An E-Delphi Proactive Approach to Meeting the Needs of Struggling Students in the General Education Classroom

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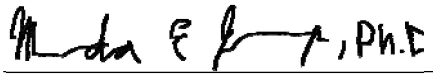

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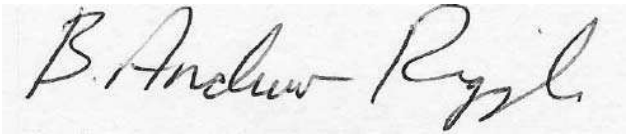

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Abstract

Every student within the general classroom deserves an equal and equitable opportunity for success, regardless of his or her learning style. Many students within the general classroom are struggling to acquire knowledge, as many teachers are unprepared to meet the demand of all students in their classroom. Estimations ranged from 10 percent to 20 percent of the population are diagnosed learning disabled. This study established the need for proven strategies that all teachers can incorporate prior to accessing the special education department. Given that students learn in a variety of instructional ways, the purpose of this qualitative e-Delphi study is to provide teachers with an array of best practices (tools and strategies) that they can implement in the general classroom. The participants were convened using the snowball approach, with the help of a recruiter. The criteria for participation: teaching for at least seven years, worked with students with learning disabilities for a minimum of five years, and have completed additional qualification course Special Education Part 1. Participants completed two rounds of survey questions, providing tools and strategies for students with varying learning styles. The results from the study provide several tools and strategies for each of the learning styles, with technology appearing in each of the three learning styles. Future studies conducted should incorporate a wider range of professionals and/or known experts within the special education field. Other recommendations include; participation of new teachers, administrators, educational assistants, ABA and IBI facilitators. Further recommendations include, additional professional development, workshops targeting specific learning deficits, and resources, such as fidgets, and yoga balls, that will enable students to stay in the learning zone for a greater length of time.

Acknowledgements

Let me begin by thanking all of those who have witnessed my many vicissitudes during this long but undisputable rewarding journey.

To my greatest love, my husband Tony, who has shown me that with hard work and diligence, success shall emerge. To my three children, Melissa, Adam, and Aaron, I thank them for their unseen motivation. Melissa, for her unrelenting pursuits of equipoise and to Adam, who has shown me that you can have it all, just jump. To Aaron, my youngest, whose loyalty and sense of humour has kept me, laughing over the years. To my sister Carolyn (Jan), who in spite of cancer, found the courage to encourage me, with daily talks and funny anecdotes. To my sister, Claudia, my biggest advocate who believes one day I will be on the cover of Marvel Comics as, "Super Teacher." A special thanks goes to Genie Specht, my recruiter, my confidant, my expert, and most of all, proud to call my friend.

Lastly, I would like to thank my mentor, Dr. Miranda Jennings, who stated, "it's not about them, it's about you, and this is your journey." Although she only became my mentor by default, she provided me with the insight and knowledge to complete this journey. To all the staff at Northcentral, whose motivation either through positive reinforcements or through negative responses, kept me inspired to continue.

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Chapter 1: Introduction

Estimations ranged from 10 percent to 20 percent of the population are diagnosed "learning disabled" (Budd, et al, 2016; "Learning Disabilities Association of Ontario," 2006, Ontario Ministry of Education, 2013, "National Dissemination Center for Children with Disabilities," 2015). Until May of 2013, the definition of learning disability in Ontario, Canada, was any individual impacted by the acquisition, organization, retention, understanding, or use of verbal or nonverbal information, resulting in an inability to demonstrate their knowledge (Learning Disabilities Association of Ontario, 2013; National Dissemination Center for Children with Disabilities, 2011). A diagnosis involves the implementation of a number of assessments, and the analysis of the results by a board certified Psychologist. To obtain the diagnosis of a learning disability, historically a student's psychological assessment would reveal an academic task level in the high range and yet, the student would demonstrate unexpected academic under-achievement (Learning Disabilities Association of Canada, 2015; Snowing and Hulme, 2011; Stegemann, 2016). Al-Yagon et al., (2013), stated that the definition for a learning disability within the DSM-IV was critically important for the practices of medical, educational and mental health purposes.

Students with a learning disability face a number of challenges (Aron & Loprest, 2012). These students have higher than average dropout rates with up to 33 percent of students leaving high school before graduation, 15 percent have a dual diagnosis of emotional, psychological, and or nervous difficulties, while parents of children without disabilities reported only 1% of such diagnoses (Haaland, 2011, LDAO, 2015; Weis et al., 2016). Students with learning disabilities also report feeling alone, disenfranchised

and forgotten, within the walls of the general classroom (Haq, 2015). Many of these students will never receive the instruction or access to higher education because of their learning disabilities (Longmoor, 2009). Many of these students will fail to acquire the skills needed for Math and Language (Grunke, & Morrison-Cavindish, 2016). Without intervention, many of these same students, as adults with learning disabilities, struggle to acquire not only a decent education, but also a good working wage (Grunke & Morrison-Cavindish, 2016; Haq, 2015; LDAC, 2009; Wilson et al., 2009). For those individuals who did obtain employment (15- 64 age group), the total income per year was $12,200 compared to their non-disabled counterparts, at $33,800. Their ability to obtain information relies solely on their ability to read, write, and comprehend (Braaten, & Willoughby, 2014).

Dr. Rosemary Tannock PhD. is Professor Emeritus at the University of Toronto and a Senior Scientist at the Hospital for Sick Children in Toronto, Canada and is a member of the DSM-V group. With changes that have occurred recently, the new criteria defined within the Diagnostic and Statistical Manual of Mental Disorders V (DSM- V), reflect two major vicissitudes. The first is the specifiers that are obtained within the assessments, indicating one of three domains; reading, writing, or mathematics. The second change Dr. Tannock stated was, "the elimination of the IQ--achievement discrepancy requirement and its replacement with four criteria" (Tannock, 2014, p.2).

The impact of this new criteria means that school boards, clinicians and teachers, will require a more rigorous intervention of the student's academic abilities prior to the assessment and identification of any student (Al-Yagon, et al., 2013). Wakefield (2016) stated that the revisions were created due in part, to what has been called a paradigm

shift, which challenged the status quo. Teachers will be required to show an array of assessment and instructional strategies that have been tried and have proven unsuccessful, to confirm the existence of a gap or gaps in the student's learning, and low academic achievement (Tannock, 2014). Dr. Tannock stated,

> This change also may require retraining of clinicians, school psychologists, and educators to identify and understand this conceptualization of LD and how to design learning pathways for each student with LD, who will have divergent and changing manifestations of their learning difficulties. The hope is that this change might lead to better alignment of practice between clinical and educational communities (International Dyslexia Association, 2014, p. 2).

Background

There are five different categories of exceptionalities within the Ontario Ministry of Education (M.O.E. 2017), behavioral, intellectual, communication, physical, and multiple. Under the exceptionality of communication are five subcategories, Learning Disabled, Autistic, Language Impairment, Speech Impairment, and Hard of Hearing (Government of Ontario, 2014). In order for a student to have been identified with exceptionality prior to the DSM-V, there would have been the implementation of a number of assessments, the analyzing of the results by a board certified Psychologist, and the results revealing the particular identification. To obtain a diagnosis of a learning disability, prior to the DSM-V, a student's psychological assessment would have revealed an academic task level in the high range (75% - 99%) and yet, the student would have trouble demonstrating this, due to a cognitive deficit (National Association of School Psychologists, NASP, 2015). This deficit may be in receptive or expressive language,

language processing, math computations or a combination of several different academic areas (Fletcher, 2011).

With the abandonment of the IQ- Achievement discrepancy and cognitive processing deficits (Snowing & Hulme, 2011), which were considered flawed conceptually (Tannock, 2013), psychologists will no longer need to administer lengthy cognitive assessments but will be able to aid in the intervention strategies for the student, teacher, and parents (Berninger, 2006; Tannock, 2014, Fletcher, 2007). A better understanding of the student will be required on the part of the teacher, prior to the assessment, as each student's will require the development, implementation, assessment, and revision of the curriculum in order to demonstrate that the needs of each student has been met. Teachers will be required to show an array of assessment and instructional strategies tried and failed to confirm the existence of low academic achievement. The DSM-V recommends, "Multiple sources of information are to be used to assess reading, one of which must be an individually administered, culturally appropriate, and psychometrically sound standardized measure of reading and reading-related abilities" (Snowing and Hulme, 2011, p. 10).

Another shift that will occur is the need for data collection, to demonstrate the persistence of these difficulties (Weis, et al, 2016), once the intervention strategies have been implemented. The hope is that a closer relationship between teacher, psychologist, parents, and student will ensue, as the data collection will require not only a formal analysis by professionals, but also, an informal analysis (Tannock, 2014).
More assessments will then be required on the part of the clinician and educator, once this deficit has been demonstrated (Tannock, 2014). This can have a positive effect, as it

will lead to a more delineated outcome, affecting special educational services and the funding they required (Tannock, 2014). The impact of this on school boards and clinicians is that a more rigorous assessment of the student's academic skills is required in order to determine the subtype of learning disability (Tannock, 2014). Additional stipulation for the identification process of a learning disability forces teacher, clinicians and educational psychologist to detail previous interventions as stated above, however, this documentation must also rule out the existence of any other disorders. Dr. Tannock stated that more research, as it pertains to this new development, is required.

The DSM-V, "specifies which disorders (Intellectual Disabilities, uncorrected auditory or visual acuity problems, other mental or neurological disorders) or adverse conditions (psychosocial adversity, lack of proficiency in the language of instruction, inadequate instruction) must be ruled out before a diagnosis of SLD can be confirmed" (Grunke, & Morrison-Cavindish, 2016; Tannock, 2014; p. 2). The criteria for identification falls largely upon the classroom teacher, as they will be required to gather a profile on each student, teach according to their preferred learning style, provide documentation of intervention strategies (Davies, 2016) and be able to prove that even with all this intervention and support, there are gaps in this students learning. The LDAO (2013) also stated that inadequate instruction might not cause a learning disability however, it can "compound the impact of a learning disability" (as cited in Csoli, 2013).

Schools now become a cacophony for students awaiting intervention. In a study completed by the Learning Disabilities Association of Ontario (2011), over 76 percent of parents whose children were undiagnosed, reported that their children were doing very well at school (LDAO, 2015). Comparatively, only 24.5 percent of parents with children

diagnosed with a Learning Disability (LD) reported their children were doing very well at school (Budd et al., 2016; LDAO, 2015). Furthermore, in the general population, 16 percent of identified students obtain remedial help outside of school, whereby only 5 percent of the general population's non-identified students receive intervention.

Students with a learning disability face a number of other challenges: higher dropout rates (Webb, Patterson, Syverud, Seabrooks-Blackmore, 2008), up to 33 percent of students leaving high school before graduation (LDAC, 2009), 15 percent have a dual diagnosis of emotional, psychological, or nervous difficulties, while parents of children without disabilities reported only 1% of such diagnoses (Haaland, 2011, LDAO, 2015; Statistics Canada, 2012). Students with learning disabilities also report feeling alone, disenfranchised and forgotten, within the walls of the regular classroom (Haq, 2015; Statistics Canada, 2012). Many of these students will never receive the instruction or access to higher education because of their learning disabilities (Longmoor, 2009).

Meeting the basic needs of life is an expectation that everyone should have, regardless of their disability (Claes et al., 2010). Without intervention, these same students as adults with learning disabilities, struggle to acquire not only a decent education but also a good working wage (Haq, 2015; Mooney & Cole, 2000; Parke et al, 2015; Stegemann, 2016). Their ability to procure information relies solely on their ability to read, write, and comprehend (Tannock, 2013). Instructional methods for these students must be tailor made to their specific deficits and must include their strengths, as well as, their areas of concern (Gardner, 2009).

The National Institute of Neurological Disorders and Stroke (2010) define dyslexia as a learning disability that impairs a student's ability to read. Dysgraphia is a

neurological disorder that affects a student's ability to write and Dyscalculia as a learning disorder that affects a student's ability to comprehend and calculate arithmetic. The researchers at the National Institute of Neurological Disorders and Stroke, The Learning Disabilities Association of Ontario (LDAO), The Ontario Ministry of Education (OME), and The Learning Disabilities Association of Canada (LDAC) state that more research is required in the treatment and solutions for students with all subtypes of learning disabilities.

Statement of the Problem

The research problem identified in this study concerns the lack of understanding, disjunction and execution of curriculum for all students, either with or without the diagnosis of a learning disability, and the predominately one- dimensional teaching style currently being implemented (Demaillie, 2008; Krummick, 2014). On May 18th, 2013, the DSM-V released the new criteria for the process of acquiring the diagnosis of a learning disability (International Dyslexia Association, 2014). Based upon this new criterion, it is up to the teacher to demonstrate that they have exhausted all their tools and strategies to ensure that each student has the opportunity to be successful within the general classroom (Tannock, 2014). Students with learning disabilities struggle to acquiring knowledge (Roblyer & Doering, 2009). Many of these students suffer in silence, as they are unable to follow the instructions that are delivered primarily through auditory means and end up with decreased self-esteem (Mooney & Cole, 2000), higher dropout rates and social and emotional difficulties (Ashman et al., 2012; Dare & Nowicki, 2015; Haq, 2015). "Their intellectual identity has been shrunken down to a list

of examination scores that will determine their destinies while shedding little light on their true strengths, weaknesses, and educational needs" (Kaplan, 2013, p. 14).

With the lack of teacher preparedness (Bayar, 2014; Tomlinson, 2014), teachers are struggling to deliver instruction in a variety of way that is deemed meaningful for all students (Bosier, 2007; Bostrom, 2012; Brackenreed, 2011; Brassell, 2009; Fletcher, 2007; Gardner, 1973, 2004, 2006, 2008, 2009, 2012; Goodwin, 2013; Graham-Lawrence, 2014; Grunke & Morrison, 2016; Patall, 2013). With the increase and changes for student identification, more research is required to explore the topic of student identifications as it pertains to learning styles (Csoli, 2013) and ways to ensure that prior to any diagnosis, a student has received instruction that meets their particular learning style (Gardner, 2009; 2010).

Purpose of the Study

The purpose of this non-experimental qualitative method, e-Delphi study is to elicit expert consensus (Heitner, Kahn & Sherman, 2013; Nworie, 2011; Salancik, Wenger, & Helfer, 1971) of the most effective strategies that will enable all students in the general classroom a fair and equitable access to curriculum. Using a snowball sampling restricted to those pundits who have worked a minimum of seven years as educators, with a minimum of five years working with students diagnosed learning disabled. Participants were solicited to provide their most effective strategies. A snowball quantitative sampling is a sampling procedure whereby, the researcher identifies a number of qualified participants who meet the desired qualifications and asks those participants to identify other experts (Creswell, 2014). The identification of appropriate stakeholders (Avella, 2016) for this study will be solicited, as they are people

who have credibility among the target audience, as noted by their years of experience working with struggling students (Pinsen et al., 2014)

An e-Delphi approach was used to gather the most effective tools and strategies from an array of experts working within this field. Melnyk et al., (2009) state, "by using subject matter experts in an anonymous environment and bypassing those weaknesses found in meetings and conferences, researchers have been able to accurately forecast the development of a number of things that have since become components of everyday life" (p. 306). Using an approved program, SurveyMonkey ©, three questions will begin the initial e-Delphi questionnaire. Using an online questionnaire is considered to be one of the most effective and unbiased ways of gathering data from teachers professional opinions (Denissen, Neumann, & van Zalk, 2010). This method does not limit the results by Board, catchment area, city, town, province or country (Denissen, et al., 2010). With the help of a recruiter, an email was sent out to prospective experts providing the eligibility criteria. No other demographics were collected. As this was an anonymous study, no identifying information was collected including IP address. Each participant was asked to read the consent form and click on the acceptance button prior to completing the survey. Based upon participant responses and a willingness to complete the study, pundits were required to complete two rounds of questions, in order to provide the best strategies for each of the different learning styles, visual, auditory and kinesthetic.

Research Questions

The following research questions were used to fulfill the requirements of this study. As a researcher, the need for good questions is important. Good research

questions lay the foundation for the research, and good questions lead to good answers (Bufkin, 2008; Leedy & Ormrod, 2010; Stage, 2007). A qualitative approach is best used in answering exploratory areas (Barry, 2013; Creswell, 2009). Qualitative research can contribute to a more robust intervention by providing descriptive detailing. Constructing valid qualitative research question will produce deep, rich, responses, practitioner fidelity and adaption to interventions, while better explaining varying results (Cook, et al., 2014). Brantlinger, Jiménez, Klingner, Pugach, & Richardson (2005) state, "qualitative designs do produce science-based evidence that can inform policy and practice in special education" (p. 195). These questions were designed to elicit expert knowledge about learning styles and the best tools and strategies for students either with or without a learning disability.

For the first round of this e-Delphi study, the following questions were used to elicit responses.

1. In your expert opinion, what are your recommendations for the best tools and strategies designed for working with visual students?
2. In your expert opinion, what are your recommendations for the best tools and strategies designed for working with auditory students?
3. In your expert opinion, what are your recommendations for the best tools and strategies designed for working with kinesthetic students?

Nature of the Study

This proposed qualitative method, e-Delphi, research study will provide the necessary intervention for students not yet diagnosed with a learning disability and providing proven tools and strategies that will allow all students to gain access to the

curriculum, in a manner in which they can internalize analysis and reproduce. The intent for this research method section is to describe the methodology that was used to conduct this study; including a description of the setting, proposed design, study sample, and proposed data collection methods, procedures, and analysis.

The e-Delphi method was utilized to gather the information for this study. The theoretical framework for this type of methodology dates back to Aristotle, with the belief that practice and praxis are derived from nature and the process of doing (Haq, 2015). Delphi "is a structured process that involves collecting and synthesizing knowledge from a group of experts" (Wiersma & Jurs, pg. 314). When there is inconsistent or contradictory material available on a specific topic, such as instructional strategies, a consensus-based method is generally considered an appropriate methodology to determine the extent to which pundits agree (Prinsen et al., 2014). This type of methodology enables the researcher to gather a consensus on a topic that might not otherwise been completed (Heilner, Kahn, & Sherman, 2013). The process includes a series of systematic questions that narrow the expert opinions of professionals to extinguish and reduce to arrive at a consensus (Kim & Aktan, 2014; Pilcher, 2015; Rowell et al, 2014; Solmonson, Roaten, Sawyer, 2011; Toronto, 2017). This methodology is only utilized when the researcher wishes to communicate with others in order to arrive at a general objective (Rowell et al, 2014). Simply speaking, this style of research is genuine and truthful in nature, as it is the teacher as researcher at their best. However, the Delphi methodology is not mentioned within Christensen, Johnson, and Turner (2013), Creswell, (2010; 2014), or Leedy and Omrod (2009; 2013).

The Delphi approach to research made resurgence in the last few years. Used in the business (Nworie, 2011; Skulmoski, Hartman & Krahn, 2007) and military fields (Donohoe & Needham, 2009), this method allowed researchers to forecast and develop solutions to existing problems (Yousuf, 2007). It ran into scrutiny when a man by the name of H. Sackman, employed by The United States Air Force, believed that the method was flawed. Sackman stated there was no way to differentiate between an expert opinion and nonprofessional's opinion (Yousuf, 2007). In spite of this, it became very popular in the 1980's to the 1990's in the field of education, with as many as 83% of dissertation using this method of data collection from 1980- 1984 (Yousuf, 2007). It allowed researchers to gather expert opinions in a timely and relatively inexpensive way and is well suited to for generating an overall consensus (Heitner, Kahn, & Sherman, 2013).

The Delphi approach does have limitations. First, some participants may limit their responses to the questions that are asked, not elaborating, or expressing their true opinions (Hsu & Sanford, 2007). Discussions may be ignored or limited which may result in an artificial consensus among the participants. "Assuming that Delphi can be a surrogate for all other human communications in a given situation," may also be a limitation (Yousuef, 2007, p. 4). Will the results be generalizable to the greater population? Yet, Lipsey et al., (2012) does states, "specialized, researcher developed measures; teaching techniques; and interventions targeting individuals and small groups are associated with larger effects than standardized measures, whole school interventions, and interventions targeting whole classes and schools." (as quoted in, Cook et. al., 2014, p. 229). The results may be misinterpreted or subjective to the researchers. Experts are not adequately recognized for their contributions, with a, "what's in it for me" attitude,

will participants give of their time and expertise in a positive and genuine manner? Experts are not always equal in their representation of knowledge (Hsu & Sanford, 2007).

With the development of the internet, the Delphi technique has been modified and transformed in some instances to be known by the e-Delphi approach. It is estimated that over 3 billion people have access to the internet, providing researchers assess to a wealth of expert opinions (Cole, Donohoe, & Stellefson, 2013). Although there are some real advantages, such as, total anonymity (Armitage, 2007; de Villiers, de Villiers, & Kent, 2005; Donohoe, Needham, 2009; Yousuf, 2007), cost reductions, fast turnaround times, participant attrition and contact with a diverse population of participants, it also has its drawbacks. Conversely, attrition rates are dependent upon the context of the study (Amico, 2009) and Song and Herman (2010) noted there is no empirical basis that currently exists for an explicit criterion for attrition. Brown (2007) noted it as a challenge, rather than an advantage. Researchers using the e-Delphi method find it difficult to gather enough participants and to preserve them (Toronto, 2017). There is little personal interaction, little chance for one-to-one interviews and no face-to-face focus groups using the online approach. Either way e-Delphi is a new, exciting, and frontline way to conduct research (Cole, Donohoe, & Stellefson, 2013).

Significance of the Study

Although there is a plethora of research on learning styles (Balido-Dean, Kupczynski, & Fedynich, 2010: Baragona, 2009; Bergsteiner, Avery, and Neumann, 2010; Bostrom, 2012; Brassell, 2009; Duman, 2010; Dunn, 2008; Gardner, 2004, 2008, 2009, 2011), differentiated instruction (Ankrum & Bean, 2008; Bedir, 2015; De Jesus, 2012; Ferreri, 2009; Koeze, 2007), Cooperative Learning techniques (Avcioglu, 2007)

there appears to be a gap between the research and the implementation of pedagogy. Teachers are unprepared to deal with a number of challenges they face on a day-to-day basis in the general classroom (Bedir, 2015; Cavindish, Espinosa, Bakken, Obiakor, & Rotatori, 2013). With the recent release of the DSM-V, teachers will be responsible for demonstrating a list of strategies implemented, prior to seeking any identification for their students. The results of this e-Delphi study will help teachers incorporate a variety of proven tools and strategies from expert in the field of special education. As a result of this study, not only will students receive a range of instruction that could possibly close the gap that exists, prior to identification, teachers will be given a list of recommended approaches derived from this study. Administrators will also benefit, as they will be provided with a list of recommendations for teachers that will enable student success and improve student's performance across the board (Caine, et al, 2005; Regoniel, 2015).

Definition of Key Terms

The following key terms were utilized throughout this study. Each of these key terms will be followed by a brief definition provided by a relevant source. Variation of the key terms maybe used within this study, but will be addressed accordingly by the sources who apply the variations.

Academic Achievement. The accumulation of knowledge gained through learning acquired by effort and/or the results of hard work (Trotter, 2010).

Active Learner. An active learner is a student who learns best by being interactive and engaged with the resources. An active learner is a communicator and thrives in an interactive group setting (Krunz, 2009).

Assistive Technology. Assistive technology is any type of equipment, product or

Software used to develop, maintain, increase, and/or improve the ability of students with learning disabilities (Cohen, & Spenchiner, 2009; Learning Centre, 2015).

