visible objects	*Teacher responsibility *Safety & well-being for teacher & students *Classroom pets & science specimens	*Caucasian and single
Josie	*Family check *Teaching environment	*Know fearful/scary students' objects *Avoid darkness at any rate *A model of being brave for students	*Hispanic and separated
Raymond	*Personal style *Teaching materials	*Avoid scary/frightened objects *Safety for classroom teaching materials *Safety for classroom, playground, gym	*Asian and married
Veronica	*Personal space *Personal life	*Safety from the state of mind *Teacher's feelings & thoughts of fear *Teacher's emotion and problems	*African-American and divorced

Subject # 1

In her interviews, Dayna alleged that safe environment played a central role in teaching and learning. Non-threatening environment was a critical task for teacher because students always deserved a safe learning environment. Dayna declared that "Safety and well-being of students come before anything else and it is the teacher's duty to ensure student safety before teaching." Dayna continued, "A threatening atmosphere greatly hinders the concentration and focus of the brain." For instance, there were students afraid of certain classroom pets or science specimens such as snakes or spiders. The classroom pets and science specimens had to be removed because students could not learn when they were frightened. In addition, Dayna wrote, "It is difficult for teacher to teach when she/he comes to class with certain frightening images or fear that she/he has had in mind."

Dayna added, non-threatening environment was not only for students but also for teacher. "For teacher, the state of non-threatening environment has to be clear prior to teaching" During my classroom observation with Dayna, I saw Dayna removed a science class poster art which drew several students' attention and it distracted their studies.

Subject # 2

For Josie, classroom teacher needed to know what caused students to be fearful. She said, "I often ask the student's parents to understand what kind of objects and images that make students frightened or fearful?" She said, "I have several students afraid of snakes and spiders and I never show them the images of these animals." In the journals, Josie viewed that fear was seen as the most common factor of human beings.

Fear was an emotion that could be triggered by both deceased and living things. Josie said, "It is always best to check the emotion of students and keep their emotion positive."

In another journal, Josie alleged that most young students were afraid of darkness and teacher never let students stay in darkness or confront with the dark. Darkness could bring a negative psychological impact on student's future and students should avoid staying in the dark at any rate. She said, "It is never right to place students in a situation where they have to confront with the dark. Turn off the classroom light and let students experience the dark is never right." During my classroom observation with Josie, I saw her explained to her students and demonstrate a 'model being brave' by not freaking out whenever confronting with difficulty in learning. Model being brave helped the students overcome fear.

Subject # 3

In his interviews, Raymond called a non-threatening environment was a reserved teaching and learning environment e.g. students should be free from fear and scariness. It was important for teacher to ensure the safety for all students. Raymond viewed, "Very often, I have to check everything in class to make sure the safety of my students such as blackboards, bookcases, supply closets, hanging posters, and all hanging devices which have to be attached or nailed properly to the walls." He added, "Students can get hurt and injured from the nonmoving teaching materials in class." In his journals, Raymond characterized, "non-threatening environment for students is not only in the classroom but also playground areas where students often spend time together."

In the same journal, Raymond continued, "I often go out with my students to the playground area and watching them during the break period." As a teacher, "I need to

know my students are safe at the school premise and this includes the classroom,

playground area, and gym." During my classroom observation with Raymond, there was

a student who discovered a scary bug at the classroom corner; I saw Raymond took the

bug out and he covered it with a piece of paper. Raymond later explained, "I used a piece

of paper to cover the bug to ensure that no one saw it, except the student who discovered

it."

Subject # 4

According to Veronica, non-threatening environment for students included

the physical classroom and teacher's state of mind. She claimed, "Feelings are based on

emotions which come from the heart. If teacher feels threatening and unsafe, teaching

should be delayed until teacher obtains the safe and clear feelings in mind." Veronica

continued, "Compared with males, females are easy to get panic when confronting with

an unexpected situation. When teacher is panic, students are also panic." In the journals,

Veronica pointed out that "Thinking is connected to the brain and when teacher is fearful

and threatening for unreasonable cause, she/he should not teach because fear is

dominating the mind, and fear is recognized through facial features and external

behaviors."

In another journal, Veronica clearly indicated that "It is easy to be frustrated and

angry when getting stuck in the long traffic jam, being cut off and brake-checked by a

rude driver, or having an unresolved issue from the family. If this is a case, teacher can be

confronting with uneasy feelings such as anxiety, unbalanced emotion, or dizziness. All

of which can make the teacher become worried and fearful." During my classroom

observation with Veronica, there was a female student whose face suddenly turned pale

because she was afraid that the parent would not come to pick her up after the class. When recognizing the student's face changed, Veronica stopped the teaching immediately and she addressed the student's issue.

Regarding Research Question # 3, I believed that four participating subjects presented and explained their strategies for creating and maintaining a non-threatening environment in their own way. The above presentations and explanations of four subjects helped me answer the research question # 3.

Theme 5: Triangulation

Once data were organized and accepted, I analyzed the collected data according to the purposes and inquiry of the research questions. Data triangulation used for this study was taken from various sources in order to increase the validity and relevance to the study. Below was Table 6 which converged the data collected from all sources of four subjects and that determined the consistency of the results for this study.

Table 6

Triangulation of Four Subjects

Subjects	Participant Subjects *(Person)*	Communicative Events *(Time & Space)*	Converged Facts *(Keywords)*
Dayna	- Teaching role in BBT - Tapping into prior knowledge - Reinforcing teaching abilities - Teaching paradigms	- In-depth interviews - Classroom observations and teaching artifacts - Documents & E-journals	Teaching role, prior teaching, teaching knowledge, teaching paradigms
Josie	- Teaching role with parents - Practicality of teaching - Ongoing formation for teaching	- In-depth interviews - Classroom observations and teaching artifacts - Documents & E-journals	Teaching role, involved parents, practicality of teaching, student literacy
Raymond	- Family value & support	- In-depth interviews	Teaching abilities

	teaching - In-class physical activities - Success of BBT strategies	- Classroom observations and teaching artifacts - Documents & E-journals	and students' physical activities
Veronica	- Student engagement - Teacher's feelings and thoughts - Ongoing formation for teaching - Reaching out to the colleagues	- In-depth interviews - Classroom observations and teaching artifacts - Documents & E-journals	Student engagement, personal insight, teacher's support

Triangulation was a powerful tool to strengthen the qualitative research design for this study. Data triangulation allowed me to collect various sources of four subjects in a prescribed setting from different stages in the activities of the entire research. Having used the multiple sources of four subjects, data triangulation of this study aimed at corroborating the same findings e.g., helping to strengthen the construct validity of the study. A point of converged findings was the same phenomenon of interest shared by four subjects through their implementation of BBT strategies. Use of evidence from the subjects would increase the confidence that this study had rendered the events accurately.

Subject # 1

Dayna affirmed that her teaching method of brain-based education enabled her to improve her BBT strategies as a learner. This allowed her to teach more effectively by sharing her knowledge with students, tapping into prior knowledge of students, and reinforcing the teaching abilities. For Dayna, BBT strategies became more effective when she used her BBT strategies as a teaching paradigm to enhance her own teaching career. This was what Dayna had experienced in class. Dayna contended that the implementation of BBT strategies to her second-grade students worked well for her and her students.

BBT strategies supplemented for Dayna's teaching and they improved student reading performance.