Birmingham Grid. Is an online test that provides explanation of the eight multiple intelligences. Students can print a copy of their multiple intelligences wheel. There is also a unique number printed on the sheet, which allows each student to re-visit his or her wheel (www.bgfl.org/bgfl/custom/resources_ftp/client_ftp/.../questions.cfm).

Brain- based Learning. Refers to teaching methods based on the latest scientific research about how the brain learns, and how students learn differently as they develop (Connell, 2002, 2006, 2008, 2009; Voyles, 2014).

Constructivism. Constructivism refers to theory that believes that learning is based upon a students' active participation in problem-solving and experiential thinking regarding a learning activity (Futrell-Schilling, 2009; Kurtz, 2009).

Delphi Study. The Delphi technique is a structured process that involves gathering and synthesizing information from a group of experts in a given field (Solmonson, Roaten, & Sawyer, 2011, Yousuf, 2007).

e-Delphi Study. This style of data collection methodology is derived from the Delphi technique which is a process to gather information from experts to arrive at a consensus of opinions, however it is completed using the internet (Cole, Donohoe & Stellefson, 2013, Prinsen et al., 2014)

Executive Functioning. Executive functioning is defined as, the self-regulation of behaviours with components of impulsive, hostile reactions that can manifest without foresight (Feifer & Rattan, 2007). It is widely debated whether this is a single cognitive construct or an amalgamation of many skills and abilities (Weingartner, 2000).

Experts. For the purpose of this study, the definition of "expert" is based upon the eligibility criteria: You are suitable to participate in this research if you have been teaching for seven years or longer. You have been teaching students with a learning disability for five years or more. You have Special Education Part 1. Avella states, who qualifies as an "expert" invited to participate is of critical importance" (p. 307). Davidson (2013) states, "the expert panel is up the researcher, but the defense of the definition is also the responsibility of the researcher (p. 63). Melnyk et al., (2009) provide an itemized list of 29 objectives to enlist their experts (p. 4635).

Differentiated Instruction. Is a philosophy in education that believes that each student's path to acquiring knowledge is different and must be completed in different ways (De Jesus, 2012; Tomlinson, 2014; Tomlinson & ImBeau, 2010; Tomlinson & McTighe 2006)

Direct instruction. Direct instruction is the use of straightforward, explicit, teacher-directed model that focuses on teaching a specific skill (Klahr & Nigam, 2004)

Dyslexia. Dyslexia is a brain-based type of learning disability that impacts a student's ability to learn to read and affects the Wernicke and Brocca (Buttner & Hasselhorn, 2012; Handler & Fierson, 2012; Shaywitz, 2012, The National Institute of Neurological Disorders and Stroke, 2010; The National Institutes of Health, 2010).

Dyscalculia. Dyscalculia is a deficiency of a students' ability to perform tasks related to arithmetical calculations (Fletcher, 2007; The National Institutes of Neurological Disorders and Stroke, 2010; The National Institutes of Health, 2010).

Dysgraphia. Dysgraphia is a deficiency in the ability to write coherently (The National Institutes of Neurological Disorders and Stroke, 2010; The National Institutes of Health, 2010).

Educator. An educator is "defined as any person who is recorded by the school as a full time employee responsible for the education of a child and spends the majority of his day within the classroom setting" (Campbell, 2012, p. 9).

Learning Disability. Involves the inability to acquire, store, retrieve or use information in a productive way (Kavale, Spaulding, & Beam, 2009; LDAC, 2015; LDAO, 2015; Oliver, 1996). Research indicates that at least five per cent of higher education students have a learning disability, which can cause significant difficulties for perceiving or processing auditory, visual, or spatial information (ADCET, 2016). Students experiencing difficulties in specific cognitive processes and academic acquisition yet possess normal or above normal intellectual functioning are classified as learning disabled (Buttner & Hasselhorn, 2011).

Learning Styles. The acquisition of information delivered and received in a manner conducive to the individual (Gardner, 2012).

Left-brain Right-brain Theory. A theory that states that the each of these sides of the brain process information in different ways (Connell, 2009; Sperry, 1983)

Multiple Intelligence. The theory of multiple intelligences was first developed by Dr. Howard Gardner, professor of education at Harvard University believing that the traditional notion of intelligence was based on I.Q. testing and did not account for the many different ways a student could be intelligent (Armstrong, 2015; Davis et al., 2011; Sluis-Thiescheffer, Bekker, Eggen, 2007; Stewart, 2013).

Ontario Ministry of Education. The Ministry of Education is responsible for overseeing all aspects of Ontario's public education system (OME, 2015).

Reading Comprehension. The ability of a student to read, learns, and comprehends information from various subjects at a grade appropriate level (Haq, 2015).

Self-regulation. Is described as the ability to direct oneself to fulfill a goal across time in spite of feelings of frustration or boredom (Parker & Boutelle, 2009).

Survey. Surveys employ a questionnaire and interviews that inform the researcher about the participants (Cozey, 2012).

VAK. The VAK (Visual, Auditory, and Kinesthetic model defines how people process information based upon their sensory strengths (Balido-Dean, Kupczynski, & Fedynich, 2010; Buttner & Hasselhorn, 2012

Summary

This study sought to explore the best tools and strategies for each student, both identified with a learning disability or without, and provide teachers with a number of effective and proven ways to deliver the curriculum in the general classrooms. Approximately, 50% of students deemed exceptional, will be classified as learning disabled (Buttner & Hasselhorn, 2012; OME, 2014; McGilchrist, 2013). Students with learning disabilities are falling further behind their cohorts because of traditional teaching techniques (Goodwin & Miller, 2013; Gubera & Aruguete, 2013; Kykalová & Vasilyeva, 2015; Lombardi, 2008; Taylor, 2015). Traditional teaching methods consist of students sitting in rows partaking in meaningless and mundane assignments that do not reflect their personal learning styles, cultures or individual differences (Shirley, 2012). Techniques that fail to incorporate the use of multi-sensory (Greenspan & Greenspan,

2010), holistically rich milieus (Houff, Klinger & Coffman, 2015). Gardner believed that students would not be able to demonstrate a true reflection of their intelligence, if they were limited to the subject matter of math and literacy taught in antiquated methods, primarily auditorily (Demailes, 2008, Gardner, 2004, 2008, 2009, 2012). Notions of brain lateralization, regions and neuroplasticity, have provided not only the opportunity for researchers to discover our hidden potentials but have also propelled research into new educational directions (Blair, 2007; Burns, 2011; Casner, & Chung, 2012; Connell, 2009; Geake, 2007; Sperry; 1968, 1973; Rissman, 2010). This research could optimally provide clear directions for education, teachers, and lessons, leading to the discussion on teaching students in a more meaningful and relevant manner (Bryk, Gomez & Grunow, 2011). Future research needs to address the preferred learning styles of all students, taking into account their visual, auditory and kinesthetic (VAK) preferences and what impact this might have on student achievement (Balido-Dean, Kupczynski, & Fedynich, 2010; Buttner & Hasselhorn, 2012). Environmental studies are needed in order to explore the physical, emotional, and social requirements of a student with learning disabilities (Bell et al., 2008; Bellah et al., 2008; Sternberg, et al, 2008). Studies that focus on a combination of Gardner's Multiple Intelligences, learning styles, brain theories, and VAK preference are also needed (De Jesus, 2012; Gardner, 2012). As well as, studies to determine the effectiveness of assessments that are currently being implemented today (Rosenberg et al., 2009) and how the impact of the new DSM-V criteria for identification will play out (Al-Yagon, et al., 2013).

Chapter 2: Literature Review

The following literature review will begin with a section entitled documentation, which provides a purposeful definition as to the impetus for this study. It outlines the types of searchers, the search engines used and the criteria for the selection of primary and secondary sources. This literature review will provide an overarching definition of the main themes relating to this study, such as, the division of brain hemispheres, and assessments. Several theoretical frameworks are also presented within a number of empirical studies including: Piaget's Developmental Theory, Structural Lateralization Theory, Dunn's Learning Styles Theory, and Gardner's Multiple Intelligence Theory. The historical definition of a learning disability and the new criteria for the identification as outlined by the DSM-V were discussed. Subsequently there are 10 domains that follow, Historical perspective, Active participation, Ontario Schools, Intervention Models, Mitigating Variables, Learning Styles and the Brain, Gardner's Multiple Intelligences, Brain-based Learning Strategies, Differentiation for All, Teacher Expectations, and Assessments. Each of these resources have been gleaned and incorporated, based upon their significance, areas of strengths, and areas of weakness. The summary provides an overview of the literature, as it pertains to this study, binding the information together to create a comprehensive understanding for the purpose of the study.

Documentation

The purpose of this literature review is to establish the need for further investigation of students who are struggling within the general classrooms, and the teachers who may have limited resources and strategies to enable students with a learning disability to acquire knowledge. A well-written literature review provides the documentation and means of demonstrating the researcher's knowledge about a particular field of study (Randolph, 2009). The data provided for this study has been gathered from scholarly literature, books, and websites, primarily written within the past five years. The data bases used to collect much of this information were obtained through EBSCO, ERIC, ProQuest, Sage online Journals and Google Scholar. The search for relevant literature is not limited to Peer-reviewed Journal articles alone, as Randolph (2009) stated, "the reviewer promises to locate and consider every available piece of research on a certain topic, published or unpublished" (p. 4). Keywords used within these search engines were learning disabilities, brain-based learning, Multiple Intelligences, VAK (Visual, Auditory, and Kinesthetic), professional development, teacher instruction, teacher expectations, teacher preparedness, alternative programing, problem-based learning, alternative instruction, left-brain right-brain theory, and parallel tasks. The data that has been referred to, if prior to the last five years, is of chronological relevance, as it provides the expertise and theoretical foundation for this study.

Also provided in this literature review, are several well-known experts' studies, which discuss the need for differentiated instruction, the implications of Multiple Intelligence and preferred learning styles: visual, auditory and kinesthetic (Chamberlin, 2011). There is a review of an oral presentation given by Dr. Howard Gardner, which

discusses his current philosophy of education and his work with Mihaly Csikszentmihaly. There is also a graphic video relayed by Dr. Lain McGilchrist, who discussed the importance of brain hemispheres as it pertains to allocated physiognomies and the acquisition of knowledge.

The purpose of this study is to provide teachers with an array of best practices that they can implement in the general classroom. The general classroom has become a mosaic of students with an array of various needs, ESL (English as a second language) LD's, ADHD, mental health issues and behaviours (Andist, & Watts, 2013; Pelsser, 2009; Shine, 2015). The theories surrounding students with learning disabilities and their particular learning styles is important, as it enables each student to access the information through their strengths enabling them to reach their fullest potential. The following information was gathered to provide the reader with an overview of the process for learning. First, it provides an understanding of the historical philosophies of knowledge acquisition, and the theorist who developed them. Second, it focuses on the conceptualization of a learning disability and the demarcation of identification. Third, it provides a motivation for the value of knowing each students learning style, and specifically, understanding the impact of Howard Gardner's Multiple Intelligence which will enable a teacher to teach to the strengths of their student (Saleh, 2011; Martin and Morris, 2013). It is divided into several sub-sections with the following headings: Documentation, Introduction, Theoretical Framework, Historical Perspective, Active Participation, Learning and the Brain, Mitigating Variables, Executive Functioning, DSM-V, Intervention Models, Brain-based learning, Differentiated Instruction, Assistive Technology, Canada and Ontario Schools, Professional Development, Parent

Perspectives, Assessments, Critics, Responses to Criticism, The Impact, Teacher Expectations, and the Summary.

Introduction

A surfeit of qualitative and quantitative empirical research studies can be located on the following areas: learning styles, multiple intelligences, brain-based learning, and left-brain, right-brain dominance, as it pertains to students (Rosihan, & Liew, 2007; Scott, 2007). However, little data, as it pertains to the area of students with learning disabilities and high yield strategies that will improve their ability to absorb information exists (Bender, 2008; Bender & Wall, 1994; Clarke, 2006; Gardner, 2009; Sperry, 1990). Although a lack of research is not a compelling enough problem, a further understanding of students diagnosed as learning disabled, as it pertains to this subject matter is necessary. Most schools in Ontario, Canada, now encourage the use of learning styles assessments and multiple intelligence assessments, but the acknowledgment and use of each of these assessments, has not changed the course of lives for students. Even if a student is found to be predominately a kinesthetic or visual learner, 75% of their student's instruction will not be delivered in their preferred learning style but rather, auditorily (Demaille, 2008). Over 80% of data retained by the brain, is transformed through visual means (Reed, 2009). For example, in a study completed by Dunn & Burke, (2006), the researchers stated,

> "It was hypothesized that a significant relationship existed between processing-style preferences and a strong visual preference. This hypothesis was based on the definition of a visual-preferenced learner as one whose primary perceptual strength was visual and who could recall at least 75% of what had been read or observed during a 40-50 minute lesson."

As a result, many of these students fall further behind their classmates, only to be placed on a psychological assessment waitlist. Students, who sit on a waitlist, utilize support staff, educational assistants, and special educational resource teachers, pending their fate, which can take up to two or more years, forcing them to fall further behind their peers. A deeper understanding of this not so unique situation is needed.

Theoretical Framework

A good theory consists of "a fully explained set of conceptual relationships used for empirical investigation" (Wacker, 2008, p.). A theory consists of four characteristics: conceptual definitions, domain limitations, relationship- building, and predictions (Wacker, 1998). A great deal of misunderstanding surround the notion of a theory, however, a theory is merely an association that exists between variables, it is observable, and measureable (Gelso, 2009; Stam, 2006). The relationship that occurs between these variables must occur consistently (Carbonell, 2013). At its root, theory is the essence for research. If a theory has been proven effective, it will provide the foundation for change and inform instructional programming. Instructional programs, practices, and strategies that are based upon learning theories and implemented within the classroom, are considered components of instructional classroom design (Hille, 2011).

A theoretical contribution is generally thought of in two ways, incremental and practical (Corley & Gioia, 2011). The contribution must be viewed as possessing pragmatic utility, while remaining rigorous in nature. However, it is difficult to provide meaning to either of these notions, when in fact, the definition of a theoretical contribution remains elusive (Rindova, 2008; Harlow, 2009). Corley and Gioia (2011) argued that with each academic community, psychology, economics, sociology, and so

forth, there are a set of different standards and norms to provide legitimacy. For example, instrumentalism, realism, and reductionism were once considered the most ubiquitous science theories; although arguably, they may still be in use today but for examples of "what not to do" (Stam, 2006). Furthermore, if the idea of research is to contribute to an existing body of knowledge, how to revolutionize new thoughts and ideas without upsetting the social edict (Ellis & Levy, 2008).

Knowledge acquisition has been researched and implemented through a variety of interventions over many decades (Fischer, Goswami, & Geake, 2010). The essential theory of this study is built upon the philosophies outlined by Dr. Howard Gardner, who believed that all students were genius in their own right, and as educators, it is our responsibility to discover the genius within (Freeman & Walsh, 2013; Gardner, 2011). Gardner was greatly influenced by the work of Norman Geschwind's, a behavioral neurologist who work with individuals having experienced a traumatic brain injury. Struck by strokes, tumors, or damage to the brain, Geschwind discovered that although these patients had acquired brain deficits, they were able to perform other functions with ease. The greater part of Geschwind's research was dedicated to the partitions located within the brain and their functions.

As a result of Geschwind's research, Gardner's fourth book, *The Shattered Mind* (1975), chronicled the lives of these individuals and their suffrages. Gardner was given a rare opportunity, which was to synthesize his knowledge of both individuals with brain impairments and his understanding of cognitive development. Born out of this opportunity, is what is known today as, Multiple Intelligences, a set of criteria identifying eight different intellects. Gardner went on to state, what most psychologist refer to as "g"

or general intelligences was a misnomer, and that humans did not possess just one intelligence but a montage of intelligences. Known as the guru of Multiple Intelligences (MI), Gardner emphatically denied that he is a teacher and does not profess how to deliver instruction. Although he continues to delve into the theory of multiple intelligences, revisiting and editing his original theory, Gardner (2011) proposed three distinct definitions for the term intelligence. He stated, intelligence is "A property of all human beings (All of us possess these 8 or 9 intelligences), A dimension on which human beings differ (No two people—not even identical twins—possess exactly the same profile of intelligences) and the way in which one carries out a task in virtue of one's goals" (p. 5).

Gardner (2014) concluded that much work and research needs to be completed in the area of multiple intelligences and pedagogical goals for all students. He stated, "I think that the potential of MI ways of thinking for dealing with various kinds of learning problems has hardly been scratched" (p. 9). He is eager for the work of David Rose, who stated, "we should not think of students as disabled; we should instead consider whether it is our curricula may be disabled" (as quoted in Gardner, 2014).

Finally, it is not enough to understand that change is needed, how the change can and must occur is also required. Gordon Moore, a co-founder of Intel, believed that expectations could be measured by past performances and the feasibility of development. All of these characteristics create the rotation of accountability. Although Moore's primary focus was rooted in the technological field, this law has been adapted within several academic fields (Bryk, Gomez, & Browan, 2011). The goal or target must

contain several attributes; it must be explicit, measurable and under constant scrutiny (Carbonell, 2013).

For the purpose of education, Moore's Law was anchored in the No Child Left Behind Act (NCLB). Given the previous discussion, the mandates developed within this initiative (e.g., 100% proficiency on state tests in math and reading by 2014), were concrete, measurable and explicit. In Canada, Moore's Law can been seen in the restructuring of Individual Education Plans (IEP) (OME, 2014). Rooted in empirical evidence and as a result of this law, the hope is that all educational mandates will include precise and measureable goals that will enable all students to be successful at school. This law has important implications for this research, as it encourages all stakeholders to converge and contribute in measurable, explicit manner to develop an all-inclusive environment for each student.

Historical perspective on learning

Dating as far back as Piaget, the primary focus of education was to instruct students, and prepare students for the realities of life (Bonawitz et al., 2009; Burnett, 2010; Hinde & Perry, 2007). One might say it is the role of the teacher, to ensure that all students receive the same opportunities for success (Gardner, 2009). The importance of Piaget's Theory of Cognitive Development on learning disabilities, is that it provides the link between the acquisition, construction and use of knowledge within a given age of development (Burnett, 2010; Ewing & Foster, 2011; Campbell, 2012). Cognitive Development Theory hypothesizes that student's travel through the steps of development chronologically, and that cognitive development is obtained by the use of four influences; maturation, active experience, social interactions and a general progression of

equilibrium (Piaget, 1945). Quite simply, Piaget believed that humans grew intellectually because of their physical and mental growth, and the experiences lived (Sumara & Davis, 2006). Children have a general understanding of what they know, and when a different experience happens to challenge their beliefs, they reconstruct and transform their understanding of the knowledge.

The ability to teach students is a noble and worthy profession; however, it is not an easy task. Debatably, how best to determine the ways in which to educate has long been the pursuit of teachers for many years. Understanding how this could be achieved, Ewing and Foster's (2011), set out to determine if in fact, students travel through the same developmental stages as outlined by Piaget's theory, and in the same way. In particular, they wanted to investigate the association between active experience, one of the four influences outlined by Piaget's Developmental Theory, and its contribution to the acquisition of knowledge. What was found to be quite notably, the researchers stated that never before has a student level of cognition been operationally defined or analyzed (Ewing & Foster, 2011). This study is important as it provided one of the basic conditions for learning, active engagement. They concluded by saying, in order to engage and aid students in their learning, several things must occur (Parker, 2009; Theisen, 2016). Students must be challenged to think deeper about the topic (Bonawitz et al., 2009). They must be provided with examples that will help them make connections and finally, the examples must be relevant to their own experiences. Piaget believed that students must be involved in active and meaningful participation if learning and retention is to occur (Ewing and Foster, 2011; Piaget, 1945).

Active participation

Active engagement is a predictor for student achievement (Conderman, Bedner & Hedner, 2012; Theisen, 2016), and the ability to finish school (Skinner et al., 2009). Students who are actively engaged are more like to get higher grade, learn more and are more likely to pursue and extend their learning opportunities to higher education (Park, Holloway, Arendtsz, Bempechat, & Li, 2012). Active participation can only occur if the student is receiving information applicable to his or her unique learning style (Bostrom, 2012; Connor, et al, 2014). In a study completed by Glago, Mastropieri, & Scruggs, (2009) was the significance of self-determination in students with learning disabilities. Within the last ten years, the move to empower students and allow them to make their own choices has enabled students with exceptionalities to improve their quality of life (Glago, Mastropieri, & Scruggs, 2009). Self-determination is a construct with characteristics consisting of autonomy, independence, self- control, self-regulation, self-advocacy and intrinsic motivation (Glago et al., 2009; Graham-Lawrence, 2014; Shanker, 2010). "A new vision of the learner as an active sense-maker suggesting new instructional methods that emphasize discussion, as well as hands on activity is the mantra of the constructivist revolution" (Carbonell, 2013, p. 31).

The theory of metacognition centres on one's understanding of how one learns, providing the necessary tools for active engagement (Chiu & Kuo, 2010). A study completed by Bostrom (2012) investigated students' perception of their own learning style and compared it to their actual learning style. The researchers explored young students' perception of how they learn, and if indeed, their perceptions aligned with their actual dominant learning style? There are many different learning styles surveys

available, such as, Curry's, Dunn & Dunn's, and Kolb's (Bergstein, Avery, Neumann, 2010; Bostrom, 2012). Although each of these theoretical frameworks shares much of the same characteristics, the researchers chose to use Dunn's Learning Styles Model as their framework, because it is internationally recognized.

The findings within this study clearly demonstrate that a student's perception of how they learn did not match their actual learning styles (Bostrom, 2012). The students tended to overestimate their actual strengths. A discussion ensued about why this might have occurred. The researcher stated that only 20% of the students surveyed were auditory learners, and the questions were read aloud. This lends credence to the fact that students must receive instruction in their unique particular learning style in order for them to understand and accomplish a set task. In addition, if only 20% of the students were auditory than the majority of these students must have been either kinesthetic or visual learners. What does this say about the generalizability of these statistics? With or without a diagnosis, a student must receive instruction in their preferred learning styles if acquisition of knowledge is to transpire.

Determining the learning style of any student is important, as research has shown that students learn more effectively if given an environment rich with sensory relevant opportunities (Houff, Klinger, & Coffman, 2015). Sharp, Bowker and Bryne (2008) investigated the use of VAK learning styles, as it pertained to accelerated learning, and brain-based strategies. The study focused on determining the reliability and validity of the VAK test. Their results indicated that the VAK survey was both reliable and valid. The researchers stated that many other variables need to be considered when determining

a student's ability to learn, and that more research is needed to determine the best way to augment a student's ability to learn.

Learning and the brain

Neuroscience has provided us with many new philosophies surrounding the brain and its ability to acquire knowledge (Fischer, Goswami, & Geake, 2010; Hook, & Farah, 2012; Parke et al., 2015). Researchers have investigated the complexities of the brain, its neural systems, and cognitive functions (Gözüyeşil & Dikici, 2014). At the root of this theory is the idea that classroom instruction can be based upon scientific theories proven to enhance both, how the brain acquires knowledge and how that knowledge is retained (Clement& Lovet, 2012; Gözüyeşil & Dikici, 2014; Gulpinar, 2015; Rushton, Juola-Rushton, & Larkin, 2010; Rushton, 2011). Another theory that continues to draw interest within the field of education is the topic of brain hemispheres (Schiferl, 2008: Gutierrez, 2013; Morris, 2006). How and what the implications of these findings might be, in regards to learning, is fairly new and ongoing (Bishka, 2010; Fletcher, Lyon, Fuchs, & Barnes, 2007). The way humans learn is a very complex phenomenon, which requires the ability to maneuver between the two hemispheres of our brain (Bassett et al., 2010; 2011). These two separate hemispheres, operating in two completely different manners, are responsible for several different and unique functions. The ability to acquire knowledge is done through a systematic process, whereby accessing the optimal regions within the brain, allows the learner to acquire the skill, and once mastered, allows for the automaticity of this skill (Morin, 2014; Bassett et al., 2011). With the understanding that particular regions within the brains structures, therein lies smaller subsections that provide the ability for a particular, detailed function. Given this dynamic design and

feature of the brains composition, it becomes clear how important of a role each of these regions play in the acquisition of knowledge (Schiferl, 2008). No brain is developed in the same way, which leads us to understand that although the areas of function might be the same throughout humans; these areas may not be developed to the same degree and quite possibly, may not even be located within a particular area (Shaywitz, 2005). For many students diagnosed with a learning disability, such as dyslexia, the areas identified for the purpose of language acquisition, the Wernicke and Brocca either may be relocated within the brain or may be underdeveloped; a true learning disability (Fletcher et al., 2007; Morin, 2014; Shaywitz, 2005). .

However, there are instances where these regions are fully developed, and there are no defects to the brain. There are many other factors that can affect a student's ability to learn. Taking the same approach to education then becomes a conundrum, as many students whose brains are designed to function in a different manner, are left to fend for themselves (Lutfi, 2006). These struggling students cannot compete in a classroom driven by the oration of knowledge, because of the way they learn, the information is not accessible to them; unless of course, they become identified as exceptional or having a learning disability (O. M. E., 2014).

To address this matter, some schools have enlisted the help of non-traditional approaches to education, choosing to embrace a more diverse route (Chita, 2012). There are some schools of thought that the brain is very flexible and adapts to the learning opportunities, it is confronted with (Dickenson, 2002). This adaptation can only be completed given a nurturing and stimulating environment that enlists the use of differentiated learning styles and multiple intelligences. Shore (2012) stated that the

brain loves novelty, including music, movement (Skoning, 2010), games, colours, a variety of partners and using different fonts for different subjects. Arguably, researchers acknowledge the fact that more research needs to be completed in the direction of learning styles and the dominance of left or right hemispheres (Szirony, Pearson, Burgin, Murray, & Elrod, 2007)

According to Sperry (1981), the brain is divided into two hemispheres, the left and right side, with each side playing a role in how the student will learn and acquire knowledge. There has been a lot of discussion around whole brain activities, however, the dominance or ability to use one side of the brain or another continues to be investigated. Sperry did provide a definition for the separate functions of the right and left hemispheres. He stated that the left side of the brain is used in the development of speaking and writing words. It uses symbols and pictures; assessing the whole by analyzing the its many parts; organizing tasks in sequential steps; breaking things apart to see them in smaller detail, logical and factual, organizing data in a sequential manner; and relying on the use of numbers (Sperry, 1968). In contrast, Sperry identified the right side of the brain as a sense of knowing and communicating without words. Thinking about the whole rather than its parts; focusing on what is real and happening now; understanding based on analogies, assessing the relative location of objects in time and space, and learning through intuition instead of analysis (Morris, 2006; Sperry, 1968, 1973; Szirony et al., 2007). At its core, the left-brain is logical, structured and organized, while the right brain is holistic, artistic, and creative (Szirony et al., 2007). This is not to say that students must be either be left or right brain dominant, but rather, dominance in

one region can demonstrate overt behaviors that can be indicative of a particular learning style.

Most research supports the idea of a particular brain hemisphere, dominant in students; conversely, there is other research to suggesting some students use both hemispheres equally (Szirony et al., 2007) or a collaboration of both hemispheres to function simultaneously (Rissman, 2010). A research study completed in the 1990's, "The Human Processing Information Survey" (HIPS) was used to assess students, to determine if placements within academic majors were associated to the to their particular brain dominance (Szirony et al., 2007). First, students were administered the HIPS to determine brain hemisphere dominance. Then a determination was completed to identify left-brain subjects, such as business and accounting, and right brain subjects, such as Fine Arts, Music, and Communications. Their findings indicated that there was a connection between students who had scored higher on the HIP survey in left- brain dominance and their enrollment in Criminal Justice, Finance, and Economics. While those students, who scored higher for right-brain dominance, were enrolled in right-brain, dominate majors, such as Journalism and Architecture (Szirony et al., 2007). There appears to be relationship between left-brain, right-brain dominance, and career choice.

To analyze right-brain and left-brain thinkers and certain styles of learning styles, Bielefeldt, (2006), completed a mixed methodological study on 100 college students. He defined each student's specific learning style based upon the use of the VAK test. Using a survey, Bielefeldt compared the participant's education aspirations and their learning styles and strengths. Bielefeldt concluded, those students who rated highest in the right-brain visual category were completing studies with the arts and social studies, adversely

students who scored the highest in left-brain dominance, the auditory category, were completing studies in the math and English departments.

Kwon, Cho and Lee's (2009), completed a study on left- brain (FP1), and right-brain (FP2) activities using an EEG (electroencephalography). This technology is used to measure the specific physiological changes in the brain, but for the purpose of this study, it was used to demonstrate these changes during the acquisition of knowledge. The researchers believed that students learn more, and are more engaged when cartoon visuals are used rather than mere text. The results of the research showed that students were more engaged as their brains produced more focused attention while working with cartoons. Furthermore, "the theta brainwave of the left brain and right brain shows significant differences ($p<0.05$) from cartoon learning versus text learning in the theta brainwave while the other brain waves show similar patterns," proving that the brain accesses different regions for different learning tasks (Kwon, Cho & Kee, 2009).

Nevertheless, education appears to have abandoned the right form of intellect, neglecting to address this type of learner; seeing them as a student to be identified as learning disabled rather than a student who just learns differently. The two hemispheres that operate separately, with their own thoughts and processes, are pitted against one another in a society that embraces the left hemisphere dominant student (Schiferl, 2008). Surveys are now completed in classrooms for learning styles (VAK) and Multiple Intelligences (M.I.Smarts), as they inform the teacher of the student's brain ability to process information, however, what is done with this information never appears to rise above the ground level, let alone make its way into a lesson plan. The information that is

gathered about student's brain dominance has not made its way past the classroom door to creators of the curriculum (Morris, 2006).

Some educators say that the argument that exists between the left-brain and right-brain is just a distraction from what really matters and that is the whole brain (Finn et al., 2013; Morris, 2010). Choosing to ignore this dichotomy and their differences that have been proven to exists, is far too simplistic and rather myopic. This ignorance has led to the preponderance of left-brain-based curriculum and teaching style (Connell, 2008). In a society that has learned to embrace and worship left-brain thinkers, right-brain thinkers are seen as "flakey, illogical, and most importantly "Disabled."

The starting point of action then becomes one of removing the label of "disabled" and replacing it with "different." This is not to say that there are no learning disabilities, as there are many. The next step then is to understand the differences between the two hemispheres; we need to appreciate the fact that some people see the whole picture, while others see the details (Morris, 2010). Taking a learning styles survey and M.I.Smarts test provides us with the thinking preferences of a particular student; however, teaching to those preferences becomes another problem.

As determined above, the ability to acquire knowledge is based upon student engagement and interests (Bryk, Gomez & Grunow, 2011; Dalgarno, Kennedy & Bennett, 2010) and one's unique way of receiving incoming data. Patall (2013) studied the connection between student interests and student achievement. The researcher concluded that students who did not receive instruction conducive to their learning styles were not as successful as those who received their instruction, text and assessments, based upon their given strengths (Patall, 2013).

Dianne Connell has a doctorate in education from Boston University, and Master's Degree in Educational Psychology from Columbia, and is currently teaching at Riviera University. Dr. Connell and her colleagues focused several studies on learning disabilities, including non-verbal learning disabilities and dyslexia. Dr. Connell determined that preferential hemispheres left or right-brain dominant students could be classified in the following manner: right-brain dominant students were intuitive, visual, and emotional. Students that are left-brain dominant, were sequential, verbal and time oriented. Those who are middle-brain dominant tend to be more flexible than either the left- or the right-brain individuals; but one often vacillate between the two hemispheres when making a decisions. Sometimes students with these characteristics get confused when decisions need to be made because neurologically speaking, they could do most tasks through either a left-brain or a right-brain method (Connell, 2009).

This is relevant to the theory of learning styles, as each learning style can be classified within a particular hemisphere of the brain. Ned Herrmann, considered the work of Sperry and developed a theory known as Four-quadrant Model, apply named Herrmann Brain Dominance Instrument (HBDI) (Morris, 2006). Connell stated, "by better understanding, our own brain preferences we can best help our students reach their fullest potential by providing appropriate learning environments and instruction" (2008, p. 11). The study discusses the current method of instruction, by providing a single lesson plan to reach all students and how this does not work. Different learning styles require different approaches to instruction. Teachers must analyze themselves and their own neurological styles, which influences the way they teach (Berry and Settle, 2011; Kablan & Kaya, 2014; Wilson, 2012; Sharp, et al, 2008). Like each student, teachers

demonstrate a preference for either left-brain, right-brain, or the use of both. Most teachers are auditory teachers, relying mainly on linguistic and logics (Pienaar, Mieman, & Kamper, 2011) and as such, are comfortable teaching in this style of instruction (De Jesus, 2012; Demaille, 2008).

Ornstein (1970) argued, "Western cultures make use of the left hemisphere and neglect the right hemisphere through their emphasis on language and logical thinking (Morris, 2006). Conversely, eastern cultures, the right hemisphere in more exercised through their religious, languages, intuition, and mysticism." Findings to the questionnaire showed that 16.5 percent of respondents were linked in some way to the auditory learning style, while 69.6 percent were linked to the visual learning style and 26.6 percent were linked to the kinesthetic learning style.

In a study completed by Al Ghraibeh (2012), 300 psychology students attending college, were surveyed to determine the degree to which they were either right or left-brain dominant, as it pertained to Gardner's Multiple Intelligences. "The findings of the study substantiated the findings of another study implemented by Annette (2010) confirming the role of the right hemisphere in supporting the visual memory, and the left hemisphere of the brain in supporting the verbal ability, linking brain hemispheres to particular learning styles" (Al Ghraibeh, 2012, p. 110). The researchers support the completion of further research in the brain-based instruction, as it pertains to multiple intelligences.

A further investigation in relationship to brain location and the multiplicity of functions, Yonelinas, et al (2010) conducted a study on visual word recognition and visual memory. The researchers sought to examine prior claims of patients who had

suffered occipital lobe lesions. The researchers incorporated the use of lexical-decision, mirror-reading, picture fragment and word-fragment completion tests. The results indicate that the right occipital lobe does not play as much of a role in implicit memory, however, the left hemisphere does support visual memory.

Although his previous study focused on the occipital lobe, Yonelinas et al (2010) completed another quantitative study that focused on two separate memory retrieval processes, recollection, and familiarity, with relevance to temporal lobe. This dual-process signal detection model, which has been utilized in numerous neuroscientific investigations, provided the findings for recognition, and other cognitive functions, such as, perception, implicit memory, and short-term memory. All of the aforementioned areas are used when determining diagnosis of a learning disability. What was found, which has also been found in previous studies (Caresimo et al., 1994: Curran et al., 1999) that "given the proposed role of the hippocampus in supporting the binding of item and context information, this region may play a role in the perception and short-term maintenance of complex spatial and relational information" (p. 1190). This study upholds the notion that different regions in the brain are responsible for the acquisitions of knowledge. If there is impairment, or a disability, then instruction must also be modified in order for the individual to acquire knowledge.

Mitigating variables

Often, educators will describe the variables present in their classroom such as, socio-economic status, gender, cultural backgrounds, and age as influencing the ways in which a student may learn, however, there are many ways in which a students can and will acquire knowledge (Al Ghraibeh, 2012). Many factors can influence a students'

ability to learn. Comorbidity, also known as twice exceptionalities, "alphabet students," or multiple exceptionalities, in school-aged children is estimated to be between 7% (Assouline & Whiteman, 2011; Baum & Olenchak, 2002, p. 77; Dare & Nowicki, 2015; Schnitzer, Andries & Lebeer, 2007) and 60% (Tannock, 2009). These terms that are used to describe and label students were derived from a number of research articles (Baum & Olenchak, 2002, Dare & Nowicki, 2015). The estimation are considered to be truncated, due in part to low cognizance of multiple- exceptionalities resulting in low numbers of formal identifications (Foley-Nicpon et al., 2013; Bees, 2009). As well, many students can present with an array of symptoms, creating a barrier to a diagnosis (Dare & Nowicki, 2015; Foley-Nicpon et al., 2013).

Students with learning disabilities can face a number of co-morbid problems (Chisolm; 2012, DuPaul et al., 2013, Jensen, 2008; Mazzucchelli & Sanders, 2011; Parker & Boutelle, 2009) that can impact their ability to absorb information. Many of these students will also be diagnosed with Attention Deficit Disorder (ADD), Attention Deficit Hyperactivity Disorder (ADHD), Oppositional Defiance Disorder, Conduct Disorder, and any number of social-behaviour disorders (Algozzine et al, 2012; Cook, 2005; Dare & Nowicki, 2015; Snowing & Hulme, 2011; Tannock, 2009). Mary Cook, author of The Disruptive or ADHD child: What to do when kids won't sit and be quiet, stated that up to 80% of children with ODD will also have learning problems, anxiety (Abreu-Ellis, Ellis & Hayes, 2009; Bell, 2011; Grills-Taquechel, Fletcher, Vaughn, & Stuebing, 2012; Weis et al., 2016) and or depression (2005, p. 2). It is estimated that 17% of all elementary students and 27% of secondary students attending Ontario Ministry funded schools receives special education support (People for Education, 2016).

Algozzine et al., (2012) investigated the coexistence of these disorders and their impact on academic skills. Although many of these students appeared unable to achieve academic success, the researchers stated that this was not due to a causal relationship between the disabilities. The researchers felt that there might be other reasons for this lack of acquisition, namely, ineffective instruction, and/or inability to stay focused. Adelman et al., (2013), agrees with this assumption.

DuPaul et al., (2013) examined 17 studies that were completed between the years of 2001- 2011, and what the researchers discovered was that the relationship between students identified with a learning disabilities and ADHD, were much higher than originally thought. The researchers suggested that this rate was as high as 45.1% based upon all types of learning disabilities, including those students identified with a disability in writing and mathematics, not just reading. The authors suggest that more empirical studies are required to aid in the treatment and intervention for these students.

In an article published in conjunction with UCLA Mental Health in Schools and Program and Policy Analysist, Adelman et al., (2013), declares there is an increase in the diagnosis of learning disabilities and the co-morbid concerns that are affecting the way these students are learning. With this increase in the manifestation of learning concerns, behaviours and emotional outburst, more psychiatric diagnosis are on the rise; labels such as, depression, LD, and ADHD (Cook, 2005; Wakefield, 2013; 2016) have become the mainstay of today (Barkley, 2013). The researchers state that these problems appear to be external rather than internal and are caused by the environment. LD and ADHD are currently the most diagnosed exceptionalities in our schools (Adelman et al., 2013). Not only has the numbers increased but also there has been a significant increase in the

number of older students being identified. Adelman et al., state, “The problem of false positives has become an increasing concern because a significant number of older students are feigning symptoms of LD and ADHD to obtain special accommodations in the classroom and in academic testing situations” (Harrison & Rosenblum, 2010; Snowing and Hulme, 2011; Sullivan, May, & Galbally, 2007, as cited in Adelman). Although these terms can be helpful in determining proven strategies and techniques, they can also create harmful typecasts. This generalization can bring forth harmful effects, as it seeks to fix the student rather than fixing what is a systematically broken.

While the purpose of the study completed by Parke et al, (2015) did not focus on learning disorders per se, it sought to establish the connection between ADHD and those student with a combined learning disorder (Cook, 2005). The results revealed that these students have a significant deficit when mastering language, an increased difficulty in attention and difficulty process auditory information. Students with a combined LD and ADHD had a decrease in working memory, suggesting that they were more likely to need assistance with auditory directions. The researchers state that more research is needed in the area of ADHD and combined types of learning disabilities.

The purpose of this study completed by Budd, et al., (2016) was to compare students at the college who have been identified with either ADHD (Attention Deficit Hyperactivity Disorder, or a LD (Learning disability) or both. Although this was a self-reporting study, the students completed a survey that focused on four primary areas; grades, parental education, self-efficacy and personal obstacles. The researchers reported of the students attending college and university, 31% were diagnosed with a disability and among those, 18% were LD

students. The results of the study indicated that students with ADHD (Bell, 2011), either with or without comorbidity (Cheung et al., 2012), suffered from poor grades, low self-esteem, or were unable to self-advocate. Exact numbers of these students comorbidity is unknown, "Given that epidemiological studies of learning disorders are rare, evidence about the exact rates of different comorbidities is limited" (Snowing & Hulme, 2011, p. 7). Budd et al., stated, due to poor time management (Snowing & Hulme, 2011), these students were unable to complete academic tasks on time, had the worst grades, high dropout rates, and were more likely to be placed on academic probation. DuPaul et al. (2013, as cited in Budd, et al, 2016), state that even with the identification of a learning disability, and the comorbidity of this diagnosis appears to be around 45%. Budd et al, (2016) concluded by stating that more research is needed in this area.

In a recent cross-sectional mega-analysis study completed by Hoogman et al., (2017) involving over 3200 participants, the findings revealed that ADHD is real and that there are distinct differences in the structures of individuals with the disorder. Dr. Evdokia Anagnostou states, "It is a bit distressing that kids are still getting feedback that they are misbehaving or that [ADHD] is not real" (Adhopia, 2017). Most noteworthy was the finding that both the hippocampus and the amygdala were smaller in individuals who had been identified with the disorder and it is these two areas of the brain that are associated with emotional processing (Hoogman et al., 2017).

Even though the dropout rates for students are higher verses students without a learning disability (Haq, 2015; Ashman, Mazariego, Roldan & Tamhane, 2012; Weis et

al, 2016), and they somehow manage to reach the college/university level, they will not receive the necessary interventions that will lead to success (Weis et al., 2016). Students will no longer have access to interventions because the systems that have been in place during elementary and secondary levels, such as the IDEIA (Individuals with Disabilities Education Improvement Act, 2004), ADAAA (Americans with Disabilities Act Amendments Act, 2008) which entitle students with disabilities will no longer apply at the college level (Weis et al., 2016). As a result, these students may experience more anxiety now, as they fret over understanding the material, engaging in lectures, and completing assignments (Weis et al; 2016). Lovett, Nelson & Lindstrom (2014) stated, unlike IDEIA, which encourages and endorses the success of each student up and through high school, the ADAAA and section 504 ensures access to higher education, but they do not promise success. Furthermore, the law does not distinguish between learning disabilities and other disabilities, so determining what resources should be in place for students with learning disabilities is difficult (Taymans, 2012). For example, logistically a student who is deaf and hard of hearing may need a translator or a student with mobility issues a ramp for their wheelchair but selecting the appropriate accommodations of a student with a learning disability is not always that straightforward (Newman et al., 2012).

Parents are feeling the stress as well. Parents of children with learning disabilities and challenging behaviours reported having higher levels of stress (Griffiths & Hastings, 2014; Mazzucchelli & Saunders, 2011). Hence, the reason for effective and evidence based proven strategies (Thompson-Janes et al., 2014).

Executive functioning

Executive functioning may also affect the ability or inability of a student's learning (Feifer and Rattan, 2007). There appears to be a crossing at the anatomical intersection between executive functioning regions and regions where emotional regulation are located (Feifer & Rattan, 2007). Diamond and Lee, the authors of an article published in 2011, *Closing the achievement gap through modification of neurocognitive and neuroendocrine function: Results from a cluster randomized controlled trial of an innovative approach to the education of children in kindergarten*, focused on the relevance of social and emotional experiences and executive functioning skills. Executive functioning skills are described as the ability to reason, plan, inhibit, focus attention and cognitive flexibility (Weyandt, 2009). Also, defined as, the self-regulation of behaviours with components of impulsive, hostile reactions that can manifest without foresight (Feifer & Rattan, 2007). It is widely debated whether this is a single cognitive construct or an amalgamation of many skills and abilities (Weingartner, 2000). Either way, each of these characteristics can impact students' efforts to be successful in the academic environment (Diamond & Lee, 2011; Blair & Raver, 2014). Some studies have also linked executive functioning skills and conduct disorder (Stuss & Levine, 2002). Other studies indicated that there might be a link between the deficits of executive functioning in pre-school students and reading disabilities (Fuhs & Day, 2011); however, the study also reported that students within the junior kindergarten levels reported increased executive functioning skills.

DSM-V

On May 18th, 2013, the DSM-V released the new criteria for the identification of a learning disability (International Dyslexia Association). The research problem

identified within this study concerns the lack of understanding, disjunction and execution of curriculum for various learning styles of students either with or without a learning disability diagnosis, and the predominately one- dimensional teaching styles, currently being implemented (Demaille, 2008; Krummick, 2014; Gardner, 2011). Students with learning disabilities struggle to acquiring knowledge (Roblyer, & Doering, 2009). Many of these students suffer in silence, as they are unable to follow the instructions that are delivered primarily through auditory means and end up with decreased self-esteem, higher dropout rates and social and emotional difficulties (Haq, 2015; Ashman, Mazariego, Roldan & Tamhane, 2012). With the lack of teacher preparedness, teachers are struggling to deliver differentiated instruction that is deemed meaningful for all students (Bosier, 2007; Bostrom, 2012; Brackenreed, 2011; Brassell, 2009; Fletcher, 2995, 2007 Gardner, 1973, 2004, 2006, 2008, 2009, 2012; Goodwin, 2013; Graham-Lawrence, 2014; Petrilli, 2011). With the increase and changes for student identification, more research is required to explore the topic of student identifications as it pertains to specific learning styles and ways to ensure that students, who are either visual or kinesthetic learners, are receiving the most conducive instruction for their learning styles.

Intervention models

Intervention for students with learning disabilities is difficult as the exact causes are numerous, and clear implications are vast (Snowing, and Hulme, 2011). Previous research calls into question the validity of most diagnoses (Sparks & Lovett, 2009). In two studies completed by Sparks and Lovett, (2009a; 2009b) where the results of 378 and 336 students, who had been identified with a learning disability, up to 50% did not meet the criteria of the DSM-IV manual for this identification. More importantly, most of

these students did not receive recommended academic accommodations (Weis et al., 2016).

Several studies (Gregg, 2007; 2009a; 2009b; 2011; 2012; Gregg et al., 2006; Gregg & Lindstrom, 2008; Gregg & nelson, 2012; Ofiesh, 2007; Ofiesh, Hughes, & Scott, 2004) have recommended the use of four guiding principles, when determining accommodations for students with learning disabilities. First, clinicians and educators should reflect upon the history of the student and their diagnosis. Second, determine the relevance of a learning disability and examine the existence of a current learning disability. Third, determine to what degree of involvement is required. If the student is not struggle and does not demonstrate a gap in learning, then no accommodations are required. Finally, take into consideration the actual psychological assessment when determining the student's limitations and how best to tailor strategies to their individual needs. Although these recommendations were discussed at the college level, they would serve well for all students.

Academic interventions for students who have been identified with a dual diagnosis or multiple exceptionalities suggest supporting a student's strengths, rather than focussing on areas of limitations (Bees, 2009; Baum & Owen, 1998; Nielsen & Higgins, 2005; Weinfeld et al., 2006). Often by focussing on the student's limitations will result in a low sense of academic self-efficacy and self-worth (Baum & Owen, 1998). While it is said, students with exceptionalities are diverse their interventions needs to be diverse as well (Bees, 2009), there are still others who ascertain that direct instruction is best (Hawkins,et al,. 2015).