Subject # 2

Josie valued the important role of teacher through the involvement of parents. Josie believed in the practicality of teaching, and her philosophy of teaching was "Practice makes perfect." The more she engaged in the implementation of BBT strategies, the better she realized the effectiveness of her BBT strategies. Josie insisted the important ongoing formation of brain-based education and she continued to engage in the future trainings and workshops to enhance her own teaching career. Josie believed that environment was a factor that significantly contributed to the implementation of her BBT strategies. BBT strategies were the teaching techniques that Josie used to empower her own teaching and they had the substantial impacts on improving student reading.

Subject # 3

Raymond valued his family as the vital source of support and encouragement to his teaching career. Family was the place where Raymond clarified his confusion and empowered his BBT strategies. Raymond experienced physical exercises as the driving force to help his students involve in class and incorporate with his teaching strategies. BBT strategies provided various ways of success to teaching and Raymond had used it since he became a teacher. BBT strategies improved the students' reading skills.

Subject # 4

Having experienced the teaching for nearly three decades, Veronica valued her effective teaching as the association with student engagement and parent

involvement. Veronica valued teacher's feelings and attitudes towards the students as the positive factors to the implementation of her BBT strategies. Ongoing training was important to keep Veronica's BBT strategies became effective. Reaching out to other teachers was another source to empower her teaching. BBT strategies worked well for Veronica's teaching career and they also helped her struggling readers read faster.

Summary

This chapter provided the information and data of four participant subjects that they shared and experienced their BBT strategies in a variety of way. Each of the participating subject was unique and distinct, and they all shared and experienced their teachings and the implementation of their BBT strategies in a very different way. The results presented above clearly indicated that the factors and conditions that positively contributed to the implementation of BBT strategies were more stable and much stronger than the factors that impeded the teaching. The results also showed that there was less commonality that each participant subject understood, practiced, and experienced through their understandings and teachings of BBT strategies. A more detail summary and conclusions will be presented in the next chapter.

Chapter 5: Discussions, Conclusions, and Recommendations

Introduction

The purpose of this case study was to explore how four participant subjects at central school district in southwestern state implemented their BBT strategies to enhance their teaching and assist struggling readers. Besides, it presented the summary of the study and provided the interpretation of the findings in which the information and data of four subjects were collected and presented in Chapter 4 as well as their relationships to prior research related to BBT strategies in the context of teaching and learning. This chapter also provides the limitations of the study, its implications in terms of the findings, and potential impacts for positive social changes. The chapter finally offers several recommendations for future research and the conclusion of the study.

Summary of the Study

The research questions for the study and their findings were as follows:

Research Question # 1: What types of training and education have second-grade teachers received in utilizing brain-based teaching strategies for reading? Theme 1: "Teacher-as-learner" of this study applies to the research question since teaching and learning go hand-in-hand and they cannot be separated from education. Teaching requires learning and learning empowers teaching skills and abilities (Gardner, 2014).

Research Question # 2: How do second-grade teachers utilize their training in brain-based teaching strategies in the classroom? Theme 2: "Evolving to a deeper understanding and competency for teaching" fits the research question. BBT activities such as friendly attitude with students and increasing student engagement are the strategies for improving one's teaching competency. There are a variety of ways to

conduct BBL, and each subject performed it in a way that best fit for her/his own students.

Research Question # 3: How do second-grade teachers utilize their training in brain-based teaching strategies for student engagement in the classroom? Theme 3: "Using the artifacts for effective teaching" applies to the research question due to the fact that student engagement is part of successful teaching and learning (Hughes & Baylin, 2012; McCandliss, 2003). The subjects of this study motivated their student engagement by using the teaching artifacts such as lesson plans, student progress template, and teaching routine checklist.

Research Question # 4: What do second-grade teachers like or dislike about BBT? Theme 4: "Using BBL for non threatening teaching environment" fits the research question because safe environment education plays a decisive role in effective teaching and learning (Kayalar & Turkan, 2016). The subjects of this study believed that a non-threatening classroom environment would be a place where each participant felt safe and free to learn within the limits of the teacher's design for the course. The subjects embraced it and they decided to maintain it.

The Interpretation of the Findings

Previous literature results have shown that the benefits of BBL changed the way teacher approached teaching. Saleh and Salmiza (2011) investigated the studies of several groups of elementary school teachers in the effectiveness of BBT approach. The researchers used the data collection techniques involved in a qualitative method to analyze the research samples and its analytical strategies. The implementation of the study was based on using the achievement analysis of the questionnaire of teaching

motivation and journal documentations. The researchers found that BBL was an effective teaching approach in dealing with the issue aforementioned. It was found that BBL motivated the elementary school teachers to change in order to engage themselves in teaching to achieve teaching goals. Like the previous literature results, the results of my study, namely, Theme 2: "Evolving to a deeper understanding and competency for teaching" concur with the previous studies. The results of my study indicated that the participant subjects discovered the benefits of brain-based teaching strategies that encouraged them to change the way they teach. As a result, BBL helped the subjects of my study accomplish their teaching goals.

Previous literature results indicated that there is a lack of knowledge and understanding in teaching that educators and teachers are either unknown or unaware of brain development in children. Consequently, teaching became less effective and less successful. Chaiwat et al. (2016) studied a series of teacher intents and involvements in understanding student brain development at several elementary school districts through the data collection provided by the participants and analyzed by a qualitative technique. The researchers found that more than 90 % of the participant teachers would face the challenge to obtain effective teaching, if they did not understand the stages of childhood brain development. In another supporting study, Ozgul and Necdet (2012) explored public elementary school teachers' attitudes and approaches to children's brain development; the researchers concluded that the implementation of BBL might be subject to change and adjustment, depending upon teacher; however, knowledge and understanding of students' brain development was required for brain-based teachers to attain both successful teaching and learning results. Similar to the previous literature

results of the above researchers, the results of my study Theme 1:Teacher-as-learner, indicated that the participant subjects, before attending the BBL training, either did not understand or misunderstood about the brain development of their students. When the participant subjects were open to the learning opportunities in order to understand the functions of student brain and its developmental stages, they would know how to boost student memory. Nonetheless, the results of my study differed slightly from the findings in the literature review for two following reasons:

Research cited in the literature review showed that experience matters for teaching when it comes to effective teaching. Nevertheless, my study indicated that knowledge and understanding of BBL was more important than experience since knowledge and understanding was a decisive factor for effective teaching, not only teaching experience.

Research cited in the literature review focused on traditional teaching method which relied mainly on teachers and textbooks that were the sources of knowledge, while students were passive receivers that must memorize things. In traditional method, teaching was deeply teacher centered, and it was "teacher-dominated interaction" (McCall, 2012). In my study, the participating subjects relied on the modern teaching in which teachers utilized textbooks and teaching materials to create the course materials to be taught and then enforced it. Students were encouraged to participate in thinking and reasoning. Modern teaching was "student-centered' method based on an activity integrated with teaching and learning through portfolios and observation.

Previous studies highlighted the importance of individual effort in teaching rather than team work. Previous research studies focused on effective teaching which was anything, but an individual effort (Caine, & Caine, 2002; Hart, 1975). To verify the teaching, Demirhan et al. (2014) explored the studies of individual vs. group effort to determine which one had more effective in BBT. The researchers utilized the sample of 65 elementary school teachers who would implement BBL in class and let them choose between an individual style or group effort to make the teaching effective. The researchers collected the data of the participant teachers through questionnaires and reflective journals and analyzed them by a qualitative method. The results from the researchers showed that 69 % of the participant teachers conducted their BBL effectively with the supportive feedbacks from other teachers in the department, while 19% of the population was confident in the individual effort, and 12% was undecided. Like the findings in the literature review, the results of my study – Theme 3: "Using the artifacts for effective teaching" indicated that group effort played a significant role in effective teaching; however, group effort alone would not work without using teaching artifacts to motivate student engagement. The subjects of my study viewed that teaching artifacts made teaching become effective, rather than group effort, which could be positive or negative. For this reason, the results of my study concur with the findings in the literature in terms of group effort, but they do not agree with the literature about the lack of teaching artifacts.

Previous research results relied so much on teaching qualities and teaching competency without underscoring the environmental factors that highly affected teaching and learning. Simply put, research recited in the literature review emphasized and

overemphasized the importance of teaching qualities in education, while it underestimated the importance of teaching and learning environment. Kayalar and Turkan (2016) investigated 27 participants, including teachers, instructors, mentors, and coaches at several elementary schools through interviews and reflective journals which were analyzed by a qualitative technique. The results from the researchers indicated that the majority of participants were depending upon their knowledge and understanding of BBL in effective teaching rather than environmental factors. Contrary to the findings in the literature review, the results of my study – Theme 4: "Using BBL for non-threatening teaching environment" indicated that non-threatening teaching environment has a significant impact on effective teaching. Non-threatening teaching environment enhances teaching and reduces reading impairment.

Limitations of the Study

This research study was not without limitations. The first limitation of this study was of the sample size. According to Yin (2014), four participating subjects were sufficient for the study. In this study, the participating subjects were (a) a single Caucasian female, (b) a separated Hispanic female, (c) a married Asian male, and (d) a divorced African-American female. Each participating subject represented for her/his own ethical and cultural group. Elected representatives were chosen in order to bring variety and diversity to the study. Diversity of sample size enriches the educational experience and it benefits the research study (Yin, 2014). However, the sample size of this study would be small or limited, compared to the different population of the same or larger group.

The second limitation of the study was of methodology research. In this study, the researcher collected the data from the participating subjects' reflective journals, interviews, classroom observations, and other resources related to the study. I realized that the process of data collection for this study was time-consuming because both the participating subjects and the researcher had to spend time with each other for the interviews, classroom observations, and journal responses. To this end, the participating subjects and the researcher found time for each other in their busy schedules. Preparing and collecting the data requested the participating subjects and researcher to spend a lot time and be patient with its process. It is important to note that the researcher could not obtain the best information and data, if the participating subjects did not spend enough time to prepare for it (Creswell, 1999). Lack of data preparation or insufficiency of data collection was the limit of the study.

The third limitation of the study was of analytic techniques. I used cross-case synthesis as analytic tool to explore, validate, and find associations among data. Cross-case synthesis often consisted of at least two cases (Patten & Newhart, 1997). In this study, if one participating subject decided to withdraw from the study, it would be difficult for the researcher to find two similar cases with the same existing conditions and same standards. Since the participants were allowed to withdraw at any time, there was a risk of losing the participants during the process of data collection. For this reason, participant withdrawal would limit the study's findings, and it could jeopardize the integrity of the study.

Another limitation of the study was that some participating subjects were opposed to brain-based education because they opined that the research study might not be

beneficial to their teaching careers or struggling readers. If the participating subjects refused to participate in the research study, the researcher had the limits of choice which was the limitation of the study.

Recommendations for Future Research

Based on this research study, I recommend the following avenues for additional research. First, the participant subjects in this study were four selected second-grade teachers from the public school district of southwestern state. According to Yin (2014), the sample size of a study can be used for another study or a future research study at a larger population. For this reason, I recommend the sample size of this study which can be used for the future research throughout the southwestern state or perhaps in other states with the same or larger population.

This study was conducted by a qualitative research method. According to Creswell (1998), a topic research study can be conducted by a qualitative, quantitative, or mixed method, and it is at the researcher's disposal. In this regard, I recommend a future research which will be conducted by (a) a descriptive design of quantitative research method, a survey research that seeks to describe the current status of a variable or phenomenon, and its data collection is mostly observational in nature and it develops after the data is collected, or (b) a sequential explanatory of mixed method design e.g. the implementation sequence of data collection which is characterized by a collection and analysis of quantitative data followed by a collection and analysis of qualitative data. The purpose of sequential explanatory of mixed method design is to use the qualitative results to assist in explaining and interpreting the findings of quantitative study. Each research

method has its own strengths and weaknesses. Once selected, the researcher of the future research should follow its own method regulations and requirements (Creswell, 1999).

I found that parents of elementary school students played an important role in education. The role of parents is essential to successful learning and teaching. According to Henderson (1987) and Jenyes (2003), when schools, families, and community groups work together to support learning, children tend to do better in school. Students stay in school longer and they like school more. The relationship between parents and teachers is necessary for students' success. Parental involvement can free teachers to focus more on the task of teaching children. When teachers and parents have a regular and good relationship, teachers definitely learn more about students' needs and home environment. Parents who are involved with teachers tend to have a more positive view of teachers which often results in improved teacher morale. For this reason, I recommend that the future research of a qualitative method will be focused on the mutual integration of teacher and parents in education e.g. how teachers and parents work together to increase effective teaching and learning.

Implications for Social Change

Based on the collected data, I have observed that BBL is a cutting-edge teaching method which is very influential in education today, especially at the elementary schools where teaching is not merely to transmit one's own knowledge to students, but also to form young students to adapt to and embrace a good and effective learning habit. In a nutshell, the role of teachers at the elementary school is including but not limited to teaching, mentoring, and preparing for a better and stronger generation in which teacher knows how to enhance one's knowledge and assist students to learn effectively.

When conducting the study, I realized that limitations of BBL do exist. The most common weakness of BBL, according to the participant subjects and researcher, was lack of support from BBL experts and lack of scientific data e.g. a lack of concrete evidence proving that brain-based education is more effective than other techniques. Although BBL is subject to its flaws and weaknesses, I found that "The strengths outweighed the weaknesses" e.g. BBL has many benefits and few drawbacks.

With regard to this study, I strongly believe that BBL is a teaching modality that helped the participant subjects in this study achieve their teaching goals and reduce student reading impairment. I believe that BBL has become a unique teaching technique that enables to strengthen one's teaching qualities and skills. Effective teaching pedagogy is an array of teaching strategies that support intellectual engagement, connectedness to the wider world, and supportive classroom environments. BBL helps to build community confidence in the quality of teaching and learning in education.

Conclusion

Teaching and learning are two separate and distinct aspects of education, but they are one. Such unity was found in this study. BBT strategies helped the participant subjects in this study teach effectively and reduce students' reading problems significantly. Struggling readers need to be taught in a way that is best for their reading fluency but also best for teaching qualities.

It is important to note that elementary school leaders at all levels of education play an important role in education. School leaders and school administrators are not only principals and superintendents but also vice principals, assistant superintendents, and others who are involving in educational success of effective teaching and learning. This

study found that school administrators such as principals and teachers in the department brought a great support to the success of the participating subjects. Simply put, a school principal and school administrator must be a support to BBL teachers. Teachers should be placed in situations where they can learn from other teachers, school leaders and administrators. Teachers also realized the importance of student engagement and parental involvement in their teaching. Students also need to see teachers and parents as the reliable resources to improve their learning goals.