Brain-based learning

Neuroscience have provided the educational community, with respect to the acquisition of knowledge, a deeper understanding of the way the human brain works (Fischer, Goswami, & Geake, 2010; Hardiman, Rinne, Gregory, & Yarmolinskaya, 2012; Lalancett & Campbell, 2012; Martin & Groff, 2011). Learning theorist's research how children learn and provide the educational community with the knowledge to develop tools and strategies for the most effective ways to impart knowledge (Eret, Gokmenoglue & Engin-Demir, 2013). However, much of this researcher has been completed in isolation (Caine, & Caine, 200). Brain-based learning provides strategies that allow the student to become an active learner in a student driven environment (Rushton, 2011). The neuroplasticity of the brain changes within the learning environment, and can impact student achievement (Hardiman, Rinne, Gregory, & Yarmolinskaya, 2012).

Brain-based learning is a strategy to incorporate different styles of learning to enhance student achievement (Eret, Gokmenoglu & Engin-Demir, 2013). Rather than teacher led instruction, brain-based learning allows children to explore and discover their environments collaboratively, while making meaning through the process (Ertmer & Newby, 2013). Klinek, (2009) examined brain-based learning within a framework of multiple intelligences, cognitive learning, and planned behavior. The primary purpose of this study was to gain an understanding of higher education teachers and educational faculties' knowledge, beliefs, and practices of their experiences with brain-based learning and if they incorporate it in their classroom (Muscella, 2015; Ridley, 2015). As was suggested by studies cited within Klinek's literature review, effective brain-based learning compels teachers to alter their thinking and incorporate strategies from research on learning and the brain. The researcher stated that further investigation into

differentiated instruction would provide information about the potential gain in other academic area

Table 1
Twelve Principles of Brain-based learning and Related Applications

Principle	Application
All learning engages the entire physiology	Students are given choices and activities involving the senses, movement, and decision-making skills.
The brain/mind is social	Students are given cooperative learning opportunities.
The search for meaning is innate	The learning environment is meaningful and engages children through relaxed alertness.
The search for meaning occurs through patterning	Meaningful patterning encourages students to utilize prior experiences to process new learning.
Emotions are critical to patterning	Learning is more effective when appropriate emotions are connected to learning.
The brain/mind process parts and whole simultaneously	Students are provided with smaller experiences that connect to the overall theme.
Learning involves both focused attention and peripheral perception	Students should be engaged and focused to ensure learning.
Learning is both conscious and unconscious	Students should be given the opportunity to reflect upon learning.
There are at least two approaches to memory	Students should be presented learning through various hands-on experiences.
Learning is developmental	Teachers consider individual differences and maturity of children when preparing lessons.
Complex learning is enhanced by challenging and inhibited by threat associated with helplessness and fatigue	Teachers create a non-threatening learning environment that challenges students to learn.
Each brain is uniquely organized	Teachers should present learning experiences in various ways based on individual student learning styles.

(Caine, Caine, McClintic & Klimek, 2009)

Caine and Caine (2000) went on to expand upon their 12 principles, stating, "We had four criteria in mind that a principle had to meet" (p.1)

1. *The phenomena described by a principle should be universal, and apply to all human beings;*

2. *A principle should emerge out of research from several different disciplines;*

3. *A principle should anticipate future research; and*

4. *A principle should have implications for educational practice*

These 12 principles must be viewed through the lens of each criterion simultaneously, as they represent all aspects of human learning, regardless of field, subject, or domain (Caine, & Caine, 2000).

Bellah, et al., (2008) explains that there is a difference between brain-based learning and brain antagonistic learning or teaching. The purpose of this study was to investigate brain-based learning, as it involves the agricultural education profession. This study provides an important message for the learning community, as it is not isolated to just the agricultural community, but rather, all learning environments. The researchers state, "Brain-based learning encourages agricultural educators, and other subject matter educators, to capitalize on the associations the brain must make to create synaptic connections and anchor learning through contextual experience" (p. 20). Contained within this study, is a brief history for the development of brain-based learning. The study refers to as far back as 400 BC, and Hippocrates stating, "The brain was involved with all sensation and was the seat of intelligence" (p. 16). One of the main teaching principles as out lined in this study, is the use of scaffolding on prior knowledge to create new knowledge (Gözüyeşil & Dikici, 2014). Thompson-Janes et al (2003) stated,

meaningful learning occurs during the gradual release model; a transitional model from teacher-centred milieus, to student-centred milieus. Brain-based learning is defined as an educational model that incorporates researched methods for optimal learning (Birkholz, 2004). The results of this study demonstrate that need of brain-based learning, stating "if such a divergence exists, research should first seek to confirm the potential existence of this inhospitable environment, and then to inform and provide professional development to assist faculty in understand the needs of their students" (p. 21).

Radin (2009) completed a qualitative study that focused on teacher's perceptions and abilities to conduct scientifically researched brain-based instruction in the classroom. Although the teachers believed that brain-based learning strategies would enhance their teaching, the researchers also stated that teachers lacked the formal training needed to combine both neuroscience and pedagogical theory (Carew & Magsamen, 2010; Edelenbosch, et al., 2015; Hook, & Farah, 2012). If teachers knew the importance of brain-based strategies, they would create classrooms conducive for the participation and success of each student (Dubinsky, Roehrig, & Varma, 2013). It has been suggested by other researchers (Devonshire & Dommett, 2010), that the study of the brain and its ability to acquire knowledge and the study of educational instruction are to divergent, making it impossible to meld. Busso and Pollack (2015) stated that misinterpretation of neuroscientific terms might impede the use of neuroscientific strategies in the general classroom. Blair (2016) stated that teachers who implemented brain-based learning strategies and the theories associated with the philosophy would increase the likelihood of student achievement. Ansari, Coch, and De Smedt (2011) provided support for the inclusion of teachers and neuroscientists to collaborate in a manner that would deliver

instruction that is both scientifically derived and meaningful to the student. The researchers state, pre-service courses need to be developed using both neuroscientific theories of learning and techniques that address these theories (Ansari, Coch, & De Smedt, 2011). However, the information gathered lead the researchers to believe that, educators who embraced the brain-based philosophy and provided a safe environment, rich in problem solving activities increased their students achievement levels (Reed, 2009). To this, that there must be an optimal emotional and social climate to enhance learning (Gozuyesil, & Dikici, 2014). Hook and Farah (2012) suggest that teachers need more training that is rigorous, if they are to be successful with the implementation of brain-based concepts. McCall (2012) states there are several things to be considered when implementing brain-based strategies. First, the brain is still not fully understood; many of the studies surrounding neurological findings are over sensationalized. In addition, there are numerous myths surrounding this type of research and finally, teachers should be educated on the brain itself and base instruction on researched strategies rather than impulsive decision-making.

Duman (2010), set out to investigate the relationship between two learning styles. The researcher incorporated the use of two theories to enable students to improve their overall academic achievement, Kolb's Experiential Learning Styles, and Brain-based Learning strategies. Understanding that each classroom consists of diverse group of students, with varying degrees of complexities, such as, culture, economics, and learning styles, how then to address each of these requirements. The researcher investigated 42 previous studies based upon these two theories, which also contributes to the legitimacy of the theory. The mere fact that a theory has been replicated so many times, adds to its

reliability and validity (Fraenkel & Wallen, 2013). Many research studies have provided the empirical data needed in order to address these situations autonomously, (Dunn et al., 2009; Gardner, 2009; Hassan et al., 2011) and these strategies have helped, not only students in regular classrooms but also, the needs of students diagnosed with a learning disabled (Bender, 2008). What does not appear in the review, is a study that amalgamates these two theories, which was the impetus for Duman's study. Each question developed by the researcher was designed to address the needs for current student success. The demographics collected on the 68 participants; age, gender, socio-economic status, and cultural backgrounds, were used to contribute to the existing body of knowledge for each of these two theories. The duration of intervention was six weeks. Although Duman stated that there were no statistical significance found between student achievement and a preferred learning style, there was a difference found when comparing learning-styles instruction and student achievement (Szpringer, Kopik, & Formella, 2014). Meaning, students who had received instruction in brain-based strategies showed a greater degree of knowledge acquisition (Saleh, 2011). Based upon these results, the researchers suggest, if student success is to be obtained, then incorporating the use of brain-based learning strategies should be implemented (Duman, 2010; Restaino, 2011). Studies such as this one provide the theoretical research necessary to guide practice.

One-dimensional instructional delivery can lead to negative performances, as suggested by Berry and Settle, (2011). Berry and Settle (2011) investigated the use of learning styles in an online, lecture-based, finance course. The researchers found the majority of students did not prefer the style of delivery provided, and may have done better if other instructional methods had of been incorporated. Berry and Settle, (2011)

suggested that students who did poorly in this course, did so because of the instructional delivery and not due to the challenging material.

Learning styles

Learning styles that are incorporated into the daily lesson plans for students have demonstrated improved success (O'Neil-Blackwood, 2012). Although previous studies acknowledge the existence of a readiness level, they also acknowledge the significance of a student preferential learning style. There are many different definitions and applications of learning styles, including cognitive, psychological and emotional (Bergsteiner et al., 2010; Berry & Settle, 2011; Cook, 2006; Crowne, 2013; Dunn et al., 2009; Evans et al., 2010; Ivie, 2009; Kinshuk et al., 2009; Morris, 2006; Rakap, 2010; Scales, 2008; Turnbull, 2009). The implementation of learning styles has been duly noted by researcher Scales, (2008), who suggests that learning styles is best used in conjunction with the student and not in a way that labels or limits them.

Today, there are a number of different learning style models. However, the Network board of Learning Styles concluded that Dunn and Dunn Learning Styles Model was the preferred method because of its extensive research base (Doolan, 2004). To date, the International Learning Styles Network (2008) Website provides a reference base of over 870 studies conducted at over 135 institutions globally.

Dunn et al, (2009) investigated the use of learning styles on students in several institutions and communities. The researchers sought to establish the connection between learning styles implementations and the overall outcomes on teachers' professional instructions. The researchers concluded that the learning styles of each student must be determined, to establish mastery of a subject and should be the basis for practical

application. Some of the responses from surveys completed by the students revealed that students felt more engaged, and accepted more responsibility for their own learning, if the instruction was delivered in manner to which was appropriate to their learning style. Students felt that they better understood the concepts that were being taught, as they were more personal and relevant, as well as, being more equitable. The authors stated, "Matching students' learning styles with compatible educational interventions positively impacted their academic achievement" (p. 356).

In further discussion on this topic, the study completed by Bell and Meade (2009) set out to disprove or add to this body of knowledge. They investigated the use of several modes of instructional strategies on students with learning disabilities. The researcher's primary focus was on the acquisition of literacy, reading, comprehension, and writing. The researcher's sought to understand how different modes of knowledge transmission could lead to improved acquisition. Bell and Meade (2009) concluded that teachers need to become familiar with alternate instruction, in order to reach those students with various learning disabilities (Glover, et al., 2010).

Learners do express a preference within their learning environments and with positive results (Naimie et al., 2010). Cagiltay (2008) investigated the use of learning styles among first year engineering students in Turkey. Participants included 285 students, 46 of whom were female. What was noted, the majority of engineering students fell under the assimilator category as outlined by Kolb's Learning Styles Inventory, which had been suggested by other studies. The researcher suggests that proving students with alternative methods for delivery, assessment, and ongoing instruction would allow them to be more successful in school.

Gardner's Multiple Intelligences.

In his attempt to go beyond the work of previous theorists, Dr. Howard Gardner established Multiple Intelligences, a way to view students' strengths through a different lens (Blomberg, 2009; Futrell-Schilling, 2009; Gardner, 2008, Geake, 2008; Jensen, 2005). Gardner believed that students could be intelligent in different ways (Kykalová & Vasilyeva, 2015) and need to be given the opportunity to demonstrate those strengths, using alternative experiences (Lombardi, 2008). Studies suggest students either identified with and without a learning disability, successfully acquire knowledge when they are actively engaged (Piaget, 1945) and the instruction being delivered, is done so, in their preferred learning style (Pienaar, Neiman, & Kamper, 2011: Gardner, 1973; 2004; 2006; 2009; 2011).

According to Gardner, brain function is determined based upon several differences that are attributed to diverse cognitive and physiological functions. Connell (2008; 2010; 2014) suggests the learning styles of a student can be found within a particular part of the brain. Gardner proclaimed that each of the multiple intelligences, could be physiologically located in parts of the brain, and although they were interdependent upon one another, they each emerged with a specific clarity (Connell, 2008; Saleh, 2011). Gardner proclaimed that the only way to increase a student's likelihood for success was to differentiate the instruction.

Table 2

The eight multiple intelligence, the strengths and requirements

Intelligences	As a strength	Benefits	Requirements for learning
Visual-spatial	Students think in terms of physical space.	Drawing, architecture, puzzles	Learning through the use of models, graphics, charts drawings, videos and pictures
Bodily-Kinesthetic	Students think in terms of movement	Communication through touch, making and building things	Learning through hands-on projects, acting out and role-playing. Likes to use tools and build using real materials
Musical	Students think in terms of rhythm and beats	Loves music and sound production	Learning through the use of lyrics, lessons completed in speaking rhythmically, musical instruments and sound production devices
Interpersonal	Students learn through communication with others	Communication in groups and others, many friends and empathetic	Learning best through interaction with groups, dialoging, conferencing, video chatting and computers
Intrapersonal	Students understand their what they need and where they are going	Intrinsically motivated, intuitive and are strong willed	Learning through independent studies, books, quiet time and self-reflection
Linguistic	Students are the most effective with words	Auditory students and often think in terms of words	Learning through the use of words, using stories, poems and books, likes computers, games and lectures
Logical-mathematical	Students conceptual and abstract thinkers	Patterns and relationships, reasoning and calculating	Learning through experimenting, solving problems, playing games, investigating and self- taught through enquiry projects
Naturalistic	Students learn through the patterns and relationships with nature	Exploring their environments, botany, biology and zoology	Learning through camping, walking and hiking through the woods, outdoor exploring, cataloging information and

Adapted from Gardner, H. (2004). A Multiplicity of Intelligences.

Increasing the likelihood of success among students was the focus for the study completed by Oden (2012). The researcher set forth to investigate the impact of differentiated instruction on the achievement of students enrolled in a business program. The researcher also attempted to verify how differentiated instruction was more effective than traditional instruction (Oden, 2012). The results revealed three key findings; those students exposed to differentiated instructions distributed a better acceptance to the instructional methods. The instructional methods used in the classroom offered a more thorough way of approaching difficult material, helping the students to obtain an increased achievement rate and finally, both groups appeared to grasp the concepts easier as demonstrated by their problem solving abilities.

Differentiated Instruction

If education is the conduit that enables us to reach our fullest potential, then how best to deliver the information remains the question? Although somewhat recent, and as a result of Gardner's Multiple Intelligences (Adcock, 2014), the adaptation of differentiated instruction has led to the increase of student participation, and success (Bedir, 2015; Bender, 2007; Defur, 2002; De Jesus, 2012; Dixon et al, 2014; Koeze, 2007; Sadeghi, Kasim, & Abdullah, 2012; Smit & Humpert, 2012; Valiandes, 2015). Professional development in the area of differentiated instruction provides students with an opportunity to acquire knowledge based upon their learning strengths (Ankrum, & Bean, 2008; Bedir, 2015; Burnett, 2013; White, 2012). Teachers must learn various ways to reach their students, and shift their method of delivery to create a learning environment for all students (Brown, 2004; Nazzal, 2011). Not only is differentiated instruction useful for the mainstream student but also, if these strategies are not implemented, how might

this impact upon the student diagnosed with a learning disability (Ferreri, 2012) or on the waitlist to be identified?

The recent push in the direction of differentiated instruction has reduced some of the aforementioned; however, many of the students are still not receiving the particular style of education best suited to meet their particular needs (De Jesus, 2012). Many students arrive at school every day feeling, frustrated, angry and not wishing to be there; seeing themselves as academically unfulfilled and social inept (Budd et al., 2016; Lutfi, 2006). Either they are pigeon holed into the label of "disabled" in order to receive the adequate support needed for their success, or they sit in silence, learning to accept a grade far below their actual abilities (Budd et al, 2016). In a society where reading and writing is considered first and foremost, the student who is unable to obtain a Reading Benchmark of five, upon leaving kindergarten is considered "slow" (Langelier & Connell, 2005). In the end, is the diagnosis of a learning disability a label used to acquire the necessary intervention for a student or a way of blaming the student for an inadequate system (Ashman, Mazariego, Roldan & Tamhane, 2012)?

Currently, the diagnosis of a learning disability and ADHD are the most applied diagnosis (Ashman et al., 2012). Teachers, administrators, and researchers are being advised as to the high number of false positives. Many student exhibit characteristics of learning disabilities, and/or other disabilities but it is not always the case. These labels can cause unwanted desires, making young students the focus of intervention instead of improving the system deficiencies. A number of contributing factors can lead to undesirable behaviours (Shine, 2015) and a misdiagnosis (Ashman et al., 2012). For example, the environment as it pertains to the student or just the student themselves, can

be the impetuous for any of these factors. Students can demonstrate behaviours that are consistent with a disruptive environment and when interventions are implemented, the behaviours disappear.

One result from this misdiagnosis, as there are many, is higher-level educational facilities having to accommodate students in testing situations. The reality is that these problems are complex, severe, pervasive, and chronic. It is reported that many students are identified in order for them to receive services. This is the reason for the development and implementation of RTI (Response to Intervention) Act. That is not to say that this interventions should or are being used in a misappropriate way, by delaying services to a student with special needs. Elder (2010) suggests that, nearly 1 million children in the U.S. may be misdiagnosed as ADHD because they are the youngest and most immature in their kindergarten class. Hence, this is one of the reasons for the new definition within the new DSM-V.

In a study conducted by Neiman and Kamper (2011) in which they explored the use of multiple intelligences in a middle school environment, found after one year of interventions, using the Multiple Intelligence philosophy, students' achievement increased. Understanding the importance of preferred learning instruction, a study completed by Abdulkader, Gundogdu, and Eissa (2009), focused on Multiple Intelligence strategies and the impact upon students identified with a learning disability. The 60 primary students, who were experiencing reading difficulties, were given a pre- and post-assessment to determine the degree in which their academics had improved. The students were given instruction based upon their predominant multiple intelligence over the course of two months. The findings indicated that students within the experimental group who

had received the tailor-made instructions increased their reading, comprehension, and word recognition skills. However, those students in the controlled group had also increased their word recognition skills. Even though these students were diagnosed with a learning disability, they were able to effectively improve their reading comprehension and word recognition skills with the incorporation of tailor-made instruction (Abdulkader, Gundogdu, & Eissa; 2009).

The purpose of this study by Geake (2009) was to examine the multisensory ways in which the brain learns a new idea. The researchers' study involved 200 teachers, and the use of several surveys, including, Multiple Intelligences, VAK (Visual, Auditory, and Kinesthetic) and left-brain, right-brain, which he used to investigate their relevance to learning acquisition. The researcher claimed that many of the brain-based theories that are incorporated into the classroom are not scientifically proven and it is not of professional practice to be incorporating these strategies. The researcher findings recommended that teachers enlist a more practical approach to education and not rely on cure-alls that currently invade our classrooms. More research is needed in this area if teachers are to be given proven strategies that effectively enhance students' performance.

Ankrum and Bean (2008) sought to establish satisfactory No Child Left Behind Adequate Yearly Progress benchmarks. The purpose of the researchers study, was to determine the effect of explicitly, differentiated, reading instruction on eighth-grade students' reading comprehension, assessment scores, and classroom reading grade scores, in a rural middle school. The questions most often asked by teachers were,

1) how long should a differentiated lesson last and

2) how frequently they need to occur?

"All students should receive daily instruction in the whole-class lesson. However, struggling students may need to be instructed more often than other students, in a small group environment, in order to make accelerated progress" (p. 142). The researchers first sought to define differentiation, as it would look in relation to a reading instructional lesson, as they state, "what is missing in the research literature is a detailed description of *how* differentiated reading instruction occurs" (p. 137).

Yenice and Aktamis's (2010) study was three fold in nature. The researchers sought to investigate the preferred learning styles of student teachers, how student teachers ultimately seek out adjacent subjects, and the preferred learning styles of pre-service teachers based upon gender differences. Yenice and Aktamis state, "in a traditional education, a traditional teacher uses vocal verbal intelligence range more often" (p. 100). Their study incorporated the use of a survey using the practice measurement parameters of a Likert scale. The researchers concluded, teachers must first be aware of their own strengths and learning styles. Once they understand their own strengths, they can perfect their craft accordingly. Teachers must also be aware of the environment to which they are teaching in, focusing on students' strengths that will enable the student to enhance their learning. Finally, many of the traditional classrooms do not incorporate the use of many of the multiple intelligences, thus a student with strengths in these areas may never be given the opportunity to increase their innate qualities.

This is not to say that everyone is on board with tailored made instructions. In an empirical study completed by Pashler et al., (2008), there was no evidence to suggest an increase of learning outcomes for those who received tailored instruction compared with

those students who did not. In small groups, students received preferred instruction however, test results did not demonstrate a maximization of performance. Several other studies that focused on learning styles and student outcomes, yielded no evidence (Cook, Gelula, Dupras, & Schwartz, 2007; Hsieh & Dwyer, 2009). Furthermore, accommodation to instructions do not attribute to improved academic performance (Pham, 2012; Riener & Willingham, 2010; Scott, 2010).

Pham, (2012) suggests it is better to focus on differentiated instruction rather than learning styles. As a professor of English at the University of Economics and Law, Pham stated, learning styles have not been empirically proven, differentiation gives the student an opportunity to extract information and make sense of the big ideas in a more effective manner. The author stated, "Teachers should, therefore, present information in the most appropriate manner based on students" backgrounds, prior knowledge, and abilities rather than learning styles" (p. 15). Differentiated instruction focuses more on the readiness levels of the student and allows the student to become an independent learner (Pham, 2012). Differentiation allows the teacher to address the changing landscape of the general classroom equipping each student with useful, relevant skills and competencies by alternating the process, and the product (Lingo, Barton-Arwood, & Jolivette, 2011).

Teachers stated several barriers to differentiated instruction (Ruys et al., 2013; Tawil, 2014) lack of administrative support, insufficient teacher's courses, unable to work collaboratively with support, and a lack of understanding between general and special education responsibilities. Understanding the various needs and being able to select appropriate instructional strategies for each of the students was a big responsibility (Ruys et al., 2013). Teachers do not feel they have been trained adequately in

differentiated instruction (Ruys et al, 2013) to meet the needs of a various of students and more in-services and resources are needed (Chita, 2012; Connell, 2009; De Jesus, 2012; Duman, 2010; Erlauer, 2003; Ellis, 2008; Ferreri, 2009; Haaland, 2011).

Assistive technology

The Constitution Act of 1982, which was enacted in 1985, consists of the Canadian Charter of Rights and Freedoms (Section 15) declares "every individual is equal before and under the law and has the right to equal protection and equal benefit of the law without discrimination and, in particular, without discrimination based on …mental or physical disability" (Department of Justice Canada, 1982). Ontario Minister of Education, Liz Sandals stated student today are growing up in a world where technology and digital resources are an integral part of the everyday lives (Wheeler, 2014). Children today are bombarded with an influx of technology and social media in their day-to-day environments (Clifton & Mann, 2011). In fact, research is beginning to suggest, technology may become a vital tool to enhance education and student achievement (Campigotto, McEwen, & Demmans Epp, 2013). In a study completed by Dietze and Kashin (2013), the authors explored the use of technology and its influence on teaching practices and pedagogy (Curry & Whitney-Emberton, 2016; Roblyer, & Doering, 2009). The authors stated, students today arrive at school already with an awareness and understanding of technology, and if this is indeed the case, can this be the starting point to improve teaching and learning practices. Using technology in an open-ended play based environment allows children the opportunity to discover and make choices about how and what they learn (Dietz & Kashin, 2013). However, the lack of professional learning in the area of inquiry and technology may attribute to the under use

of technology in the early years (Dietze, & Kashin, 2012). The authors concluded by stating, "We argue that incorporating technology as a process to support learners in playing with, using, and examining the many uses of technology in various ways and settings, and also using it to facilitate their own learning, can be a starting point" (Dietze & Kashin, 2013, p. 9).