It is believed that elementary school teachers are truly on the front line of responding to students' learning problems. The most common problem of second-grade students, as the study indicated, is reading disorder and teacher has a primary role in improving their struggling readers to read faster and read at their age level. To this end, teacher needs to have a good teaching technique and BBL has effectively proved the enhancement of teaching and the improvement of reading. This study further shows that the role of second-grade teachers is to know what best for teaching, and what best for learning.

References

Alfassi, M. (2003). Promoting the will and skill of students at academic risk: An

    evaluation of an instructional design geared to foster achievement, self-efficacy

    and motivation. *Journal of Instructional Psychology*, *30*(1), 28-40.

Allinder, R.M., Dunse, L., Brunken, C.D., & Obermiller-Krolikowski, H.J. (2001).

    Improving fluency with at-risk readers and students with learning disabilities.

    Remedial and Special Education, 22 (1), 48-54.

Anderson, O. R., Love, B. C., & Tsai, M. J. (2014). Neuroscience perspectives for

    science and mathematics learning in technology-enhanced learning

    Environments. *International Journal of Science and Mathematics Education*,

    12(3), 467- 474.

Asiago-Lenah, S., Walter, O., Nyang'au, A., and Ondima, C. (2012). Effect of non-

    financial incentives on job satisfaction of teachers in public secondary school

    survey of Kisii sub county. *Journal of Educational and Practice.2,* 62-69.

Bates, C.C., D'Agostino, J.V., Gambrell, L., & Xu, M. (2016). Reading Recovery:

    Exploring the Effects on First-Graders' Reading Motivation and Achievement.

    Journal of Education for Students Placed at Risk (JESPAR), *21,* 47-59.

Battro, A. M., Fischer, K. W., & Léna, P. J. (2008). Introduction: Mind, brain, and

    education in theory and practice. *Educated Brain. Essays in Neuroeducation,*

    Cambridge University Press, Cambridge, 1-19.

Becattini, S., Latorre, D., Mele, F., Foglierini, M., De Gregorio, C., Cassotta, A., &

    Lanzavecchia, A. (2015). Functional heterogeneity of human memory CD4 T cell

    clones primed by pathogens or vaccines. *Science*, *347*(6220), 400-406.

Begeny, J. C., Mitchell, R. C., Whitehouse, M. H., Harris Samuels, F., & Stage, S. A. (2011). Effects of the HELPS Reading Fluency Program when Implemented by Classroom Teachers with Low Performing Second Grade Students. *Learning Disabilities Research & Practice*, *26*(3), 122-133.

Bell, L. & Perfetti, C. (1994). Reading skill: Some adult comparisons. *Journal of Educational Psychology, 86,* 244-255.

Blachman, B. A., Schatschneider, C., Fletcher, J. M., Murray, M. S., Munger, K. A., & Vaughn, M. G. (2014). Intensive reading remediation in grade 2 or 3: Are there effects a decade later? *Journal of educational psychology*, *106*(1), 46 - 54.

Black, G. L. (2014). Say Cheese! A Snapshot of Elementary Teachers' Engagement and Motivation for Classroom Assessment. *Action in Teacher Education*, *36(5-6),* 377-388.

Block-Zaretsky, T. (2013). *Dyslexia Training Institute: Education Challenges Everything Level 1. Winter/Spring 2013.* San Diego, CA. www.dylexiatraininginstitute.org

Borg, S. (2015). *Teacher cognition and language education: Research and practice*. Bloomsbury Publishing.

Boss, S., Johanson, C., Arnold, S. D., Parker, W. C., Nguyen, D., Mosborg, S., & Bransford, J. (2011). The quest for deeper learning and engagement in advanced high school courses. *The Foundation Review*, *3*(3), 3.

Bowen, C. H. (2011). Resolving the Conflict: Brain-Based Learning, Best Practices, and No Child Left Behind. *Perspectives in Learning: A Journal of the College of Education & Health Professions Columbus State University*, *12*(1).

Bradley, R. (2012). Learning to read changes our brains. *Developmental Psychology: Revisiting the Classic Studies*, 132 - 143.

Brier, D. J., & Lebbin, V. K. (2015). Learning Information Literacy through Drawing. *Reference Services Review, 43(1,)* 45-67.

Byrnes, J. P., & Vu, L. T. (2015). Educational neuroscience: definitional, methodological, and   interpretive issues. *Wiley Interdisciplinary Reviews: Cognitive Science.*

Caine, R. N. Caine, G., McClintic, C., & Klimek, K. J. (2009). *Brain/mind learning principles in action: Developing executive functions of the human brain.* Thousand Oaks, CA: Corwin Press.

Caine, G. & Caine, R. N. (2010). *Strengthening and enriching your professional learning community: The art of learning together.* Alexandria, VA: Association for Supervision & Curriculum Development (ASCD).

Calhoon, M. B. (2005). Effects of a peer-mediated phonological skill and reading comprehension program on reading skill acquisition for middle school students with reading disabilities. *Journal of Learning Disabilities. 38*, 424-433.

Campbell, R. & Ahrens, C.E. (1998). Innovative community services for rape victims: An application of multiple case study methodology. *American Journal of Community Psychology, 26*, 537-571.

Caravolas, M., Larva, A., Deiform, S., Seidlová Málková, G., & Hulme, C. (2012). Different Patterns, but Equivalent Predictors, of Growth in Reading in Consistent and Inconsistent Orthographies. *Associate for Psychological Science, 24(8),*1398 –1407. DOI:10.1177/0956797612473122 pss.sagepub.com

Case, S. S., & Oetama☐Paul, A. J. (2015). Brain Biology and Gendered

   Discourse. *Applied Psychology*. DOI: 10.1111/apps.12040

Chaiwat Waree (2016). An Increasing of Primary School Teachers' Competency in

   Brain-Based Learning. *International Education Studies*. Vol. 10, No. 3; 2017.

Chall, J.S. (1967). *Learning to read: The great debate.* New York, NY: McGraw-Hill.

Chapman, J. W., & Tunmer, W. E. (2014). The Literacy Performance of Young Adults

   Who Had Reading Difficulties in School: New Zealand Data from the

   International Adult Literacy   and Lifestyle Survey. *Asia Pacific Journal of*

   Developmental Differences, 1(1), 30-43.

Chaplain, R. (2016). *Teaching Without Disruption in the Primary School: A Practical*

   Approach to Managing Pupil Behavior. Routledge Publishers.

Chapman, S. B., Aslan, S., Spence, J. S., Hart, J. J., Bartz, E. K., Didehbani, N., & Lu, H.

   (2015). Neural mechanisms of brain plasticity with complex cognitive training in

   healthy seniors. *Cerebral Cortex*, *25*(2), 396-405.

Child Development Institute (2010). *About dyslexia and reading problems*. Retrieved

   from www.childdevelopment.com/learning/dyslexia.shtml

Chipongian, L. (2004). *What is "Brain-Based Learning"*? Retrieved from

   http://brainconnection.brainhq.com/2004/03/26/what-is-brain-based-learning/

Coffman, T. L., & Klinger, M. B. (2014). Collaboration and Communication in the

   Online Classroom through a Brain-Based Approach. *International Journal of*

   Information Communication Technologies and Human Development

   (IJICTHD),*6*(3), 42-52.

Connell, D., & VanStelten, J. (2013). Neuroscience: The genesis of our individual brain

strengths. In *Early Childhood and Neuroscience-Links to Development and Learning, (7)* 23-42.

Corbin, J., & Strauss, A. (2014). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. San Francisco, CA: Sage Publications.