Technology has become more than just a tool for entertainment; it has become a tool to help those identified with a learning disability (Haq, 2015; Roblyer & Doering, 2009). Technology has been used for intervention purposes by incorporating the use of video games; however, more research is needed to determine the effects (Belo et al., 2016; Cordero et al., 2015). Technology specialists crucial to the development of applications, device manufacturers, and programs state that handheld, touchscreen devices, are an effective way to aid in student with exceptionalities (Campigotto, McEwen, & Demmans Epp, 2013). Nevertheless, the use of assistive technology has been under- investigated (Haq, 2015).

Recent research into electronics, points to the positive benefits of combining literacy and technology (Belo et al., 2016; Beschorner & Hutchison, 2013). The use of assistive technology and storytelling has now made it possible for students to hear stories read aloud by many actors, authors, and illustrators (Belo, et al., 2016). Multiple studies have been completed to determine the effects on preschool students and language development incorporating the use of assistive technology devices, and determined that such devices enabled the students to make better connections through all aspects of language attainment (Abrami, Meyer, & Wade, 2013; Cviko, McKenney & Voogt, 2012).

Fullarton and Duquette (2016) investigated the experiences of four university students with learning disabilities in Ontario, Canada. The researchers, using interviews to gather data, explored the experiences of these students at the university level. The increase of students at this level has been increased due to civil rights legislation, technological advances, and the acceptance of special education supports at the college and university levels (Leyser & Greenberger, 2008). It is important that students with learning disabilities have access to assistive technology, in order to compensate for their specific difficulty (Mull & Sitlington, 2003). There are many positives to using assistive technology such as, voice recognition software, recording, and text to speech software; it can also increase student's self-confidence. The participants of the study contributed their success to "provisions of service, accommodations, and assistive technology" (p. 63).

Fullarton and Duquette (2016) stated several barriers to the use of assistive technology. The first barrier associated with the use of assistive technology was the professor's willingness to accept the accommodation (Fullarton & Duquette, 2016). Some professors fear that by given students with a disability, accommodations might be perceived as an unfair advantage (Leyser & Greenberger, 2008) and that there are students who might take advantage of these accommodations (Denhart, 2008). Students with a learning disability need to be provided accommodations in order for them to be successful (Bank, 2014). Veteran teachers also expressed a great deal of anxiety to the use of technology, stating that they had to learn how to prepare lessons and assessed the students ability to demonstrate their acquisition of knowledge (Belo et al., 2013).

Another barrier that influences the integration of assisted technology is the inconsistency in policy among educational institutions (Hindes & Mather, 2007). As mentioned previously, The Constitution Act ensures that students will not be denied access to postsecondary education based upon their disability (Fullarton & Duquette, 2016). Although education policies are created on a provincial level, the Ministry of Training and Colleges and Universities in Ontario, provides the funding to each of these bodies to ensure students with disabilities are adequately supported (Harrison, Larochette & Nichols, 2007).

Educational institutions have a moral and legal obligation to provide students who have been identified with a learning disability, services that will enable the student to be successful at school. Accommodations are crucial for the success of students with learning disabilities (Lombardi, Murray, & Gerdes, 2012). Fullarton and Duquette (2016) state, "a facilitating environment combined with various individual capacities can lead to academic success for students with LD's" (p. 64).

Canada and Ontario Schools

Canada has been considered a leader in the realm of special education, and human rights (Katz, 2013; 2015; Stegemann, 2016). As a co-signer of the Salamanca Statement, Canada supports the following statement, "necessity and urgency of providing education for children, youth and adults with special educational needs within the regular education system," by creating laws and policies to adopt this declaration (UNESCO, 1994, p. viii). Unlike the United States, whereby education is federally legislated, in Canada each province has control over the development of their definition of a learning disability. The term learning disability originated in Canada when "students who appeared of average

intelligence, demonstrated significant problems academically" (Wiener & Siegel, 1992, p. 341). There was a belief that intellect and learning difficulties were mutually exclusive, meaning they were not likely to occur (Brody & Mills, 1997). It was in conjunction with Montreal Children's Hospital Learning Centre, that Dr. Edwin Levinson decided to explore these confusing phenomenon's, which lead to the development of several interventions (Wiener & Siegel, 1992, p. 341). Based on these findings, the development of what is known today as; The Learning Disabilities Association of Canada (LDAC) was created (LDAC, 2016). This society was responsible for the creation of a set of key features that were part and parcel to the identification of a learning disability. However, these key features did not appear in most of the Provincial Ministry of Educational documents; verbal and non-verbal, average intellectual ability, and impairments in language, visual spatial processing, processing speed, memory, attention, reading, mathematics, and social skills (Stegemann, 2016). This is where the confusion arose, as each province created their own distinct definition of a learning disability, inconsistent with each of the provincial definitions and the LDAC.

Based upon criteria as outlined in the DSM-IV of the 1,352,965 students currently attending elementary school in Ontario (Ontario Ministry of Education, 2016) and 662,446 enrolled in secondary school, approximately 200,000 students have been identified with a learning disability. At the national level, it is difficult to estimate the number of children identified with a learning disability (Butler-Jones, 2009). Dr. Bulter-Jones stated it is difficult to estimate the prevalence rate of students with a learning disability, as there is a lack of identification due to parent resistance, poor and limited survey data, and a lack of longitudinal studies (2009). There have been a number of other

longitudinal studies, The National Longitudinal Survey of Children and Youth (NLSCY), The Participation and Activity Limitation Survey (PALS) and the Canadian Survey on Disability (CSD), but these also have not been administered on a consistent basis (Stegemann, 2016).

The Ministry of Education in Ontario recommends a tiered approach incorporating a number of high-quality, evidence based assessments, and systematic interventions such as Universal Design and Differentiated Instruction (OME, 2014). King-Sears (2009) states that Universal Design or Universal Design for Learning (UDL) is not about incorporating technology into the classroom, but it is a pedagogy for all students, not just those with a disability. There are seven principles that drive UDL, equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort and size and space of approach (Connell et al., 1997).

Professional development

In 1982, The Canadian Charter of Rights and Freedoms passed a law that would ensure that all citizens would be entitled to receive equal treatment regardless of their exceptionality (Brackenreed, 2012). The Ministry of Education followed suite and has provided compulsory education that provides inclusion of all students (OME, 2016). In order for all students to acquire knowledge, even those identified with a disability, they must be given a variety of methods to achieve this goal (Ahsa, Sharma, & Deppeler, 2012; Erlauer, 2003; Lombardi, 2008; Sulaiman, Hassan, & Yi, 2011). However, there is a disconnect between recent neurological findings and gaps and deficiency occurring in professional development (Lindell & Kidd, 2011). Bryk, Gomez, & Grunow, (2010)

stated that, “As noted earlier, multiple processes combine to create observed community college outcomes” (p. 8). Their study focused on college students involved in math courses, who received a variety of instruction based upon their multiple intelligences and learning styles. They concluded,

> The intrinsic complexity of such problem systems means that most participants appreciate only the part of the system that seems particularly relevant to their role. Understanding what works when, for whom and in which contexts, also places demands on how network participants design their individual inquiries so that practical inferences can be drawn, about outcome variability (p. 25).

Given that most students learn in their own unique manner, a variety of tools and strategies must be provided. It is not only the responsibility of the educator to incorporate and delivery the instruction using a variety of methods (Glover, et al., 2010; Szpringer, Kopik, & Formella, 2014); students must also be allowed to demonstrate their understanding and competencies in a variety of assessment methods. Fullan (2013) stated, “The moral imperative in education consists of the deep commitment to raising the bar and closing the gap for all students” (p. 57). Professional development must provide teachers with the tools and training that will enable all students to reach their fullest potential (Howe, Jacobs, Vekelich, & Recchia, 2012).

If students are to gain any knowledge and understanding of curriculum it must be delivered in a manner that is relevant to them (Cavendish et al., 2013; Shani, 2013; Tausan, 2011; Whiteley, 2007). Haier and Jung (2008) stated,

> “in our view, understanding the neural basis for individual differences central to intelligence may present the single most important challenge to educators in the

> next decade, especially if it turns out that the neural basis of intelligences is amenable to educational strategies" (p. 171).

Previous studies have led us to understand that students are not able to recognize their own strengths leaving educators to take the necessary measures to ensure that they know their target audience and provide a number of education modalities (Goldberg & Stevens, 2011; Haaland, 2011).

Whether a student has been identified with exceptionality or not, they must be exposed to, a variety of instruction if learning is to occur (Lovorn & Summer, 2013). This was impetus for the study completed by Baragona (2009) who set forth to investigate the relationship between multiple intelligence strengths and alternative teaching methods. Teachers were asked to provide instruction to their students in a variety of ways. The results indicated that students whose strengths lied in tradition teaching methods (auditory) did not show a significant change, as a result of the intervention. However, in students who strength was other than auditory, either visual or kinesthetic, not only their academic scores increased but also, their emotional attitudes towards school increased dramatically.

Ruthven (2005) explored current practices used by teachers and the development for good evidence based instruction (Cook et al., 2014). The author stated, "The call for papers for this special issue on Teachers' Good Practice and Research poses a series of questions which distinguish—indeed rhetorically oppose—three mechanisms through which 'good practice in teaching in schools' might be defined and developed". The first mechanism to be considered, being official criteria or a consensus among such parties as OFSTED, and TTA (Ruthven, 2005). The second is the individual teaching practice of

the teacher and the third is the very institution, providing the feedback and validation for good practices.

Ahsan, Sharma and Deppeler (2012), explored pre-service teachers perception of teaching-efficacy, and overall concerns of inclusiveness in education at the college level in Bangladesh, and what the researcher discovered several variables affecting a teachers perception and ability to address the inclusive classroom. The greatest concern among the participants was their level of training. Although the study highlighted the need for an investigation and reformulation of the curriculum to pre-service teachers in Bangladesh, it also suggests that the new curriculum should include skills, knowledge, beliefs, level of commitment, but must also allow for the teacher be given an opportunity to experience a diverse population of students.

Thomas Armstrong is the author of four books: *Awakening Genius in the Classroom* (1998), *ADD/ADHD Alternatives in the Classroom* (1999), *The Multiple Intelligences of Reading and Writing* (2003), and The Best Schools: How Human *Development Research Should Inform Educational Practice* (2006). Over the past 10 years, Armstrong has contributed to the understanding of neurodiversity. The author has extended his philosophy to the learning disability community, providing an understanding of individuals with brain differences, including those with Autism, ADHD, Dyslexia, and intellectual disabilities. Armstrong's books discuss the quality of education for students today. Armstrong (2009) stated that there are a number of forces working against a child's ability to learn, poverty (McKinney, 2014; Parker & Flessa, 2009; Tomlinson & Jarvis, 2014; Kumar & Hamer, 2013), depression, anxiety, etc. (Snowing & Hulme, 2011). However, Armstrong stated that we could spark the natural

genus in students if we first, reignite the spark within ourselves. Second, if we could find a way to hook students and third, understand that each child is a genus in their own right and that phenomenon can be discovered using multiple intelligences.

There are many internal and external factors that affect the ways in which a teacher refines and enhances his or her craft (Abernathy-Dyer, Ortlieb, & Cheeck, 2013). Teachers are influenced by a number of factors that impact their values, beliefs, objectives, and instructional practices (Howe, Jacobs, Vukelich, & Recchia, 2012). Teachers teach better when given an opportunity to reflect on their own learning and teaching (York-Barr et al., 2016; Scales, 2008). Scales (2008) stated, "Another reason for reflective practice is because it encourages us to understand our learners and their needs abilities" (p. 26). A study completed by Wilson (2008) stated that teachers need time to reflect on the process of learning (Nazzal, 2011). If teachers are given the time to reflect on the outcomes of all of their students, they can better serve the needs of each individual student. Wilson concluded by stating that teachers can better serve their students' needs if they incorporate new teaching models, and utilizes new and recent research (Nash, 2008). However in a study completed by Kumar and Hamer (2013), intervention that occurred during preservice teachers courses initially helped teachers develop adaptive instructions for all students (Dunst and Bruder, 2014), but these diminished by the time the courses were completed. The researcher suggests that this may be due in part, to "the stresses associated with first-time field experiences in schools diminish their capacity for critical thinking and self-reflection" (Kumar & Hamer, 2013).

Saban and Bal (2012) investigated the use of elementary, mathematical teaching strategies, in terms of Gardner's Multiple Intelligences. Data collection was achieved

with an instrument created by the researchers entitled, *An Inventory of Teaching Strategies in Mathematics Teaching*. The findings revealed that most teachers, either secondary or elementary, use a variety of strategies when teaching mathematics. The top five areas of multiple intelligence strategies used by teachers consisted of verbal/linguistic, mathematical/logical, interpersonal/social, personal/intrapersonal, and naturalistic (Szpringer, Kopik & Formella, 2014). Mathematics teachers were less likely to use musical intelligences, and elementary teachers were more likely to use visual/spatial intelligences, and bodily/kinesthetic than secondary teachers. Rational for the findings are statistically sound, however, some of the notion or explanations were not as sound. For example, the researchers stated that elementary teachers are more likely to teach math using a variety of intelligences, while secondary math teachers may focus more on the actual math knowledge, and not on how to teach (Saban & Bal, 2012, p. 18). There may be a reasonable explanation for this, as secondary teachers may feel that students have already developed the necessasry skills required for secondary math questions, whereby elementary teachers may feel the students are still learning and require additional accommodations.

Teachers are feeling less prepared to handle the current circumstances they encounter on a daily basis (Al-Hazza, Fleener, & Hager, 2008; Ajayi, 2016; Bostic & Matney, 2013; Cardona, 2009; Cho & DeCastro-Ambrosetti, 2005; Porter et al., 2015; Van Reusen; 2001), support student academic expectations and modification (Boling 2007), while meeting the grade level expectations and developing their problem solving skills. Even though teachers felt that it is very important to teach to a variety of needs in their classrooms, by providing an array of diverse instructions (Ruys et al., 2013) they

felt it was very challenging to do so (Smit & Humpert, 2011). Teachers are feeling that they are unable and cannot teach the students with various needs that are placed within their general classrooms (Bloom, 2009; Cavindish et al., 2013; Lombardi, 2012).

As well, teachers had limited knowledge surrounding students with multiple exceptionalities (Foley-Nicpon, Assouline, & Colangelo, 2013; Smit & Humpert, 2012). Historically, there was a belief that students with high academic acuity could not experience learning difficulty (Dare & Nowicki, 2015). This is referred to as the Terman myth (Brody & Mill, 1997). Lewis Terman was a psychologist who studied in the field of education during the early 1900's. Terman stated, students with an intelligence quotient over 140, possessed not only superior intelligence, but also, superior bodies, health, social interactions, and moral aptitudes (Bianco & Leech, 2010). There appears to be a great deal of misunderstanding surrounding the use of many of these practices. Busso (2014) stated, the terminology used in neuroscience might impede the use of these practices (Abadzi, 2014).

Teachers are less likely to incorporate new and different concepts if they are confused about the strategies. Cavindish et al., (2013) investigated the use of best practices, for up and coming new teachers, as it pertains to the special education arena. Their study focused on several different areas, the deficit perspectives, based upon cultural and linguistically diverse students, the changes that are currently occurring to allow for perspectives to change and ends with a discussion based upon the need for collaboration across teacher education. The authors investigated the highly challenged intersection of diversity and disabilities and insist on a reform for teacher preparation courses. The researchers concluded that there are many barriers to using differentiated

instruction in the classroom, namely, lack of administrative support, insufficient professional development, and unclear lines between special education and general classroom responsibilities.

Students spend an average of 15,000 hours in the classroom from kindergarten to high school (Oberle and Schonert-Reichl, 2016). In a recent study completed in Vancouver, Canada, Oberle and Schonert-Reichl premeditated 406 4th and 7th grade students and their teachers. What the researchers found was a direct link between teacher stress and student stress. Teachers stated three main reasons for a 30-50% exodus of the profession within the first three years to five years (Aloe et al, 2014; Bloom, 2009; Katz, 2013, 2014; Ronfeldt, Loeb, & Wyckoff, 2013; Shine, 2015) emotional exhaustion (Chang, 2009) depersonalization from students and a lack of accomplishment in the classroom (Oberle & Schonert-Reichl, 2016). Teacher do not have the resources or the know how to help students both with and without special educational concerns (Casey & Childs, 2011). The current research suggests that teachers are becoming exhausted with the extensive demands placed upon them (Oakes, Lane, Jenkins, & Booker, 2013). They are becoming overwhelmed trying to cope with the diverse needs currently in their general classrooms (Ronfeldt, Loeb, & Wyckoff, 2013).

Inclusion policies in Canada are inconsistent making practices more difficult (Ainscow & Sandill, 2010). Inclusion can look like many different things to many different people, making teachers unsure of expectations and providing students with disabilities the appropriate instruction for success (Brackenreed, 2011). Many teachers support inclusion in their classrooms; however, they feel unprepared to meet all the needs of the diverse population of students (Van Reusen, Shoho & Barker, 2001). Many

students in Canada have told the Canadian Education Association (CEA) that "classrooms and learning as they are currently organized are not working. They are not working for students who can keep up with the pace set by the lectures, textbooks and tests, and they are not working for those who cannot" (Willms, Friesen, and Milton, 2009, p.5)

In their book, initially published in the 1970's, Lifelong Education and the Training of Teachers, Cropley and Dave (2014) state that the world is changing at an incredible pace and schools must now become place where the opportunity for lifelong learning is obtained. Education does not occur within a vacuum and as such, a static model of the curriculum and its delivery, cannot meet the needs of the diverse population that is present in today's general classrooms. The author stated,

> The fact that many educational systems are presently scarcely able to bear the expense of providing teachers to support a conventional schools system also suggest that it is probably necessary to visualize the possibility of other definitions of who is a teacher, what constitutes teaching, what duties may be reasonably required from professional teachers, and similar questions (p. 23).

In this fast paced society, teacher education must assume new functions, in which teachers are prepared to deliver a variety of techniques to meet the needs of all students (Cropley and Dave, 2014).

Recommendations handed down by the LDAC, which were partially obtained from the PACFOLD study, stated that a greater degree of awareness is required in the fields of education, mental health, and medicine. Greater training needs to occur for these professionals to ensure they, "reduce the short- and long-term economic costs of

failure" (Learning Disabilities Association of Canada, 2007, p. 8). As well, early intervention and universal screening should be completed in preschool and primary students, with universal health care plans to cover these costs (Aboras, et al., 2012).

In a study completed by People for Education (2016) over 1100 hundred schools, 50,000 students and 72 publicly funded school boards in Ontario were surveyed. The findings stated that 26% of students identified as requiring support are not receiving interventions. Many principals identified difficulties with meeting student needs, such as a lack of funding, and or staffing, paperwork that is associated with referrals to programs, waitlist backlogs, and behaviours and mental health concerns resulting in time away from providing support (People for Education, 2016). Although the province estimates that it will spend 2.76 billion dollars on special education programs next year, half of this amount is provided by, Special Educational Per-Pupil Amount (SEPPA). One of the recommendations outlined in the report was the need for better education supports that will enable teachers to meet the needs of a diverse population occurring in the general classroom. Ontario's Ministry of Education (2016) stated, "as more students with special education needs are accommodated within regular classrooms, providing all teachers with special education training is essential for inclusive education to be effective" (p. 18).

The current trends in the field of education, formal verses informal training, have raised many a debate (Sangra & Wheeler, 2013). With the need for reform, teachers are feeling not qualified to meet the necessities of their diverse classrooms; (Ajayi, 2016; Bostic & Matney, 2013; Kwon, Cho & DeCastro-Ambrosetti, 2005; Porter et al., 2015; Van Reusen, Shoho, & Barker, 2000–2001) where then to turn to acquire these specific skills and strategies? The internet has produced an online phenomenon, which is the

ability to reach far and wide globally, and with little cost or time. Personal interconnections have lead teachers to correspond with one another, allowing informal learning through networking, and the ability to both give tools and strategies while receiving (Sangra & Wheller, 2013).

Parent perspective

Parents play a vital role in the identification and success of their children with exceptionalities (Villeneuve et al., 2013). Previous research has demonstrated a link between race and socioeconomics with the diagnosis of exceptionalities (Ambrose, 2013). Parents who are economically advantaged are able to obtain private assessments, counselling and tutoring for their children (Dare & Nowicki, 2015; Park, Buchmann, Choi & Merry, 2016). In a study completed by Dare and Nowicki (2013), the researchers chose an exploratory qualitative method, seeking to answer the question, "How do parents become aware that their children are twice exceptional"? The researchers stated, that it is more likely that educators notice that their student is struggling in the classroom (Reis et al., 2014) yet it is the parents who are more likely to experience a frustrated child when they return from school (Dare & Nowicki, 2015). The researchers finding revealed several surprising outcomes. First, although the parents of the study had children with different needs, the parents had similar experiences. "The parents in our study were strong advocates for their children, going outside the school system to find answers to the paradoxical experience of parenting a child who is both able and struggling" (p. 26). Parents revealed that they were excited about sharing their experience in the hopes that they are able to help other parents through the process.

Assessments

In order for a student to be identified with a learning disability in the public school system in Ontario, he or she must exhibit two criteria: average or above average intelligence and a significant gap between intellectual ability and academic attainment (Stegemann, 2016). Many of the assessments that are currently used to identify a student today are primarily completed auditory and lack the variations of instruction needed to determine academic strengths (Mummaw, 2010; National Joint Committee on Learning Disabilities, 2010; Snowing and Hulme, 2011). Assessments can only represent norm-referenced interpretations of students' knowledge, not to judge the quality of either the education or instructional leaders (Popham, 1999). Furthermore, in studies that compared the results of identified and non-identified students, results indicated that there were no differences. The National Association of School Psychologists (2015) argue, "In fact, there are no readily available measures (including intellectual assessment and achievement measures) that have adequate sensitivity and specificity to permit stable and consistent diagnosis of LD (Macmann et al., 1989; Stuebing et al., 2002; Vellutino et al., 1996). Benson and Taub (2013) compared the results of students, both identified with and without a learning disability using the Woodcock- Johnson III Tests of Cognitive Ability (WJ III COG) and the Woodcock- Johnson III Test for Academic Achievement. These assessment tools are still in use today as part of a battery of tests that students must complete to obtain a diagnosis (Miciak, Fletcher, Stuebing, Vaughn, & Tolar, 2014). Participants included 994 randomly selected students who had been identified with a learning disability and 994 students with no diagnosis who had attended the Woodcock-Munoz Foundation Clinical Database Project (CDB). Results for this study revealed that students with and without a diagnosis obtained no significant differences, except on the

WJ III ACH reading comprehension, which was statistically non-significant (Benson & Taub, 2013). Although there appear to be some differences, within the reading comprehension, the WJ III demonstrated the same results for both groups of students. The researchers state that many of the specific achievements are tested using only one measure, for example, word recognition, and are not as reliable as a multi-test score, which clusters the same achievements together. Single test scores can prove beneficial for identifying particular needs of a student. This study makes a compelling case as it is statistically sound, however, due to the restricted label of learning disability, it would be hard to ensure content and representation validity. Benson and Taub state, "results suggest that bias may have a fairly consistent effect on scores obtained by students with learning disabilities, regardless of performance level" (p. 267).