Craig, C. J., Zou, Y., & Curtis, G. (2016). Preservice Teachers' Reflective Journaling: A Way to Know Culture. In *Quality and Change in Teacher Education*, 175-194.

Creswell, J.W. (2013). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches,* 4th Edition 4th Edition. Thousand Oaks, CA: Sage Publications

Cummings, K. D., Stoolmiller, M. L., Baker, S. K., Fien, H., & Kame'enui, E. J. (2015). Using school-level student achievement to engage in formative evaluation: comparative school-level rates of oral reading fluency growth conditioned by initial skill for second grade students. *Reading and Writing, 28(1),* 105-130.

Darling-Kuria, N. (2010). *Brain-Based Early Learning Activities: Connecting Theory and Practice.* St. Paul, MN: Redleaf Press Publisher.

Degen, J.R. (2014). Brain-Based Learning: The Neurological Findings About the Human Brain   that Every Teacher Should Know to be Effective. *Amity Global Business Review*, 16-23.

Deligiannidi, K. & Howard-Jones, P.A. (2015). The neuroscience literary of teachers in Greece. *Journal of Social and Behavioral Sciences*, 174, 3909-3925.

Denzin, N., & Lincoln, Y. (1994). *Handbook of qualitative research*. Thousand Oaks, CA: Sage Publications.

Diamond, M. & Hopson, J. (1998). *Magic trees of the mind: How to nurture your child's intelligence, creativity, and healthy emotions from birth through adolescence.* New York: Dutton.

Dombrowski, S. C. (2015). Learning Disabilities: *Journal of* Psychoeducational *Assessment and Report Writing*, 141-173.

Doolen, J., & Cates, L. A. (2014). Embracing Brain-Based Teaching and Learning Strategies. *Clinical Simulation in Nursing, 10*(10), 491-493.

Dyslexia Training Institute (2013). *Education Changes Everything.* San Diego, CA: *Dyslexia Certificate Program, Level 1*: Winter/Spring 2013. Retrieved from http://www.dyslexiatraininginstitute.org

Eda Demirhan, İsmail Önder, & Şenol Beşoluk (2014). Brain Based Biology Teaching: Effects on Cognitive and Affective Features and Opinions of Science Teacher Trainees. *Journal of Turkish Science Education.* Vol. 11, Issue 3, 171-812.

Edelenbosch, R., Kupper, F., Krabbendam, L., & Broerse, J. E. (2015). Brain☐Based Learning and Educational Neuroscience: Boundary Work. *Mind, Brain, and Education, 9(1),* 40-49.

Emmer, E. T., & Evertson, C. M. (2012). *Classroom management for middle and high school teachers*. Pearson Higher Ed.

Falchikov, N. (2013). *Improving assessment through student involvement: Practical solutions for aiding learning in higher and further education*. New York, NY: Routledge Falmer.

Farrington-Flint, L. (2015). *Learning and the E-Generation*. Malden, MA: John Wiley & Sons.Farwell, T. (2016). Visual, Auditory, Kinesthetic Learners. Retrieved from

http://school.familyeducation.com/intelligence/teaching-methods/38519.html

Fethi Kayalar & Türkan Güler (2016). The Views of Language Teachers over the

Strategies of Brain based Learning and Teaching for Successful Classroom

Environment. *Journal of the 8th MAC. 2016*, 164-171.

Fischer, K.W., Holmes-Bernstein, J.H., & Immordino-Yang (2007). *Mind, Brain, and*

Education in Reading New York: Cambridge University Press.

Flippo, R.F. (2014). *Studying and Learning in a High-Stakes World: Making Tests Work*

for Teachers. Lanham, MD: Rowman & Littlefield Publishers.

Flood, J., Heath, S. B., & Lapp, D. (2015). *Handbook of Research on Teaching Literacy*

Through the Communicative and Visual Arts, Volume II: A Project of the

International Reading Association. London, United Kingdom: Routledge

Publishers.

Forlin, C., Kawai, N., & Higuchi, S. (2015). Educational reform in Japan towards

inclusion: Are we training teachers for success? *International Journal of Inclusive*

Education, *19*(3), 314-331.

Frey, N. (2005). Retention, Social Promotion, and Academic Redshirting: What Do We

Know and Need to Know? *Remedial and Special Education, 26 (6),* 332-346.

Ganske, K., Monroe, J. K., & Strickland, D. S. (2003). Questions teachers ask about

struggling readers and writers. *The Reading Teacher*, *57*(2), 118-128.

Gall, M., Borg, W., & Gall, J. (1996). *Educational Research: An Introduction*. White

 Plains, NY: Longman

Gardner, L. (2014). *Speed Reading: Speed Reading for Beginners Easy Techniques to*

Improve Your Reading Speed. New York, NY: A Penguin Random House

Company.

Gazzaniga, M. (1992). *Nature's mind*. New York, NY: Basic Books.

Gayle, G.H., & Chapman, C. (2013). *Differentiated Instructional Strategies: One Size Does not Fit All.* Thousand Oaks, CA: SAGE Publications, Ltd.

Gehris, J.S., Gooze, R.A., & Whitaker, R.C. (2015). Teachers' perceptions about children's movement and learning in early childhood education programmes. *Journal of Child: Care, Health and Development*. Vol. 41, Issue 1, 122-131.

Gentles, S. J., Charles, C., Ploeg, J., & McKibbon, K. A. (2015). Sampling in Qualitative Research: Insights from an Overview of the Methods Literature. *The Qualitative Report*, *20*(11), 1772.

Gibbs, Michael (2012). Designing Incentive Plan: New Insights from Academic Research. *Worldatwork Journal*, Fourth Quarter. 29-46.

Gulpinar, M. A. (2005). The Principles of Brain-Based Learning and Constructivist Models in Education. *Educational Sciences: Theory & Practice*, 5 (2), 299-306.

Jones, J.B. (ed.) (2013). *Education for the human brain: A road map to natural learning in schools*. Lanham, MD: A Division of Rowman & Littlefield Publishers, Inc.

Jones, S. R., Torres, V., & Arminio, J. (2013). *Negotiating the complexities of qualitative research in higher education: Fundamental elements and issues*. New York, NY: Routledge Publications.

Hardiman, M. (2012). *The Brain Targeted- Teaching Model for 21st-Century Schools: Reading Companion and Study Guide:* Thousand Oaks, CA: A SAGE Company

Harrison, G. (2011). *First and Second Grade Teacher's Perceptions of Reading Fluency*. (Doctorate Dissertation). ProQuest LLC. UMI 3453840.

Harris, K. R., Graham, S., & Adkins, M. (2015). Practice-based professional

    development and self-regulated strategy development for Tier 2, at-risk writers in

    second grade. *Contemporary Educational Psychology*, *40*, 5-16.

Hart, L. (1969). The Classroom Disaster: How the Outworn Classroom System Cripples

    Our Schools and Cheats Our Children, and How to Replace It. *The Nation,* 181-

    184.

Hart, L. (1975). *How the Brain Works: A New Understanding of Human Learning,*

    Emotion, and Thinking. New York, NY: Basic Books

Hart, L. (1983). *Human brain, human leaning*. New York, NY: Longman Publisher

Hart, L. (1998). *Human brain, human leaning updated.* Washington, DC: Books for

    Educators, Inc.

Hart, L. (1999). *Human Brain and Human Learning*. Kent, WA: Books for Educators

Hawk, P. P., Coble, C. R., & Swanson, M. (1985). Certification: It does matter. *Journal*

    of Teacher Education, *36*(3), 13-15.