Sometimes students do poorly on an assessment and are diagnosed with a learning disability, when in fact there are other barriers to their learning (Sze, 2009). "Many students will be diagnosed with a learning disability when in fact they do not have a processing disorder" (p. 3). Sze (2009) study recommended the use of different assessments in order to pinpoint language deficits. "If only one type of test is used, then there could be inaccuracy due to the advantages and disadvantages of each type of assessment." Is there a difference between the underachiever and a student with a learning disability and if so, how do we measure or assess the student (NASP, 2015)? Sze's study discusses the reading disabilities of students and offers suggestions and advice.

The Joint National Committee on Learning Disabilities completed a study on assessment and evaluation of students with learning disabilities (2011). The committee

focused on oral comprehension, listening comprehension, basic reading skills, written expression, reading fluency, reading comprehension, mathematic calculation, and mathematics problem solving. The researcher's findings suggest the identification of students with a learning disability expanded to include the use of different assessments, growth models, different instructional strategies and universal design (The Joint National Committee on Learning Disabilities, 2011; Stegemann, 2013). Furthermore, all the assessments used to identify a student with a learning disability are completed auditorily. If the student is not an auditory learner, and is being tested for specific deficits, can there be any other conclusion?

The criteria outlined within the DSM-V stated that intellectual functioning is an IQ score of 70 (+-5) (American Psychiatric Association, 2013), but the LDAC is in disagreement with this definition and argues that many other factors need to be considered when determining a learning disorder. Dr. Bronwen Davies, a school psychologist stated,

> "There are many other factors that are to be considered when determining a learning disability. For example attendance, how often do they come to school, how many different schools has the child attended. Intervention strategies, what instructional strategies have been tried and what has not? Is there a history of family difficulties, economically poor, etc?"

Wakefield (2016) states, the integrity of the DSM-V is unprecedented, as much of what has been completed has been developed through the lens of psychiatry and not so much psychology. For example, gluttony now becomes a psychiatric illness. Under the sub-title of Attention-Deficit/Hyperactivity Disorder, the Centre for Disease Control and

Prevention estimates that 1 in 5 boys has been identified with ADHD and approximately 11% of the population, with approximately 2/3 of these students taking medication. Wakefield (2016) suggests that many of these children are being over diagnosed, "normal variations in developmental rate are being mistaken for disorder" (p. 116). The problem as the author puts it, "instead of grappling with how to refine the diagnostic criteria to address a massive false positive problem and its attendant overmedication, DSM-V focused on altering the ADHD criteria to facilitate expanding the diagnosis to adults" (Wakefield, p. 117, 2016). The manual not only changes the age of onset for this disorder, but also changes the criteria outline from six to five.

Critics

Many of the theories surrounding educational instructions, such as differentiated instruction, brain-based learning, left-brain, right-brain theory, and multiple intelligences have been challenged (Tardif, Doudin, & Meylan, 2015; Dekker et al., 2012; Lindell & Kidd; 2011). However, learning styles theory remains to be heavily incorporated into the classroom today (Adcock, 2014). In a recent qualitative study conducted by Edelenbosch et al., (2015), comparing and contrasting neuroscientists and educators, the results revealed a disjunction between the two disciplines. In another article authored by Lindell and Kidd (2011), the researchers set forth to challenge the validity of "right-brain" teaching and its lack of empirical studies to support the assertion (Lindell & Kidd, 2011). The author challenged the belief of first, traditional teachers neglect the right brain. Second, that individuals have a predominant preference either left or right brain and third, that there are strategies available that target either the left or right side of the brain. Lindell and Kidd (2011) state, the idea that the functions of the brain's hemispheres could

be straightforwardly divided into left and right, though appealingly simple, is patently false" (p. 125). It is not the science behind the concept that draws criticism, but rather, it is the secondary assumptions that researchers disparage (Morris, 2006). To take the literal meaning of left-brain or right-brain and assume that anyone is solely one or the other, or that any part of the brain is autonomous would be incorrect (Morris, 2006).

As neuroscientists and neuroscience gather momentum, the European Union has budgeted 1.2 billion Euros' towards the Human Brain Project. Similarly, then President of the United States, Barack Obama announced a budget of 3 billion over the course of 10 years, for the project, Brain Research through Advancing Innovative Neuroethologies. The project will focus on the advancement of 100 billion neurons in the human brain, and is said to provide a further understanding of optogenetics, nanoparticles, miniaturised neuroprobes, and DNA computing (Rose, 2013). Rose (2013) reported, "No matter that many neuroscientist are sceptical about both goals, and methods few are going to look askance at gift horses" (p. 2). Although Rose (2013) does agree that this is an exciting time for brain research, as research and technology is able to reach new heights, we must also be leery of the claims made by neuromania and neuroeducation. The author stated,

> It is easy to see why the prospect of neuroeducation, or brain-based learning, might excite schoolteachers anxious to do the best for their students and to find ways of anchoring their teaching and learning strategies into the best that science can offer. The seductive appeal of those ubiquitous false colour images of the brain, showing the regions that "light up" when solving a maths [sp] problem or learning a new language cannot be denied (p. 2).

As teachers, parents and students become the targets of a growing industry based on providing enhanced cognitive ability programs, drugs to enhance ones listening and attention abilities, and courses on brain-based learning through brain exercises and electrodes, Rose (2013) cautions, we need to consider the implications of this neuromania. Many studies have demonstrated that students from lower socioeconomic families have limited vocabularies compared to their wealthier counterparts (Rose, 2013). Furthermore, if teachers are to focus on the brain and its abilities to acquire knowledge what is to be said about the student, and their own cultural experiences? Education is not a static entity contained within a snapshot. The author contents that neuroscience may have it backwards; it is not about how they can enlighten the teaching industry but rather, how the teacher may provide insight for the neuroscientists (Rose, 2013).

Armstrong (2009) contends that much of the criticism of these theories comes from the psychometric community. Gottfredson (2004) stated that there is no scientific proof for the existence of eight separate intelligences. The author also stated, "Gardner's theory offers a useful reminder that there are many human abilities and forms of accomplishment, and it puts new labels on some of the most common of them" (Gottfredson, 2004, p. 36). Gottfredson (2004) opposes the argument of intelligence testing as noted by sociologist in the 1970's, and the existence of one or multiple intelligences. Gottfredson (2004) stated, "All these questions are about latent constructs, not tests. Their answer have been provided primarily by empiricists interested in the origins, structures, distributions, and social implications of human intelligence (the construct), not in the pragmatics of test and measurements (yardsticks)" (p. 187). Furthermore, in one of her later publication, Gottfredson, (2011) stated, "The one-plus-

many idea also exposes the implausibility of **multiple-intelligence** theories eagerly adopted by educators in the 1980's, which claimed that by tailoring lessons to suit the individuals specific strength- - visual, tactile or whatever,- - all children can be highly intelligent in some way" (p.1).

Visser, Ashton, and Vernon (2006), completed a study to test the theory of Multiple Intelligence. The researchers created 16 test, 2 tests for each of the eight multiple intelligences. The authors stated what Gardner refers to as separate intelligences are basic capabilities, secondary to the *g* factor. Gottfredson, (2004) refers to the *g* factor, which found that individuals, who scored well on one type of tests, did well on all of them: regardless of the wording, the delivery of instruction, or the spatial ability. Gardner (2006) contended that the *g* factor was simply understood as the ability to complete a task, however, the *g* factor has been observed in tasks that are not considered pen-to-paper (Visser, Ashton, & Vernon, 2006). In addition, Gardner (2006) stated that the *g* factor could be varied from task to task, but Visser, Ashton, and Vernon (2006) found that there was an inter-correlation between the *g* factor and multiple batteries. No matter what broad set of tests were completed by any student, the general intelligence of the student was typically the same.

Another criticism to Gardner is the importance of the *g* factor. Gardner does not dispute the existence of the *g* factor, but to what importance it should be given. Gardner (2006) stated that the *g* factor is merely a reflection of the "Western" philosophy in an educational setting. Gottefredson (2004) wrote, "The common factor, *g,* can be distilled from scores on any broad set of cognitive tests and it takes the same form among individuals of every age, race, sex, and nation yet studied" (p. 35). The *g* factor, as

defined by Visser, Ashton and Vernon (2006), can be observed in more than just school, as it relates to a whole host of other variables: job performance and complexities, socioeconomic status, occupational status, poverty, and even incarceration and chronic use of the welfare (Gottfredson, 2002; Visser, Ashton, & Vernon, 2006).

Jennings (2012) investigated the use of the learning styles phenomenon and found it to be antithetical to student achievement levels. The researcher suggests that although the framework behind learning styles was to discover how each student best acquires knowledge, allowing the facilitator the opportunity to impart the knowledge through preferable means, it evolved into a fluid concept of complex inherent and yet contextual claims (Jennings, 2012). These claims, which state that everyone has a preferred learning style, are based upon a flawed assumption, that it is true (Jennings, 2012).

Another study focused on the use of differentiated instruction in mathematics for primary students (Maxey, 2013). The results revealed that there were no statistical differences between the two groups of grade 2 students. Maxey (2013) stated, "The results of the data analysis showed no significant difference in the end of the year test scores of DI students and who group instruction students" and " the educational community has embraced differentiation without in-depth research into whether or not it is effective at raising student achievement (P. 38).

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Some critics challenge that fact that practitioners of education are manipulating instruction so that even students can mistakenly believe they are smart (Armstrong, 2009). Barnett, Ceci and Williams (2006) wrote, that students cannot simply rely on a label to make them feel smart. The authors stated, "the focus must be on displaying meaningful skills and competencies, not simply on feeling the one is smart" (p. 101).

In response to a study completed by Michele Hollingsworth Koomen, *Wizard* based upon a grade 7-student student experiences in a science classroom, Bannister (2016) claimed, "her undertaken-as-shared prognosis of differentiated instruction to be an ideological mismatch given her commitment to social justice" (p. 366) and recommends an equity pedagogy approach. The author stated, that while there are some valuable aspects to differentiated instruction, "many of the framing ideas for this approach are incongruent with an inclusive education strategy" (Bannister, 2016, p. 337). Under the section entitled, *Criticisms of differentiated instruction,* Bannister (2013) provides four problems with differentiated instruction ascertaining it is "ideologically opposed to goals for equitable classrooms" and argues that "the model invites reproductions of status orderings from the larger society into the classroom". First, the assumption that students who are not yet ready, need more direct instruction and routine practices through the use of inquiry-based pedagogical approaches. Second, differentiated instruction perpetuates the myth of learning styles in education. Third, there is a lack of capacity to track progress of students, and fourth, the "usage of deficit framings of students and their families within an academic diversity rational for the model" (Bannister, 2016, p. 338).

Students who need more direct instruction and routine practice are not participating in inclusive classrooms where they are able to gain and engage in meaningful learning with their peers. Bannister (2016) stated, this student, who is African American and labelled special education, perpetuates that myth of African American students needing more special education, more direct instruction further contributes to the negative myth where "White privilege and racism creates and maintains disproportionality at all levels" (Blanchett, 2006, p. 27).

Bannister's second criticism to differentiated instruction is the lack of literature and research that justifies incorporating learning styles assessments into practice. The author stated, "The use of learning styles instruction has been challenged for over 30 years, and has being thoroughly debunked for almost a decade" (Bannister, 2016, p. 339). Furthermore, she stated, Tomlinson, an advocate for differentiation, cites academic scholars, and literature to support a learning styles approach, when in fact, "if learning styles has a practical utility it remains to be demonstrated" (Pasher et al, 2008, p. 117 as quoted in Bannister, 2016, p. 399). Bannister concludes by saying she is confused by Tomlinson's circulation of antiquated information and misappropriation of the literature to further vindicate a learning styles approach.

Bannister's (2016) third criticism of differentiated instruction is its ineffectiveness to track practices. The author refers to Tomlinson's framework of Vygotsky, whereby "teaching up" and teaching to a specific teaching zone of proximity. Teacher will create different levels of expectations to meet student needs, however referring to Cohen and Lotan (2014), Bannister stated,

> The end result is the assumption that some students have more to contribute and are expected to contribute more than others while others are less capable and have less to contribute, quickly becoming a self-fulfilling prophecy where low status students contribute very little (as quoted in Bannister, 2016, p. 340).

Using differentiated instruction approach may result in setting low expectations for some students.

Bannister's (2016) fourth criticism concerns what she stated as "deficit framing" describing it as the foundation for differentiated instruction, according to Tomlinson. According to Bannister (2014), Tomlinson (2014), has been a strong proponent of and for the use of differentiated instruction in the classroom. The author continues to state, Tomlinson et al, (2003) does not focus on a student's strengths but rather, positions a student based on needs, regardless of their race, culture, language, gender or disability.

> Though beyond the scope of this discussion, it is important to note that Tomlinson included stereotypical deficits about families in cases where she believes students have less school readiness, including the demeaning, dangerous assumption that parents are not capable of providing for or do not love their children (Bannister, 2016, p. 340).

The researcher suggested that equity pedagogy be utilized in the classroom, a movement that focuses on student's getting what they need.

Finally, there exists a criticism, not so much on teacher's inability or lack of training but a more extrinsic incentive. Education has become a myriad of formal and informal activities, to include supplementary forms of interventions (Park, Buchmann, Choi, & Merry, 2016). Supplementary education can include private tutoring, cram

schools, learning centres, after school programs, summer school and online courses (Park, Buchmann, Choi, & Merry, 2016). These supplementary forms of intervention, which can improve student success at school, are only available to those who can afford to partake. The thought exists that teacher lack of instruction may be a deliberate attempt to enhance teacher's income (Buchmann, 2002). In some countries, public school teachers provide after school interventions for profit, which maybe the incentive for them to teach less during the regular hours (Buchmann, 2002).

Response to the criticism

Gardner (1993) has provided numerous empirical studies including individuals with brain-damage, biological studies, and cultural studies, to affirm his theory on multiple intelligences (Armstrong, 2009). There are innumerable studies providing rigorous research to indicate the notion of brain-lateralization, right-brain left-brain theory, and the success of Multiple intelligences (Abdulkader, et al., 2009; Ainscow & Sandill, 2010; Al Ghraibeh, 2011; Baragona, 2009; Bassett et al., 2011; Bellah et al., 2008; Bender & Wall, 2008; Bergsteiner et al., 2010; Berry & Settle, 2011; Bielefeldt, 2006; Blomberg, 2009; Bosier, 2007: Bostrom, 2012; Brassell, 2009; Cagiltay, 2008; Caine, et al., 2005; Carbonell, 2013; Casner & Chung, 2012; Cave et al, 2006; Chamberlin, 2011; Connell, 2002, 2006, 2008, 2009; Cook et al., 2007; Cook & Smith, 2006; Crowne, 2013; Dalgarno et al., 2010; De Jesus; 2012). Multiple Intelligences is not a single entity or set of instructional lessons, to be rigorously validated. It incorporates an array of strategies, programs, techniques, and methods that may look very different from class to class, school to school, and even student to student (Bender, 2008; Gardner, 2004).

Armstrong (2009) stated, “It is interesting to note that most of the criticisms of MI theory have come from academics and journalists- people who are usually far removed from the classroom” (p. 102).

The impact

Whether a child has been formally identified or not, the impact of a learning disability can be detrimental (Haq, 2015; Stegemann, 2015). Parents of children with a learning disability reported higher rates of depression in their children, (LDAC, 2016). Philpott and Cahill (2008) state, many parents have reported that they were unable to pay for the specific interventions their children with learning disabilities require. Statistics Canada (2012) reported, of the 15-24 age group of individuals with learning disabilities, 93.6% stated having mental health issues. Young adults reported higher rates of suicidal thoughts and feelings of inadequacy and stress (Wilson, el al., 2009). Children with learning disabilities were reported to have lower rates of self-esteem (LDAC, 2007; Mooney & Cole, 2000; Tsagris & Muirhead, 2012), and lower rates of self-efficacy (LDAC, 2007). The PACFOLD study commissioned by the Learning Disabilities Association of Canada (2007) hazarded to state, Canadians with learning disabilities may face a greater degree of health problems because of unemployment and lower incomes.

Summary

Students with learning disabilities have become the largest population of individuals identified under the exceptionality umbrella (Buttner & Hasselhorn, 2012; OME, 2014; McGilchrist, 2013). Intervention for students with learning disabilities is difficult as the exact causes are numerous, and clear implications are vast (Snowing, & Hulme, 2011). Numerous empirical studies have indicated early evidence interventions

have proven effective if delivered in a timely manner (Swanson, 2014). Many students with a learning disability will also be diagnosed with ADD, ADHD, CD, and any number of social-behaviour disorders (Algozzine et al, 2012; Snowing & Hulme, 2011). As a result, the gap between students with learning disabilities and their cohorts is widening (cook et al., 2014) due to traditional and antiquated teaching techniques (Gardner, 2013; Goodwin & Miller, 2013; Houff, Klinger, & Coffman, 2015).

Gardner believed that students should be allowed to demonstrate their intelligence, and could, if they were not limited to the subject matter of math and literacy taught in archaic methods (Demailes, 2008, Gardner, 2004, 2008, 2009, 2012). Piaget believed that students needed to be actively engaged if the acquisition of knowledge was to occur (Bostrom, 2012; Carbonell, 2013). New educational options have developed due to research into brain lateralization, brain regions, and the neuroplasticity of the brain (Blair, 2007; Burns, 2011; Casner, & Chung, 2012; Connell, 2009; Geake, 2007; Sperry; 1968, 1973). However, teachers are feeling unprepared to handle the current conditions they encounter daily (Bloom, 2009; Cavindish et al., 2013; Lombardi, 2012; People for Education, 2016).

Further exacerbating the situation, many of the assessments that are currently used to diagnosis a student, are completed auditory and lack the breadth of delivery to demonstrate student strengths (Kykalová & Vasilyeva, 2015; Mummaw, 2010; National Joint Committee on Learning Disabilities, 2010; Snowing and Hulme, 2011). Future research needs to address learning styles and effective strategies as they pertain to students with learning disabilities, and what impact this might have on student achievement (Balido-Dean, Kupczynski, & Fedynich, 2010; Buttner & Hasselhorn,

2012). Environmental studies are needed to explore the co-morbidity of students with learning disabilities and social, emotional, and behavioral disorders (Bell et al., 2008; Bellah et al., 2008; Sternberg, et al, 2008). Gardner's Multiple Intelligences, learning styles, differentiated instruction, and VAK preference studies are required (De Jesus, 2012; Gardner, 2012). Studies to determine the effectiveness of assessments (Rosenberg, 2009) but also, to gather the information to develop amenable instruction based on student strengths (Mummaw, 2010; National Joint Committee on Learning Disabilities, 2010; Snowing and Hulme, 2011. Should students receive instruction geared to their dominant hemisphere and or preferred learning style? What considerations should be integrated in order to reach all students and if completed, what implications would this have on the diagnosis of a learning disability.

Chapter 3: Research Method

Introduction

Based upon criteria as outlined in the DSM-IV of the 1,352,965 students currently attending elementary school in Ontario (Ontario Ministry of Education, 2016) and 662,446 enrolled in secondary school, approximately 200,000 students have been identified with a learning disability. On May 18th, 2013, the DSM-V released the new criteria for the process of obtaining a diagnosis of a learning disability (International Dyslexia Association, 2014). Based upon this new criterion, it is up to the teacher to demonstrate that they have exhausted all their intervention tools and strategies, to ensure that each student has the opportunity to be successful (Tannock, 2014). Students with learning disabilities struggle to acquiring knowledge (Roblyer, & Doering, 2009). Many of these students suffer in silence, as they are unable to follow the instructions that are delivered primarily through auditory means and end up with decreased self-esteem (Mooney & Cole, 2000), higher dropout rates and social and emotional difficulties (Haq, 2015; Ashman, Mazariego, Roldan & Tamhane, 2012). With the lack of teacher preparedness, teachers are struggling to deliver differentiated instruction in a way deemed meaningful for all students (Bosier, 2007; Bostrom, 2012; Brackenreed, 2011; Brassell, 2009; Fletcher, 2007 Gardner, 1973, 2004, 2006, 2008, 2009, 2012; Goodwin, 2013; Graham-Lawrence, 2014). The research problem identified in this study concerns the lack of understanding, disjunction and execution of curriculum for the various learning styles of students, either with or without the diagnosis of a learning disability, and the predominately one-dimensional teaching style currently being implemented (Demaillie, 2008; Krummick, 2014). With the increase and changes for student identification, more

research is required to explore the topic of student identifications as it pertains to learning styles (Csoli, 2013) and ways to ensure that prior to any diagnosis, a student has received instruction and resources to meet their particular learning style (Gardner, 2010).

Purpose of the Study

The purpose of this non-experimental qualitative, e-Delphi study is to elicit expert consensus (Skulmosk & Hartman, 2002; Skulmosk, Harman, & Krahn, 2007) on the development of the most effective tools and strategies that will enable all students in the general classroom a fair and equitable access to the curriculum. An inclusion criterion is very important for the validity to an e-Delphi study (Toronto, 2017). Attrition rates can be as low as 0% and as high as 92%, as reported with the Delphi method (Keeney et al., 2011). For the purpose of this study, participants were initially sent a recruitment email with the requirements and information concerning the study. The sampling was restricted to those pundits who have worked a minimum of seven years as an educator, five years for which they worked with students diagnosed with a learning disability (if retired, it must have been within the past three years, or they must still work within the school system as an educator /volunteer/ supply). Finally, they must hold a valid Special Education Part 1 certification. This study incorporated the use of the snowball approached (Creswell, 2014), which means that each participant was then asked to forward the information to other participants, whom they felt met the criteria and would be interested in completing the study. Other important criteria was considered, such as, access to a computer, an email account and the willingness to participate. A recruiter through an initial invitational email (appendix A) solicited participants. The participants were given the list of eligibility criteria (Akins et al., 2005) and asked to complete an

online survey. The identification of appropriate candidates for this study was initially solicited based upon the participants' credibility among the target audience, as noted by their years of experience teaching and working with struggling students (Pinsen et al., 2014)

An e-Delphi approach was used to gather the most effective tools and strategies from an array of experts working within this field (McIntyre-Hite, 2016). Using an approved program, SurveyMonkey ©, the initial e-Delphi survey consisted of three questions. The first round of questions was open-ended. The survey began on August 11th, 2017 after permission was granted from the IRB committee. Each participant was sent an invitation email from a recruiter, with the specific criteria outlined, followed by the agreement to consent, and finally, the link to the survey. The link took the participant to a survey to be completed on SurveyMonkey ©. Based upon participant responses and a willingness to complete the study, pundits were asked to complete two rounds of questions, in order to provide the best tools and strategies for each of the three modes of learning, visual, auditory, and kinesthetic. There was no way to ensure that the same individuals who completed the study, participated in both rounds, as this was an anonymous study. Some participants may have completed the first round and not the second while others may not have participated in the first round but chose to participate in the second. However, all participants must have met the same eligibility criteria.

This chapter outlines the research method and design, a description of the population, the sample and size and the instruments that were used to collect the data. A copy of the questions is provided below. Upon completion of the data collection, a description of the processing and analysis is discussed in Chapter 4 of this study,

followed by the assumptions, limitations, and delimitations. This chapter commences with a discussion on the ethical assurance and a summary.

Design

This qualitative e-Delphi research study was conducted with the sole purpose of providing the necessary intervention, for all students, either diagnosed with a learning disability, or for students struggling within the regular classroom. With the hope that these proven tools and strategies would allow all students access to the curriculum, in a manner in which they can internalize, analysis, and reproduce the information. The intent for this research method section is to describe the methodology that was used to conduct this study; including a description of the setting, proposed design, sample, data collection methods, procedures, and analysis. The actual data collection took approximately 4 weeks prior to analysis, with several months lapsing between rounds to gain IRB approval.

E-Delphi

The e-Delphi method was utilized to gather the information for this study. "The Delphi technique was named after the oracle of Delphi, who according to Greek mythology, delivered prophecies (Avella, 2016; Hsu, & Sanford, 2010, p. 344). The theoretical framework for this type of method dates back to Aristotle, with the belief that practice and praxis are derived from nature and the process of doing (Haq, 2015). Delphi "is a structured process that involves collecting and synthesizing knowledge from a group of experts" (Wiersma & Jurs, 2009, p. 314). When there is inconsistent or contradictory material available on a specific topic, such as instructional tools and strategies, a consensus-based method is generally considered an appropriate methodology to

determine the extent to which pundits agree (Prinsen et al., 2014). The process includes a series of systematic questions that narrowed the expert opinions to arrive at a hierarchical consensus (Rowell et al, 2014; Kim & Aktan, 2014; Pilcher, 2015; Solmonson, Roaten, & Sawyer, 2011). This methodology is only utilized when the researchers wishes to communicate with others in order to arrive at a general objective (Rowell et al, 2014). Simply speaking, this style of research is genuine and truthful in nature as it is the teacher as researcher at their best.

The Delphi approach to research made a resurgence in the last few years. Used in the business (Davidson, 2013; Gnatzy et al., 2011) and military fields, this method allowed researchers to forecast and develop solutions to existing problems (Green, 2014; Yousuf, 2007). However, it ran into scrutiny when a man by the name of H. Sackman, employed by The United States Air Force, believed that the method was flawed. Sackman said there was no way to differentiate between an expert opinion and nonprofessional's opinion (Yousuf, 2007). It became very popular in the 1980's to the 1990's in the field of education, with as many as 83% of dissertation using this method of data collection. It allowed researchers to gather expert opinions in a timely and relatively inexpensive way. Used for educational settings, it is used to predict trends (Nworie, 2011), inform guidelines, and set standards (Green, 2014).

Davidson (2013) states that there are several different types of Delphi techniques, classical, modified (Avella, 2016), policy, decision, real time, e-Delphi, technological, and disaggregative. Avella (2016) states, there are three different versions, Policy, Classical and Decision Making. With the development of the internet, the Delphi technique has been modified and transformed into what is known today as the e-Delphi

approach. It allows the researcher to gather data from surveys created online, control the communication between the experts and control the amount of data being collected (Donohoe et al, 2012). For the purpose of this study, e-Delphi methodology was used, "the questionnaire(s), feedback, and participation of expert panel is all done by email or online surveys" (Davidson, 2013, p. 57). It is estimated that over 3 billion people have access to the internet, providing researchers to assess to a wealth of expert opinions (Cole, Donohoe, & Stellefson, 2013).

Although there are some real advantages, such as, total anonymity (Armitage, 2007; Avella, 2016; Davidson, 2013; Skulmoski, Hartman, & Krahn, 2007), cost reductions, fast turnaround times, participant attrition, freedom of expression (Avella; 2016) and contact with a diverse population of participants. Skulmoski, Hartman and Krahn (2007) state, "The Delphi method is a flexible, effective, and efficient research method that can be successful used by IS graduate students to answer research questions in information systems and to rigorously advance the IS body of knowledge" (p.1).

Either way, e-Delphi is a new, exciting, and frontline way to conduct research (Cole, Donohoe, & Stellefson, 2013) but there are some limitations to this methodology. There is little personal interaction, little chance for one-to-one interviews and no face-to-face focus groups using the online approach. Some participants may limit their responses to the questions that are asked, not elaborating, or expressing their true opinions (Hsu & Sanford, 2007). Discussions may be ignored or limited resulting in an artificial consensus among the participants. "Assuming that Delphi can be a surrogate for all other human communications in a given situation," may also be a limitation (Yousuef, 2007). Will the results be generalizable to the greater population? The results may be

misinterpreted or subjective to the researchers. Experts are not always equal in their representation of knowledge (Hsu & Sanford, 2007). As Davidson (2013) noted, "time doing the same job for an extended period does not by itself, qualify an individual to be an expert" (p. 63). Experts are not adequately recognized for their contributions, with a "what's in it for me" attitude, will participants give of their time and expertise in a positive and genuine manner. Does the reader of the research believe in the expertise of the panel (Davidson, 2013)?

The role of the researcher is to be both the planner and the facilitator (Avella, 2016). The researcher designs the study, creates the eligibility criteria, engages the recruiter to solicit participants, constructs the surveys, and generates the questions, which means there is very little opportunity for bias (Avella, 2016). That being said, it is important to note that as the researcher, bias can occur either consciously or unconsciously, so it is important to construct the questions so as not to be leading or limiting (Davidson, 2013).

Research Questions

As a researcher, the need for good questions is important, as good research, questions lay the foundation for the research, and good questions lead to good answers (Bufkin, 2008; Leedy & Omrod, 2010; Stage, 2007). A qualitative approach is best used in answering exploratory areas (Creswell, 2009), while a quantitative approach is best implemented when determining the statistical measurements of a specific data set. These questions were designed to elicit expert knowledge about learning styles and the best tools and strategies for students with learning disabilities and those students who are struggling in the general classroom. The following research questions were used to fulfill

the requirements of this study. For the first round of this e-Delphi study, the following question will be used to elicit responses.

1. In your expert opinion, what are your recommendations for the best tools and strategies designed for working with visual students?
2. In your expert opinion, what are your recommendations for the best tools and strategies designed for working with auditory students?
3. In your expert opinion, what are your recommendations for the best tools and strategies designed for working with kinesthetic students?

Population

The population for this study comprised of teachers who were considered experts in their field. For the purpose of this study, the definition of "expert" is based upon the eligibility criteria: You (the participants) are suitable to participate in this research if you have been teaching for seven years or longer. You (the participant) have been teaching students with a learning disability for a minimum of five years. You (the participant) have completed an additional qualification course of Special Education Part 1. Avella stated, who qualifies as an "expert" invited to participate is of critical importance" (p. 307). Davidson (2013) states, "the expert panel is up the researcher, but the defense of the definition is also the responsibility of the researcher (p. 63). Melnyk et al., (2009) provide an itemized list of 29 objectives to enlist their experts (p. 4635) however, for the purpose of this study; an expert is someone who meets the eligibility criteria. The selection of participants depended upon acceptance of the offer to complete the study, an approved consent form, the willingness to complete two rounds of questions and a self-reported declaration of the eligibility criteria.

Sample

Sample size is contrariwisely associated in regards to the effects with educational intervention studies (Slavin & Smith, 2008). Donohoe and Needham (2009) state, "The literature establishes that Delphi validity, efficacy, and reliability are dependent on the expert group size" (p. 430). There appears to be no standard or established norms surrounding large or small panels (Akins, 2005; Avella, 2016; Nworie, 2011). Suggestions as to 10 to 15 participants are considered adequate (Aloe et al, 2010) but the number is generally below 50 (Hsu & Sanford, 2007) and there does not appear to be many Delphi studies conducted with fewer than 10 (Akins, 2005). Skulmoski et al, (2007) suggests an expert panel consists of approximately 12 to 20. Prinsen et al., (2014) stated that they could not find any guidelines for the sample size for a Delphi study (McIntyre-Hite, 2016), but they believed that the more participants in the study the greater the reliability of the group. Akins, Tolson & Cole, (2005) reported that studies using a varied amount of panel members had been utilized, however, they did note that less than 10 but over 1000 are rare. This study was restricted to 30 participants as requested by the IRB committee. Ten participants completed the first round of questions; however, 18 participants consented to completing the study. Akins (2005) states that, "given the fact, that specialized experts in a given field may be limited, the results of this study suggest that utilization of a small expert sample from limited numbers of experts in a field of study may be used with confidence" (p. 4). Although the Ontario Ministry of Education (O.M.E, 2016) reported that there were approximately 81,000 elementary teachers, and 42,000 secondary (August, 2017) there is no way to determine the amount of expertise they have surrounding this criteria for this study.

Materials/Instruments

The instrument used in the acquisition of data for this study was SurveyMonkey ©. SurveyMonkey was founded by Ryan Finley and Chris Finley in 1999. As of 2015, SurveyMonkey © has over 25 million users and was named on Forbes Unicorn List (Konrad, 2016). The initial questions used were open-ended. The literature review was the impetus for the research questions. Upon approval of the concept paper by the dissertation committee, the eligibility criterion was constructed and a link to the questionnaire was emailed out, via a recruiter. All graphs and charts were constructed with the use of SurveyMonkey © and Grovo.com©.

Operational Definition of Variables

Variables in research are entities that can change or vary. Typically, researchers select their independent variables and manipulate them (Roberts, 2017). In qualitative research, variables are described as things that can "happen" rather than, the "outcome" (Roberts, 2017). For example, the researcher can design the questions in such a way that will allow for a specific result. This study is an e-Delphi study and as such, there are several different types of variables that are discussed.

Independent variable for e-Delphi:

An independent variable is a variable that is not changed by another variable (Creswell, 2009). For example, your gender is not changed by the food you eat. In this study, the independent variables are the initial questions used in the survey. The factors that contribute to these being independent variables are the researcher's ability to manipulate what the questions were, hence what the responses will be based upon a

particular questions. The initial questions will not change based upon the responses of the participants.

Dependent variables for e-Delphi:

A dependent variable is a variable that changes with other factors. For the purpose of this study, the participants are the dependent variable, as their responses can change with the choice of a given question and even how the questions is worded (Roberts, 2017). The researcher will not know prior to conducting the research, what the responses will be and as such, the number of phases, themes, categories and the subsequence of questions, which are based upon the responses given. These factors influence the dependent variable and can change based upon the independent variable, the participants responses of the initial questions.

Data Collection, Process, and Analysis

The initial step to conducting an e-Delphi study is to isolate the problem (Cole, Donohoe, & Stellefson, 2013). The goal of an e-Delphi study is to gather information from a select group of experts and does not represent an entire population of the field (Heitner, Kahn & Sherman, 2013). Data collection commenced after receiving Northcentral University IRB approval. Once the selection criteria have been determined, experts were selected using a recruiter (see Appendix A). This group of experts were asked to forward the survey to anyone they believed would meet the criteria, in order to create a diverse group of leaders. This is known as a snowball sampling (Creswell, 2009).

Prior to the completion of Round 1 questionnaire, participants were asked to log on the link provided in invitational email. The participants were then asked to read the

criteria and expectations outlined and click to acknowledge their understanding, providing receipt of eligibility. If they met the requirements, participants were then asked to consent to act as a participant in this research study by clicking the acceptance button. Once the participants accepted the conditions and understood the expectations, they were then linked to Round 1 of the questionnaire. The results of this study would enable teachers to receive proven tools and strategies, thus allowing all students access to the curriculum.

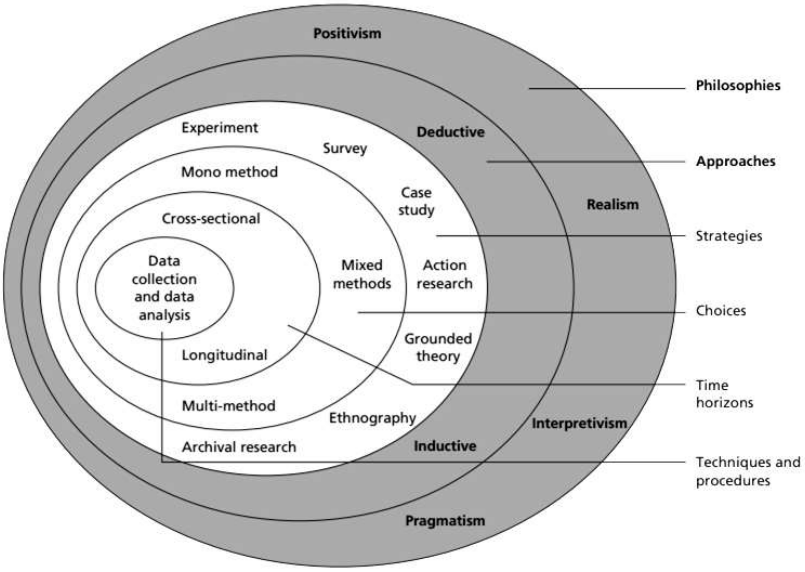
Processing

There were 19 participants who clicked on the link from the invitational email and visited the site of SurveyMonkey©. Of those 19 participants, one person chose not to consent. Of the remaining 18 participants, 10 participants completed the first round of questions. The survey asked three open-ended questions. Round one questions, generated by the researcher, were developed using the survey software program (SurveyMonkey ©). A summary of the responses were gathered and tabulated. These responses were the inspiration for Round two's questions (Yung, 2013). Upon the receipt of responses, a second set of questions were developed for Northcentral's IRB approval. Once approval was acquired, an email was sent out with a link to the next round of survey questions. It was difficult to monitor attrition rates, because after the initial respondents received their links, who was forwarded the link remained anonymous. There was no need for round three questions as only percentiles of the responses were tabulated.

Data Analysis

The interest in qualitative research has been expanding over the last few decades (Flick, 2014). It first emerged in the 20th century, as the investigation into social sciences evolved, so did the need to better understanding the way in which humans experience the world (Saunders, et al., 2009). Trochim and Donnelly (2008) describe it as, "data in which the variables are not in a numerical form" (p. 142). However, it is also stated that, "all qualitative data can be coded quantitatively" (. 144). The purpose for this exploratory type of methodology was to delve deeper into more specific issues and solutions, rather than to provide evidence for further research. In order for qualitative research to provide information to a growing body of knowledge, it must be analysed (Mayer, 2015). Saunders, Lewis and Thornhill, (2009, p. 108) provide an illustration for the process of research.

Illustration # 1 (The Onion)



The Onion

At the onset of this study, the researcher took the approach of the mixed method type of data collection, however, after reviewing a number of studies, it was determined that this study warranted a solely qualitative approach: a post-positivist view if you will. A post-positivist view is less intensive than that of a positivist view, which follows the same principles (Willis, 2007) but allows the researcher to implement additional methods to gather information, such as, surveys and interviews (Creswell, 2009).

In some instances of qualitative research, the analysis begins only after the collection process has ended, however, for the purpose of an e-Delphi study, the analysis was entangled within each step of the process. The process of this study continued until a theoretical saturation was obtained, the pursuit rather than the goal (Creswell, 2009; Willig, 2013). This iterative process (Donohoe, & Needham, 2009) involves the use of repetition and narrowing of responses to gain a further understanding of students with learning disabilities and the strategies that will enable them to strengthen their academic acuity. This qualitative study does not intend to provide either validity or reliability in the traditional sense; however, there are ways to ensure it has occurred. Creswell (2009, p. 190) provides a checklist of procedures to ensure reliability during the qualitative process.

- ✓ Check transcripts for obvious mistakes
- ✓ Make sure there is no drift in definitions of codes or applications of them during the coding process.
- ✓ If working with a team coordinate and document communication from meetings.
- ✓ Crosscheck codes with different researchers by comparing results that are independently derived.

To ensure qualitative validity, Creswell (2009) suggests the following, triangulation, member checking, rich, thick descriptions, clarify research bias, include negative or discrepant information, spend prolong time in the field, use peer debriefing and use external auditor (p. 190).

Punch (2009), describes the three major components of qualitative research as, data reduction, data display and drawing and verifying conclusions (p. 174). Data reduction is the process of reducing information to a manageable process without losing important information (Mayer, 2015). The information is then coded, and/or categorized based upon data collected, related studies, and schemes (Mayer, 2015). After coding, conclusions are then developed based upon the information. This is typically displayed within a graph, a chart, or different forms of illustrations (Creswell, 2009).

Assumptions

Several assumptions were made for the purpose of this study. It is assumed that the participants who were initially targeted, were honest in their estimation of teacher expertise and demographic information. It was also assumed that each of the participants met the eligibility criteria. Another assumption is that all participants were over the age of 18. It was further assumed that the participants did not communicate with one another to coerce other participants into a mutually agreeable strategy. It was assumed that the responses of the participants were honest and were in response to an understandable question. It is assumed that those participants that were provided by other participants, met the criteria as outlined. Lastly, it was assumed by the researcher who incorporated the use of an e-Delphi methodology, did so because it was the best methodology to gather tools and strategies for struggling students.

Limitations

There are several limitations to this study. The data that was collected was gathered using a snowball effect (Rowe & Wright, 2011), which means the recruitment of future participants, is provided by the existing subjects' acquaintances (Creswell, 2014; Miles, Huberman and Saldana, 2014; Trochim & Donnelly, 2008). This style of data collection is typically used when the researcher seeks to engage a group of similar individuals with the same characteristics, skills, and or qualifications. It realize heavily upon the researchers contacts and the hopes of generating regional, national and global participation. Although the initial contacts were regional assumedly, the hope is that the voices of global experts were represented. Using this sampling approach, does have its drawbacks (Heitner, Kahn, & Shermann, 2013). As a result, there can be bias or a non-random sampling because participants are not equally as likely to been selected. The researcher may or may not end up with a true representation of the population (Trochim & Donnelly, 2008). This type of sampling can also have low external validity (Trochim & Donnelly, 2008). Low external validity is the extent to which the results of the study can be generalized to the greater population (Hsu & Sanford, 2007). If the study only received participants who had worked in upper class communities, than the results of the study might not prove beneficial for the world at large. The sample size of this study may also be a limitation, as too little sample can make it hard to investigate meaningful relationships, as most statistical tests require larger samplings to ensure there is a true distribution of the population. To that, there is no way of knowing if this criterion was met, as no data was collected for gender, nationality, or ethnicity.

It is up to the researcher to interpret, or for that matter, misinterpret the results. Many experts are busy and may rush through the survey or feel that they are not rewarded for their contribution, with a, "what's in it for me" attitude, will participants give of their time and expertise in a positive and genuine manner? Experts are not always equal in their representation of knowledge (Hsu & Sanford, 2007). Some participants may feel that they are self-proclaimed experts dealing day-to-day within the learning disability community as a teacher, while others, who work as support staff may bring a completely different perspective. Some participants may feel they are limited by their responses to the questions, excluding information that they feel is important (Hsu & Sanford, 2007). Where there may have been an intense discussion between participants leading to the in-depth analysis or consensus about a definition per se of a particular instruction, which typically does not happen using a survey questionnaire, participants may change their responses based on a limited assumption of the question (Yousuef, 2007).

There was also a lack of prior research on this topic, as there have only been a few studies completed using the newly published definition of a specific learning disability outline within the DSM-V (Tannock, 2014). This is important because it is through the literature review that the researcher establishes the foundation of the existing knowledge of the topic and grounds the need for further investigation. This study incorporated the use of the current criteria for obtaining a specific learning disability and applied these criteria for the purpose of this study.

Limitation for response-bias was reduced, in several ways. Participants were given two weeks between survey questionnaires. This allowed participants to choose an appropriate time. Controlling whether participants gave truthful and accurate responses

could not be fully measured, however the acknowledgment and receipt of consenting to the participation of the study, should indicate that it was completed in an honest and accurate manner (Leedy, & Ormrod, 2010).

Delimitations

There are a few delimitations for this study. For the purpose of this study, the researcher choice to use the snowball approach to data collection. The data collected was gathered through the means of an online survey. All participants remained anonymous. Each participant was given two weeks to complete the survey (Yin, 2014). Two rounds of questions were used to gather the data. Finally, the participants chosen were selected based on a specific criterion; teaching for a minimum of seven years, teaching students identified with a learning disability for a minimum of five years, and they must have completed an additional qualification course, Special education part 1. If participants were retired, it must have been within the past three years, or they must still work within the school system in some capacity, such as an educator, volunteer, or supply.

Ethical Assurance

In Canada, it is the responsibility of the researcher to follow the protocol of the Tri-Council Policy Statement: Ethical conduct for research involving humans, which was first published in 1998 (Mullum, 2012). This document has just been recently updated. The United States Department of Health and Human Services has also updated their recommendations and issued an Advance Notice of Proposed Rulemaking for the Common Rule overriding most of the research funding on human participants (Mullum, 2012). Needless to say in both countries, it is the responsibility of the institutions that are

conducting the research, to ensure that it is completed through an ethical lens (Mullum, 2012).

Prior to the collection of data, the Internal Review Board (IRB) of Northcentral University was petitioned, whereby approval of the study was obtained for round one. On completion of round one, the IRB was once again petitioned to conduct round two of the study. Approval was obtained on August 11th, 2017. The completion of the Collaborative Institutional Training Initiative exam was obtained. This exam covers the historical development for the current regulatory and ethical issues surrounding the use of human subjects and their protection while participating in a research study. There are a number of modules that must be completed, and the researcher must complete all of the modules achieving an overall percentage of 85%. These modules outline the rights of the participants and the responsibilities of the researcher, as well as, the holding institution.

The participants in this study will be protected throughout this entire process. Each participant was invited to partake and did so of their own free will. The participants remained anonymous to the researcher, as well as, each of their responses to the survey questions (Garson, 2013). One of the most important features of most Delphi studies is to ensure participants anonymity (Vernon, 2009). Neither his nor her name were collected or published nor was any other persons privy to this information. The study was designed to avert teacher experts from knowing who else was involved in the study and what their answers might have been. The anonymity button was selected to ensure total anonymity, as well as, the IP address button, which meant that participants were known only as a number. The information gathered was stored on a password-protected computer that never left the home of the researcher. No personal information was

collected, only a description of the expertise and years of experience within the teaching profession was conveyed. Emails were gathered in order to contact participants with the links for the two rounds of survey questions, but they too remained anonymous to the researcher.

Informed consent is critical to ensure the protection of the participants (Baxter, 2010; CITI, 2016). Many times, it appears that the goal of informed consent is to obtain a signature however; the goal is not about the product but about the process (Erlen, 2010). For the purpose of this study, prior to the onset of data collection, each participant reviewed the Informed Consent form (see Appendix B). This document provided important information about the process for this study, and the risks and benefits to each participant upon their acceptance. Each participant must click the acceptance button to solidify their understanding of consent, which explained the process and their right to refuse at any stage of the study, without cost to them (Cozby & Bates, 2012). Erlen (2010) stated, "These questions occur for multiple reasons. For example, study participants may not fully comprehend randomization into the experimental or control arm of a clinical trial. Confusing terminology may be used as an investigator explains the study and obtains consent" (p. 276). If the participants have any questions or concerns, the consent form provides contact information of Northcentral University members.

For the purpose of this study, the informed consent document was constructed to ensure that simple and straightforward language was used (Cozby & Bates, 2012; Fleisch-Kincaid report). The capacity to make a decision must be completed in a way that will allow the participants to fully understand the process and know what steps will occur during the study (Erlen, 2010). Instructions were provided in a clear manner, and a

risk assessment for the gathering and storing of information was outlined. No children (individuals under the age of 18) are involved in this study, so no parental consent was required (CITI, 2016; Nairn, 2009). Each participant was informed; they may leave the study at any time with no consequence (Alby et al., 2014).

Summary

The purpose of this qualitative e-Delphi study was to elicit expert opinions on tried and true, tools and strategies that could be used for all students within the general classroom. The participants were gathered using a snowball approach (Creswell, 2014). Each participant met the eligibility criteria as outlined on the recruitment email (appendix, A). The data collection for this study was obtained through the use of SurveyMonkey ©. The initial rounds of questions was open-ended, and were based upon the expectations for a specific outcome (Yin, 2014). The responses were tabulated, categorized, coded and themed (Yin, 2014). Round two questions were based upon the previous round of questions and responses, and were finalized to obtain a consensus. All ethical guidelines were followed accordingly. No personal information was collected on any of the participants. Data will be destroyed after seven years. Total anonymity was achieved (NCU IRB Confidentiality and Anonymity, 2014). All participants agreed to informed consent (Alby et al., 2014). The risks were minimal for the participants. The overall benefits resulting from this study outweighed any risks associated with the completion of this study.