Hoffman, J. V., Baumann, J.F., Afflerbach, P., Duffy-Hester, A.M., McCarthey, S.J.,

    Moon-Roo, J. (2012). *Balancing Principles for Teaching Elementary Reading.*

    Mahwah, NJ: Lawrence Erlbaum Associates, Inc. Publishers.

Howard-Jones, P. A. (2014). Neuroscience and education: myths and messages. *Nature*

    Reviews Neuroscience, *15(12),* 817-824.

Hughes, D. A., & Baylin, J. (2012). *Brain-Based Parenting: The Neuroscience of*

    Caregiving for Healthy Attachment (Norton Series on Interpersonal

    Neurobiology). WW Norton & Company.

Imberman, S., Lovenheim, M.F. (2012). Incentive strength and teacher productivity: Evidence from a group-based teacher incentive pay system. *Journal of Educational Incentive.* 120-132.

James, N. (2016). Using email interviews in qualitative educational research: creating space to think and time to talk. *International Journal of Qualitative Studies in Education*, *29*(2), 150-163.

Jensen, E. (2000). Brain-based learning: A reality check. *Educational Leadership, 57*(7), 76-80

Jensen, E. (2003a). *Environments for learning*. San Diego, CA: The Brain Store.

Jensen, E. (2004). *Teaching with the Brain in Mind.* San Francisco, CA: Jossey-Bass

Jensen, E. & Snider, C. (2013). *Turnaround Tools for the Teenage Brain: Helping Underperforming Students Become Lifelong Learners*. San Francisco, CA: Jossey-Bass

Kay, R. (2014). Exploring the use of web-based learning tools in secondary school classrooms. *Interactive Learning Environments*, *22*(1), 67-83.

Kelley, M. F., Roe, M., Blanchard, J., & Atwill, K. (2015). The Influence of Spanish Vocabulary and Phonemic Awareness on Beginning English Reading Development: A Three-Year (K–2nd) Longitudinal Study. *Journal of Research in Childhood Education, 29(1),* 42-59.

Kim, Y., Petscher, Y., and Foorman, B. (2015). The Unique Relation of Silent Reading Fluency to End-of-Year-Reading Comprehension: Understanding Individual Differences at the Student, Classroom, School, and District Levels. *Reading and Writing, 28*: 131–150. doi: 10.1007/s11145-013-9455-2

Klingner, J. K., Vaughn, S., & Boardman, A. (2015). *Teaching Reading Comprehension to Students with Learning Difficulties*. New York, NY: Guilford Publications

Kraemer, H. C., & Blasey, C. (2015). *How many subjects? Statistical power analysis in research*. Thousand Oaks, CA: Sage Publications.

LaMar, A., & Burgess, D. (2015). Standards Based Mastery: Learning Gains for All Students. Retrieved from

http://digitalcommons.georgiasouthern.edu/nyar_savannah/2015/2015/176/

Lavis, C. C., Williams, K. A., Fallin, J., Barnes, P. K., Fishback, S. J., & Thien, S. (2016). Assessing a Faculty Development Program for the Adoption of Brain-based Learning Strategies. *The Journal of Faculty Development*, *30*(1), 57-70.

Lefly, D. L., & Pennington, B. F. (2000). Reliability and validity of the Adult Reading History Questionnaire. *Journal of Learning Disabilities*, *33*, 286–296.

Lervag, A., Braten, I., & Hulme, C. (2009). The cognitive and linguistic foundations of early reading development: A Norwegian latent variable longitudinal study. *Developmental Psychology*, *45,* 764 −781. doi: 10.1037/a0014132.

Liu, C. J., & Huang, C. F. (2015). Neuroscience Engagement: The Influences of Chemistry Education on Affective Dimensions. *In Affective Dimensions in Chemistry Education*, 235-258.

Liwanag, M.P.S., Fahrenbruck, M.A & Koomi, J. K. (2015). Focus on Elementary: Using Reading Strategy Rulers to Help Readers Become Critically Aware of Multiple Reading Strategies. *Childhood Education, (91)1,*65-68. DOI: 10.1080/00094056.2015.1001677

Machado, J. (2015). *Early childhood experiences in language arts: Early literacy*. Belmont, CA: Cengage Learning.

Malekzadeh, B., & Bayat, A. (2015). The effect of mind mapping strategy on comprehending implicit information in efl reading texts. *International Journal of Educational Investigations*, *2*(3), 81-90.

Marshall, C., Rossman, G. B. (2011*). Primary Data Collection Methods Designing Qualitative Research*. Los Angeles, CA: Sage Publications.

Marzano, R. J., Pickering, D., & Pollock, J. E. (2001). *Classroom instruction that works: Research-based strategies for increasing student achievement*, 29-35.

McCandliss, B. D., & Noble, K. G. (2003). The development of reading impairment: a cognitive neuroscience model. *Mental retardation and developmental disabilities research reviews*, *9*(3), 196-205.

McCall, L. A. H. (2012). Brain-based Pedagogy in Today's Diverse Classrooms: A Perfect Fit-But Be Careful! *ern*, 42. *Academic Journal Article*. Delta Kappa Gamma Bulletin*,* Vol.78, No. 3.

McFadden, P. (2010). *Using Theatre Arts to Enhance Literary Skills at the Second Grade Level.* (Doctorate Dissertation). ProQuest LLC. UMI 3428328.

McNamara, D. S. (Ed.). (2012). *Reading comprehension strategies: Theories, interventions, and technologies*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Mercer, N. (2013). The Social Brain, Language, and Goal-Directed Collective Thinking: A Social Conception of Cognition and Its Implications for Understanding How We Think, Teach, and Learn. *Educational Psychology*,(3), 148-168**.** DOI:10.1080/00461520.2013.804394

Merriam, S. B. (2014). *Qualitative research: A guide to design and implementation*. San

   Francisco, CA: John Wiley & Sons.

Merriam, S. (1998). *Qualitative research and case study applications in education.* San

   Francisco, CA: Jossey-Bass.

Merriam, S. (2009). *Qualitative research and case study applications in education.* San

   Francisco, CA: Jossey-Bass.

Mitchell, R.J., Morrison, T.G., Feinauer, E., Wilcox, B., & Black, S. (2016). Effects of

   Fourth and Second Graders' Cross-Age Tutoring on Students' Spelling Reading

   Psychology, 37, 147-166.

Moats, L. (2014). What teachers don't know and why they aren't learning it: addressing

   the need for content and pedagogy in teacher education. *Australian Journal of

   Learning Difficulties*, (19) 2*,*75-91. DOI: 10.1080/19404158.2014.941093

Morris, D.M. (2013). *Diagnosis and Correction of Reading Problems (2nd Ed.)* New

   York, NY: The Guilford Press.

Myers, C. A., Vandermosten, M., Farris, E. A., Hancock, R., Gimenez, P., Black, J. M.,

   Casto, B., Drahos, M., Tumber, M., Hendren, R. L., Hulme, C., & Hoeft, F.

   (2014). White Matter Morphometric Changes Uniquely Predict Children's

   Reading Acquisition. *Psychological science, 25(10),* 1870-1883.

Nachmias F. C., Nachmias, D.N. (2007). *Study Guide for Research Methods in the Social

   Sciences*. (7th ed.). New York, NY: St. Martin's Press

National Capital Language Resource Center, NCLRC (2013). The October 2010 Edition
    of the NCLRC Language Resource Newsletter. Retrieved from
    http://www.nclrc.org/newsletter.html

National Institute of Child Health and Human Development (1997). Total and regional
    brain volumes in a population-based normative sample from 4 to 18 years: the
    NIH MRI study of normal brain development. *Cerebral Cortex*, *22*(1), 1-12.

National Reading Council (1998). Teaching Children to Read. Retrieved from:
    http://www.nichd.nih.gov/publications/pubs/nrp/Documents/report.pdf

Nelson, I. A., London, R. A., & Strobel, K. R. (2015). Reinventing the role of the
    university researcher. *Educational Researcher*, 0013189X15570387.

North Carolina Reading Association (20150. Inspire of Love of Reading. Retrieved
    from: http://www.ncreading.org/2015-conference/

National Staff Development Council (NSDC; 2011). *Standards for Professional
    Learning*. Retrieved from http://www.learningforward.org/index.cfm

Olson, R. K., Keenan, J. M., Byrne, B., & Samuelsson, S. (2014). Why Do Children
    Differ in Their Development of Reading and Related Skills? *Scientific Studies of
    Reading*, *18(1),* 38-54.

Özgül, K. & Necdet , S. (2012). Elementary Teachers' Views on Mind Mapping.
    International Journal of Education. Vol. 4, No. 1, 93-100.

Pani, J. R., Chariker, J. H., Naaz, F., Mattingly, W., Roberts, J., & Sephton, S. E. (2014).
    Learning with interactive computer graphics in the undergraduate neuroscience
    classroom. *Advances in Health Sciences Education*, *19*(4), 507-528.

Parasuraman, R., & McKinley, R. A. (2014). Using noninvasive brain stimulation to accelerate learning and enhance human performance. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 53-74. DOI: 0018720814538815.

Patton, M. Q. (2000). *How and Why Language Matters in Evaluation, edited by Rodney Hopson,* San Francisco, CA: Jossey-Bass.

Patton, M. Q. (2014). *Qualitative Research & Evaluation Methods.* Thousand Oaks, CA*:* Sage Publications.

Payne, A. A., & Welch, K. (2015). How School and Education Impact the Development of Criminal and Antisocial Behavior. In *the Development of Criminal and Antisocial Behavior* (pp. 237-251). Springer International Publishing.

Perez, J., Montano, J., & Perez, J. (2015). Healthy Schools as a Learning Tool. Association of Learning Environment. Retrieved from http://healthyschools.cefpi.org/temperature.html

Peterson, R. L. & Pennington, B. F. (2012). Developmental dyslexia. *The Lancet, 397(9830)*, 1997-2007.

Piper, B., & Zuilkowski, S. S. (2016). The role of timing in assessing oral reading fluency and comprehension in Kenya. *Language Testing*, *33*(1), 75-98.

Price, G.R., Wilkey, E.D., Yeo, D.J., & Cutting, L.E. (2016). The relation between 1st grade grey matter volume and 2nd grade math competence. *Journal of Neuroscience*. Vol. (124), 232-237.

Ragin, C. C. (2014). *The comparative method: Moving beyond qualitative and quantitative strategies*. Oakland, CA: University of California Press.

Reis, S. M., McCoach, B., Little, C. A., Muller, L. M. & Kaniskan, R. B. (2010). The effects of differentiated instruction and enrichment pedagogy on reading 80 achievement in five elementary schools. *American Educational Research Journal*, 1-40, doi:10.3102/0002831210382891

Reynaldo B. Inocian & Laliene T. Inocian (2016). Outcomes-based Teaching for Brain-based Learning Vis-à-vis Pedagogical Content Knowledge. License Journal: *Asia Pacific Journal of Multidisciplinary Research*, Vol 4, Iss. 2, 65-75.

Richardson, J. S., Morgan, R. F., & Fleener, C. (2011). *Reading to Learn in the Content Areas.* Thousand Oaks, CA: Sage Publications.

Ritchie, J., Lewis, J., Nicholls, C. M., & Ormston, R. (Eds.). (2013). *Qualitative research practice: A guide or social science students and researchers*. Thousand Oaks, CA: Sage Publications.

Roberts, J. W. (2002). Beyond learning by doing: The brain compatible approach. *Journal of Experimental Education, 25(2)*, 281-85.

Robson, D. (2011, October 21). *Your clever body: Thinking from head to toe: New Scientist.* Retrieved from http://www.newscientist.com/article/mg21228341.500your-clever-body-thinking-from-head-to-toe.html.

Roe, B., Smith, S., & Burns, P. C. (2011). *Teaching reading in today's elementary schools*. Belmont, CA: Cengage Learning.

Rose, D. (2004). *The potential of role-model education, the encyclopedia of informal*

education. Retrieved from. http://infed.org/mobi/the-potential-of-role-model-education/

Saldaña, J. (2015). *The coding manual for qualitative researchers*. Thousand Oaks, CA: Sage Publications.

Saleh, Salmiza (2011). The Effectiveness of the Brain-Based Teaching Approach in Generating Students' Learning Motivation towards the Subject of Physics: A Qualitative Approach. Journal Articles: *Research Online Submission, US-China Education Review,* 1. 63-72.

Saleh, S. (2011). The effectiveness of brain-based teaching approach in dealing with the problems of students' conceptual understanding and learning motivation. Educational Studies, 38(1), 19-29. doi:10. 1080/ 03055698.2011 .570004.

Samuels, S. J., & Farstrup, A. E. (Eds.) (2006). *What research has to say about fluency instruction.* Newark, DE: International Reading Association.

Scales, P. (2012). *Teaching in the lifelong learning sector*. Bershire, England: McGraw-Hill International.

Sehgal Cuthbert, A. (2015). Neuroscience and Education – an Incompatible Relationship. *Sociology Compass*, *9*(1), 49-61.

Smith, T. E., Polloway, E. A., Patton, J. R., Dowdy, C. A., & Doughty, T. T. (2015). *Teaching students with special needs in inclusive settings*. Pearson

Simon, M. K. (2011). Dissertation and scholarly research: Recipes for success (2011 Ed.). Seattle, WA, Dissertation Success, LLC.

Sousa, D.A. (2014). *How the brain learns to read.* Thousand Oaks, CA: SAGE Publications, Ltd.

Stafford, Dunn, Allyn, & Bacon (1993). *Teaching Secondary Students Through Their Individual Learning Styles*. New York, NY: Pearson Publishing.

Stake, R.E. (1995). *The art of case study approach.* Thousand Oaks, CA: Sage Publications

Taylor, S. J., Bogdan, R., & DeVault, M. (2015). *Introduction to qualitative research methods: A guidebook and resource*. New York, NY: John Wiley & Sons.

Sulayman, H. I. (2014). Values-based Curriculum Model: A Practical Application of Integrated 'Maqasid Al-Sharia'for Wholeness Development of Mankind. *Procedia-Social and Behavioral Sciences*, *123*, 477-484.

Suyasti, Y., & Sada, C. (2016). Teaching reading comprehension using student team achievement divisions (STAD). *Journal Pendidikan dan Pembelajaran, (5), 1-15.*

Tanner, D., Inoue, K., & Osterhout, L. (2014). Brain-based individual differences in online L2 grammatical comprehension. *Bilingualism: Language and Cognition, 17(2),* 277-293.

Tesch, R. (1990). *Qualitative research: Analysis Types and Software Tools:* New York, NY: Falmer Press.