Chapter 4: Findings

The purpose of this qualitative e-Delphi study was to gather tools and strategies from expert teachers, for students struggling in the general classroom. This style of data collection methodology is derived from the Delphi technique, which is a process of gathering information from a group of individuals deemed experts in their field, to arrive at a consensus (Toronto, 2017); however, this study was completed with use of the internet (Cole, Donohoe & Stellefson, 2013, Prinsen et al., 2014). An e-Delphi approach was selected because those experts could be targeted (McIntyre-Hite, 2016) that could be reached globally, within a given field, and allow the collected data to be categorized, reviewed and analysed by the participants (Wiersma & Jurs, Yousuf, 2007). This researcher identified the need for this study based upon the recent changes that have occurred within the DSM-V. In order to obtain the identification of a specific learning disability (SLD), teachers are now required to demonstrate an array of proven interventions that have been utilized within their instructions (Tannock, 2014; Cavindish, 2013). In order to meet the needs of struggling students, teachers must prove they have utilized a variety of tools and strategies, however, teachers do not feel they have been trained adequately in differentiated instruction, stating that more in-services and resources are needed (Chita, 2012; Connell, 2009; De Jesus, 2012; Duman, 2010; Erlauer, 2003; Ellis, 2008; Ferreri, 2009; Haaland, 2011).

The research questions were designed to elicit expert knowledge surrounding students with various learning styles, in order to provide an array of instructional tools and strategies. Good research questions lay the foundation for the research; good questions lead to good answers (Bufkin, 2008; Leedy & Ormrod, 2010; Stage, 2007). It

is important that the questions not be limiting or leading, to reduce researcher bias (Davidson, 2013). The purpose for this chapter is to provide the results and analysis of this qualitative e-Delphi study.

This chapter includes the result of the survey questions that were constructed and uploaded into the software, SurveyMonkey ©. The results were analyzed in such a way, that the information gathered would provide teachers with a variety of different instructional strategies, tools, and resources, to use in the general classroom, prior to accessing the special education resource team for identification.

As this was a completely anonymous study, in order to maintain participant anonymity, the first round of research questions, along with the consent forms and participant information was sent out via a recruiter. The recruiter is a retired teacher of 38 years, who previously worked with students identified as exceptional. Other than meeting the required criteria, no other demographics were collected on any of the participants. The first round of questions consisted of three questions:

1. In your expert opinion, what are your recommendations for the best tools and strategies designed for working with visual students?
2. In your expert opinion, what are your recommendations for the best tools and strategies designed for working with auditory students?
3. In your expert opinion, what are your recommendations for the best tools and strategies designed for working with kinesthetic students?

Teachers were given two weeks between rounds in order to complete the surveys. On the first day of the email delivery, eight responses were gathered. On the second day, after the initial email was sent out, two more participants consented to completing the study,

and filled out the questionnaire. By the 4th day; 14 responses had been gathered; however, several respondents had either declined to participate or skipped some of the questions.

Trustworthiness of the Data

Within the realm of research, qualitative research has been under constant scrutiny (Leung, 2015). Fundamentally, the concepts of validity, efficacy, reliability, and generalizability of the study are the basis for the trustworthiness of this study. To ensure that each of these qualities are maintained, Donohoe and Needham (2009), stated, that the key to each of these is dependent upon the size of the expert group. As previously discussed in Chapter 3, a snowball sampling method was used to identify and recruit the participants for this study. A questionnaire link was sent to those individuals who had expressed a desire to participate and had completed the consent forms. In round one, each participant was asked to provide tools and strategies for students who were deemed visual, auditory, and kinesthetic. Panelists were asked, In your expert opinion, what are your recommendations for the best tools and strategies designed for working with visual students? In your expert opinion, what are your recommendations for the best tools and strategies designed for working with auditory students? In your expert opinion, what are your recommendations for the best tools and strategies designed for working with kinesthetic students?

Research questions- Round one

Teachers, who met the eligibility criteria and consented to completing the study, were asked for their expert opinions on tools and strategies for visual, auditory, and kinesthetic learners. The questions were asked in an open-ended manner, and there were no restrictions to the number of tools and strategies that were given. The purpose was to

gather as many tools and strategies to create a best practices list. There were 19 participants who accessed the online survey. Of the 19 participants, one person, respondent #14, declined to consent, which is a percentage of 5.26%, providing a 94.74% consent rate. Of the 18 individuals who consented to completing the study, only 10 participants answered all of the questions. The average person spent 2 minutes and 41 seconds completing the survey. These responses were combined to complete the following list in no particular order. Participants did not have access to this knowledge prior to answering the second round of questions. Participants were provided with a list of items to be ranked in order of effectiveness in their opinions. Each list had been themed according to common threads.

Table 3
Participant sample

Participants	Round 1	Round 2
	18	13
Totals	18	13

Table 4

The following is a frequency table of the data collection from Round 1 questions collected using SurveyMonkey© Strategies for Visual Learners

Strategies	Frequency (number of times voted)
charts	1
Self-assessment	2
flashcards	2
posters	1
diagrams	4
differentiated assessments	1
written instruction	1
visual schedules	3

frequent check-ins	1
mind maps	3
visual tutorials	1
anchor charts	1
graphic organizers	3
Power Point presentations	2
visual demonstrations	2
Khan Academy (app)	2
illustrations	3
movies	1
picture dictionary	1
Quick pic	2
highlighters	1
checklist	1
calendar	1
creative visualization	1

Table 5

The following is a frequency table of the data collection from Round 1 questions collected from SurveyMonkey© Strategies for Auditory Learners

Strategies	Frequency
Audio recordings	2
Headphones	2
Computer/technology	2
Shortened lesson plans	2
Small group instruction	1
Listening to instructions	3
Close proximity	2
Online/ read-a-louds	5
Verbal prompts	1
Auditory books	1
App's	3
Group work	2
Frequent check-ins	1
Speech to text software	3
Google Read and Write	2
Verbal lessons	1
Movies	1
Auditory guest speakers	1
Open lectures	1
Concise expectations	1
Differentiated assessments	2

Music	2
Birmingham Grid	2
Oral debates	1
Verbal games	1
Chants	1
Flash-cards	1
Oral Math calculations	1

Table 6

The following is a frequency table of the data collection from Round 1 questions collected from SurveyMonkey© Strategies for Kinesthetic learners

Strategies	Frequency
Manipulatives	7
Hands on materials	3
Fidgets	3
Hands on activities	4
Explore surroundings	1
Self-assessments	6
Rubrics	2
Open-ended questions	1
Inquiry projects	1
Group work	2
Typing	1
Visual schedules	2
Movement breaks	2
Immediate rewards and feedback	1
Experiments	2
Computer/technology (Smart Boards)	2
Exercise ball	1
Body breaks	3
Yoga and deep breathing	1
Crafts	1
Puppets	1
Dramatizations	2
Making models	2
Sensory activities (sand)	1
Rocking and reading	1
Walking while studying	1
App's (Educreation)	1

Table 7 ***Visual***	**P 1**	**P 2**	**P 3**	**P 4**	**P 5**	**P 6**	**P 7**	**P 8**	**P 9**	**P 10**	**P 11**	**P 12**	**P 13**	**P 14**	**P 15**	**P 16**	**P 17**	**P 18**	**P 19**	**Ttl**
Consent given	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X	19
Charts													X		X		X		X	4
Self-assessments		X									X							X		3
Flashcards													X						X	2
Posters		X									X								X	3
Diagrams		X											X				X		X	4
Various assessments																			X	1
Written instructions									X											1
Visual schedules						X			X											2
Frequent check-ins									X											1
Mind maps									X								X			2
Video tutorials						X											X		X	3
Tracking text						X														1
Anchor charts						X													X	2
Graphic organizers								X							X		X		X	4
P.P. presentations		X									X								X	3
Visual demonstrations		X																		1
Illustrations																	X		X	2
Movies																	X		X	2
Picture dictionary																			X	1
Quick Pic's																	X		X	2
Cartoons																			X	1
Highlighters																			X	1
Check lists																			X	1
Calendars																			X	1
Visualization strategies																			X	1

Table 8 ***Auditory***	**P 1**	**P 2**	**P 3**	**P 4**	**P 5**	**P 6**	**P 7**	**P 8**	**P 9**	**P 10**	**P 11**	**P 12**	**P 13**	**P 14**	**P 15**	**P 16**	**P 17**	**P 18**	**P 19**	**Ttl**
Consent given	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X	19
Audio recording													X					X		2
Head phones																	X			1
Computers																		X		1
Shortened lessons															X					1
Small group instructions									X				X				X	X		4
Listening to lessons													X					X		2
Close proximity to teacher									X		X									2
Online read-a-louds											X						X			2
Verbal prompts											X									1
Auditory books																	X			1
App's for language											X						X	X		3
Frequent check-ins									X											1
Speech to text software						X		X												2
Google read and write						X			X									X		3
Verbal lessons		X																		1
Movies		X																		1
Auditory guest speaker		X																		1
Open lectures		X																		1
Concise expectations																			X	1
Assessments completed auditorily															X		X		X	3
Music																	X		X	2
Birmingham Grid debates																		X		1
Verbal games																			X	1
chants																			X	1
Oral read out flashcards																			X	1
Oral math calculations																			X	1

Table 9 ***Kinesthetic***	**P 1**	**P 2**	**P 3**	**P 4**	**P 5**	**P 6**	**P 7**	**P 8**	**P 9**	**P 10**	**P 11**	**P 12**	**P 13**	**P 14**	**P 15**	**P 16**	**P 17**	**P 18**	**P 19**	**Ttl**
Consent given	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	X	X	X	X	19
Manipulatives		X				X			X			X						X	X	6
Hands on materials		X									X	X						X		4
Fidgets												X					X			2
Hands on activities		X						X	X			X							X	5
Explore surroundings											X	X								2
Multiple ways of assessments (dioramas-structures)												X			X		X	X		4
Rubrics												X						X		2
Open ended questions											X									1
Inquiry projects											X									1
Group work									X						X					2
Typing programs									X											1
Visual schedules						X														1
Movement breaks																	X			1
Immediate rewards/feedback						X														1
Experiments		X																	X	2
Use of computer																	X		X	2
Physical lessons																			X	1
Use of an exercise ball																	X	X		2
Body breaks (go for a walk)						X												X		2
Yoga and deep breathing exercises																		X		1
Crafts																			X	1
Puppets																			X	1
Dramatizations																			X	1
Making models																			X	1
Sensory activities (tracing in the sand)																			X	1
Rocking and reading																			X	1
Go for a walk while studying																	X		X	2
Educreation app																			X	1

Evaluation of findings

At the root of any qualitative research is the ability to identify themes within the data; however, it remains a mystery for the most part (Ryan & Bernard, 2003). Crabtree and Miller (1992) state, "deciding on a particular analytic approach depends on the goals of the analysis and the stage of the research" (p. 93). The data collected from this study was analyzed using an inductive thematic approach. An inductive approach is 'a process of coding the data without trying to fit it into a pre-existing coding frame or the researcher's analytic preconceptions' (Braun & Clarke 2006; p. 83). A Thematic analysis involves the researcher examining the collective themes that emerge from the data (Daly, Kellehear, & Gliksman, 1997), 'a method for identifying, analysing and reporting patterns (themes) within data' (Braun & Clarke 2006; p. 79). Upon reading and re-reading, iterative and reflect, the researcher identifies overlapping patterns, leading to categories for analysis (Fereday & Muir-Cochrane, 2006). Ryan and Bernard (2003) identified several techniques used in the discovery of themes: word repetition, indigenous categories, KWIC (key-words-in-context), compare and contrast, social science queries, searching for missing information, metaphors, and analogies, transitions, connectors, unmarked texts, pawing through text, cutting, and sorting. Most often, theme identification and its process is rarely discussed within research, except for the odd mention within a footnote or appendix (Ryan & Bernard, 2003). Whereas, coding (Yin, 2014) is the ability to identify passages or visuals that are linked together through common constructs (Gibbs, 2007; 2010).

In regards to the first round of questions, whereby teachers who met the criteria were asked to provide tools and strategies for students deemed visual, auditory, or kinesthetic learners, there were several different responses within each of the categories (tables, #3, table #4, table #5). Although most qualitative research yields volumes of text for analysis (Crabtree & Miller, 1992), the text gathered from this online survey was relatively minimal. Even the questions were designed to categorize the data into one of three categories, visual, auditory, and kinesthetic. Sub-themes were then identified within each of the three categories based upon the utility of each response, similar or thematic words, or subject matter. The themes that emerged from the categories and sub-themes are listed in the tables 10, 11 and 12, located below.

There were a number of sub-themes that emerged for each of the categories, visual, auditory, and kinesthetic. The first themes that emerged from question 1, (In your expert opinion, what are your recommendations for the best tools and strategies designed for working with visual students) as shown in Table 4 were; anchor charts (P13, P15, P17, P19), posters (P2, P11, P19) diagrams (P2, P13, P17, P19) visual schedules (P6, P9), written instructions (P9), video tutorials (P6, P17, P19), cartoons (P19) and illustrations (P17, P19) were given by participants. The second theme that emerged was the ability for a student to self-assess; power point presentations (P2, P11, P19), quick-pics (P17, P19). A Quick-Pic is a picture drawn by the student that allows them to remember a scene or important part of a book, movie or video (Learning Centre, 2015). The third theme that emerged was items that could be incorporated for the use of self-regulation, such as; creative visualization (P19), frequent check-ins (P9). The fourth theme that emerged were strategies that would enable the student to become more

organized, such as; checklists (P19), onscreen tracking (P19), calendar (P19), visual schedules (P19), graphic organizers (P19).

There were a number of sub-themes that emerged from question 2 (In your expert opinion, what are your recommendations for the best tools and strategies designed for working with auditory students?) as shown in Table 5 were; Audio recordings (P13, P18, headphones (P17), computer (P18), shortened lessons (P15), small group discussions (P9, P13, P17, P18), listening to instructions (P13, P18), close proximity to the teacher (P9, P11), online- in person read a-louds (P11, P17), verbal prompts (P11), auditory books (P17), app's for language (such as Khan Academy) (P11, P17, P18), frequent check-ins (P9), speech to text software (P6, P8), Google Read and Write (P6, P9, P18), verbal lessons (P2), movies (P2), auditory guest speakers (P2), open lectures (P2), concise expectations (P19), assessments completed auditorily (P15, P17, P19), music (P17, P19), Birmingham Grid (P17, P19), opportunity for debates (P19), chants (P19), orally read out flashcards (P19), math calculations read out-loud (P19).

There were a number of sub-themes that emerged from question 3 (In your expert opinion, what are your recommendations for the best tools and strategies designed for working with kinesthetic students?) as shown in Table 6 were, manipulatives (P2, P6, P9, P12, P18, P19), hands on materials (P2, P11, P12, P18), fidgets (P12, P17), hands on activities (P2, P8, P9, P12, P19), explore surroundings (P11, P12), multiple ways of assessments (examples dioramas-structures) (P12, P15, P17, P18), rubrics (P12, P18), open-ended questions (P11), inquiry projects (P11), group work (P9, P15), typing (P9), visual schedules (P6), movement breaks (P17), immediate rewards/feedback (P6), experiments (P2, P18), computer (P17), physical lessons (P19), use of exercise ball (17,

P18), body breaks (P6, P18), yoga and deep breathing exercises (P18), crafts (P19), puppets (P19), dramatization (P19), making models (P19), sensory activities (P19), rocking and reading (P19), walking while studying (P18, P19), Educreation app (P19), Smartboard activities (P19).

For students who were considered visual learners, the strategies presented most frequently were the use of diagrams, charts, graphic organizers, posters and illustrations. Of the four diagrams received the most recommendations. For students who were considered to be auditory learners, the strategies presented most frequently were online or in person read-a-louds, listening to instructions, speech-to-text software and Khan Academy ©, an online app for academic learning. Online or in person read-a-louds received the most recommendations of five. For students who were considered to be kinesthetic learnings, the strategies presented most frequently were the use of manipulatives, multiple ways of assessing students (dioramas-structures), and body breaks. Manipulatives received the most recommendation with seven votes.

Based upon the strategies provided, several themes emerged. Under each of the categories of visual, auditory and kinesthetic, the following list of themes were developed; using visual/auditory/kinesthetic aids in the classroom for instruction, allow students the opportunity to self- assess, strategies for self-regulation, organizational strategies, strategies to reinforce learning and online/technology app's.

Table 10

Themes that emerged from the analysis of the data from Round 1 questions

Categories	Themes	Tools and strategies
Visual	Use of visual aids in the classroom for instruction	anchor charts, posters, diagrams, visual schedules, written instructions, video

		tutorials, illustrations, cartoons
	Allowing students self-assessment	power point presentations, quick-pics
	Self-regulation	creative visualization, frequent check-ins
	Organization strategies	checklists, onscreen tracking, calendar, visual schedules, graphic organizers, highlighters
	Strategies to reinforce learning	flashcards, movies, picture dictionary
	Online app's (technology)	Khan academy ©, Read and Write
Auditory	Use of auditory aids in the classroom for instruction	audio recordings, computer, listen to lessons, small group instruction, close proximity to teacher, auditory books, auditory guest speakers, open lectures)
	Allowing students self-assessment	oral presentations, Birmingham Grid
	Self-regulation	headphones, verbal prompts, concise expectations, music
	Strategies to reinforce learning	read-aloud, auditory books, movies, debates, games, chants, flashcards, verbal math calculations
	Online app's (technology)	Khan Academy ©, Text to speech, Read and Write
Kinesthetic	Use of kinesthetic aids in the classroom for instruction	computer, manipulatives, materials, hands-on activities, physical lessons, Interactive Smartboard
	Allowing students self-assessment	dioramas, structures, rubrics, making models
	Self-regulation	fidgets, exploring surroundings, movement/ body breaks, immediate rewards/feedback, exercise ball, yoga and deep breathing, sensory activities- drawing in the sand, rock and read
	Organization strategies	visual schedule
	Strategies to reinforce	open-ended questions,

	learning	inquiry projects, experiments, crafts, puppets, dramatizations, walking while reading
	Online app's (technology)	Khan academy ©, Text to speech, Google Read and Write, typing, Educreation

Based upon qualitative analysis of the data that was generated (south, et al., 2016), from Round one questions, a further set of questions was developed for Round 2. The purpose of Round two questions was to delve deeper into the responses (Haughey, n.d; South et al., 2016) and for the purpose of this study, was to enable the participants to collate and summarize the previous responses providing a ranking of the tools and strategies.

The IRB committee was asked to review the questions for round two of this e-Delphi study. Upon approval, the link to the questionnaire was sent out through the same recruiter as used in Round one. The second round of questions provided each participant with a full record of previous responses (Haughey, nd) in no particular order. The participants were unaware of the number of times each tool or strategies was given in round one responses. The questions were administered in exactly the same way as Round 1 questions, through SurveyMonkey©. Each of the questions were presented in the form of a drop down menu. Each of the participants was asked to rank each tool or strategy in order of its effectiveness. Each response was given only one value. The participants were emailed the link to the survey as previously completed in round one and each participant was asked to review the consent forms once again. Only after the participants acknowledged their agreement to consent to participate, were they lead to the next round

of questions. Round two questions were constructed based upon the emerging themes and consisted of the following 18 questions:

How would you rank the effectiveness of each of the following strategies for a visual learner?

1. Use of visual aids in the classroom for instruction (anchor charts, posters, diagrams, visual schedules, written instructions, video tutorials, illustrations
2. Allowing students self- assessment (power point presentations, quick-pics)
3. Self-regulation (creative visualization, frequent check-ins)
4. Organization strategies (checklists, onscreen tracking, calendar, visual schedules, graphic organizers)
5. Strategies to reinforce learning (flashcards, movies, picture dictionary)
6. Online app's (Khan academy ©, Google Read and Write)

How would you rank the effectiveness of each of the following strategies for an auditory learner?

7. Use of auditory aids in the classroom for instruction (audio recordings, computer, listen to lessons, small group instruction, close proximity to teacher, auditory books, auditory guest speakers, open lectures)
8. Allowing students self- assessment (oral presentations, Birmingham Grid)
9. Self-regulation (headphones, verbal prompts, concise expectations, music)
10. Organization strategies (no strategies provided)
11. Strategies to reinforce learning (read-aloud, auditory books, movies, debates, games, chants, flashcards, verbal math calculations)
12. Online app's (Khan academy ©, Text to speech, Google Read and Write)

How would you rank from most effectiveness to least effective, each of the following strategies for a kinesthetic learner?

13. Use of kinesthetic aids in the classroom for instruction (computer, manipulatives, materials, hands-on activities, physical lessons, Interactive Smartboard)
14. Allowing students self- assessment (dioramas, structures, rubrics, making models)
15. Self-regulation (fidgets, exploring surroundings, movement/ body breaks, immediate rewards/feedback, exercise ball, yoga and deep breathing, sensory activities- drawing in the sand, rock and read)
16. Organization strategies (only one strategy was provided, visual schedule)
17. Strategies to reinforce learning (open-ended questions, inquiry projects, experiments, crafts, puppets, dramatizations, walking while reading)
18. Online App's: (Online app's (Khan academy ©, Text to speech, Read and Write, typing, Educreation).

The survey questions were accessible for 2 weeks as allotted for round one questions. Although 13 people consented to completing the study, 10 participants provided ranking for each of the 18 questions. Three participants skipped all 18 questions. The results of round two questionnaires were statistically analysed and frequency and percentages are presented below. From the data collected, the following charts and graphs were completed using SurveyMonkey© and Grovo.com.

Round 2 results

Question 1: Visual Learners: Please rank the following strategies for effectiveness: Use of visual aids in the classroom for instruction.

Table 11

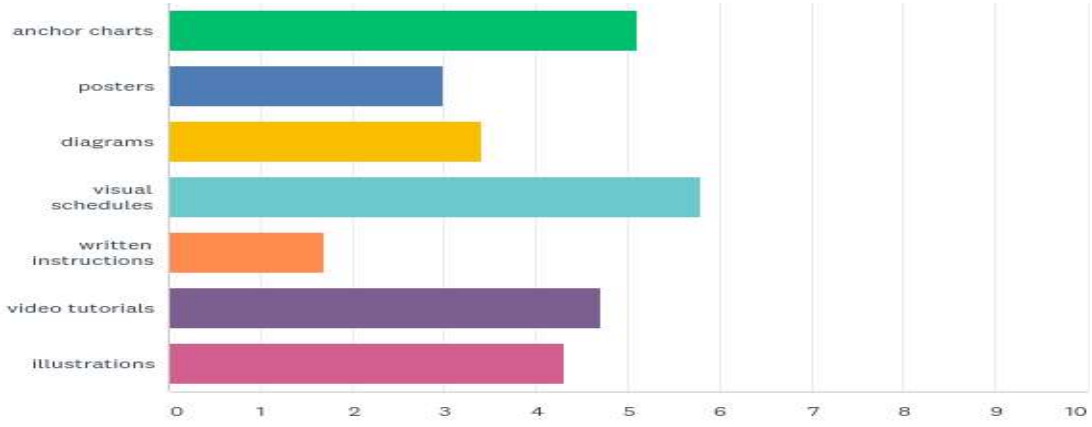
Summary of responses given in percentiles for Research question 1

	1	2	3	4	5	6	7	TOTAL	SCORE
anchor charts	10.00% 1	50.00% 5	10.00% 1	10.00% 1	10.00% 1	10.00% 1	0.00