Therrien, W. J. (2004). Fluency and comprehension gains as a result of remedial reading. *Remedial and Special Education, 25*, 252-261.

Thompson, G. B., Fletcher-Flinn, C. M., Wilson, K. J., McKay, M. F., & Margrain, V. G. (2015). Learning with sublexical information from emerging reading vocabularies in exceptionally early and normal reading development. *Cognition, 136*, 166-185.

Torgesen, J. K., Wagner, R. K., Rashotte, C. A., Rose, E., Lindamood, P., Conway, T., & Garvan, C. (1999). Preventing reading failure in young children with

phonological   processing disabilities: Group and individual responses to

instruction. *Journal of Educational Psychology, 91*(4), 579-593.

Tokuhama-Espinosa, T. (2015). *The new science of teaching and learning: Using the best of mind, brain, and education science in the classroom*. New York, NY: Teachers College Press.

Trapman, M., Gelderen, A., Steensel, R., Schooten, E., & Hulstijn, J. (2014). Linguistic knowledge, fluency and meta☐cognitive knowledge as components of reading comprehension in adolescent low achievers: differences between monolinguals and bilinguals. *Journal of Research in Reading, 37(S1),* S3-S21.

Unrau, N., Ragusa, G. & Bowers,E. (2015). Teachers Focus on Motivation for Reading: It's All About Knowing the Relationship. *Reading Psychology, (36)2, 105-144.* DOI: 10.1080/02702711.2013.836582

Urhahne, D. (2015). Teacher behavior as a mediator of the relationship between teacher judgment and students' motivation and emotion. *Teaching and Teacher Education, 45,* 73-82.

van Bergen E., de Jong P. F., Plakas A., Maassen B, van der Leij A. (2012). Child and parental literacy levels within families with a history of dyslexia. *Journal of Child Psychology Psychiatry, 53,* 28-36. doi 10.1111/j.1469-7610.2011.02418.x

van Bergen, E., van der Leij, A., & de Jong, P.F. (2014). The intergenerational multiple deficit model and the case of dyslexia. *Human Neuroscience, 8,* 320-346. doi: 10.3389/fnhum.2014.00346

van den Bos, W., Talwar, A., & McClure, S. M. (2013). Neural correlates of reinforcement learning and social preferences in competitive bidding. *The Journal of Neuroscience, 33(5),* 2137-2146.

van der Leij A., van Bergen E., van Zuijen T., de Jong P. F., Maurits N., Maassen B. (2013). Precursors of developmental dyslexia: an overview of the longitudinal dutch dyslexia programme study. *Journal of Dyslexia.* doi 19 191–213 10.1002/dys.1463

Vlachos, F., & Papadimitriou, A. (2015). Effect of age and gender on children's reading performance: The possible neural underpinnings. *Cogent Psychology*, *2*(1), 1045224.

Wang, L., Gao, Y., Shi, F., Li, G., Gilmore, J. H., Lin, W., & Shen, D. (2015). Learning-based multi-source integration framework for segmentation of infant brain images. *NeuroImage*, *108*, 160-172.

Wellington, J. (2015). *Educational research: Contemporary issues and practical approaches*. London, United Kingdom: Bloomsbury Publishing.

Wiggins, J. (2009). *Implementing Engaging Strategies for Struggling Readers: Interviewing Students and Teachers to Understand Their Perspectives* (Doctorate Dissertation). Retrieved from the database: UMI Number 3355604

Willig, C. (2013). *Introducing qualitative research in psychology*. Berkshire, England: McGraw-Hill International.

Willis, J. (2009). What You Should Know about Your Brain. *Educational Leadership/ASCD,* 1- 3.

Wilson, D. (2012). Training The Mind's Eye: "Brain Movies" Support Comprehension and Recall. *International Reading Association, (66),*3, 189-194. DOI: 10.1002/TRTR.01091

Wiznia, D., Korom, R., Marzuk, P., Safdieh, J., & Grafstein, B. (2012). Enhancing problem-based learning through increased student participation. *Medical education online*, 17-22.

Wolf, M., & Katzir-Cohen, T. (2001). Reading fluency and its intervention. *Scientific studies of reading*, *5*(3), 211-239.

Yildiz, A., & Vale, R. D. (2015). Tracking Movements of the Microtubule Motors Kinesin and Dynein Using Total Internal Reflection Fluorescence Microscopy. *Cold Spring Harbor Protocols*, *2015*(9), 355-365.

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.) Thousand Oaks, CA: Sage Publications.

Yin, R. K. (2014). *Case Study Research: Design and Methods* (5th ed.). Thousand Oaks, CA: SAGE, Inc.

Zelazo, P. D., & Lyons, K. E. (2012). The potential benefits of mindfulness training in early childhood: A developmental social cognitive neuroscience perspective. *Child Development Perspectives*, *6*(2), 154-160.

Appendix A: Questions of E-journals

Reflective and Interactive Question Journals

1. Describe a brain-based teaching strategy which you are using in class?

2. What are its pros and cons?

3. How do you implement a brain-based teaching strategy in class?

4. How are your weekly reflective and interactive journals effective to your teaching?

5. How is your brain-based teaching strategy effective for struggling readers and/or students with dyslexia?

6. How likely are you to use this teaching strategy again? Why or why not?

7. How is your teaching strategy influential in other teacher's teaching style?

8. What strategies can be used to increase student engagement in the classroom?

Appendix B: Teacher Interview Questions

Teacher Interview Guide 1

1. What teaching strategies do you implement for struggling readers?

2. How do your BBT strategies change or impact your old teaching styles?

3. What are the positive aspects of your BBT?

Teacher Interview Guide 2

1. How are your BBT strategies engaged in your teaching activities?

2. How are your BBT strategies beneficial to struggling readers?

3. Do you like the BBT strategies? What are the pros and cons?

Teacher Interview Guide 3

1. Describe the struggling readers' achievements after you have implemented your BBT strategies in class.

2. What are your perceptions of BBT strategies? How do the perceptions affect your practices in teaching?

3. Do you like or dislike your own BBT strategies? How do you compromise your own teaching styles with other teachers?

Appendix C: Classroom Observation Form

Instructor/Teacher's Name: _____

Researcher/Observer's Name: _____

Location: _____

Date: _____

Time: _____

REVIEW SECTION	DESCRIPTIONS / COMMENTS
1. SUBJECT MATTER CONTENT (showing good command and knowledge of subject matter, ability to demonstrate breadth, and depth of mastery)	
2. ORGANIZATION (organizing subject matters, evidences of preparation, clear objectives, emphasizing and summarizing main points)	
3. RAPPORT (holding interest of students, respectful, fair, and impartial. Providing feedback and encouraging participation. Interacting with students and showing enthusiasm)	
4. TEACHING METHODS / PRESENTATION (using relevant teaching methods, aids, materials, techniques, and technology. Including the varieties of method, balancing the imagination, using examples that are simple, clear, precise, and appropriate)	
5. MANAGEMENT (using time wisely: attends to course interaction; demonstrates leadership ability; maintains discipline and control; maintains effective e-platform management)	
6. SENSITIVITY (exhibiting sensitivity to students' personal culture, gender differences and disabilities,	

responds appropriately in a non-threatening, pro-active learning environment)	
7. ENVIRONMENTAL SETTING (displaying visible teaching materials, technology and attraction to students.)	

Suggestions for improvement:

Overall impression of teaching effectiveness: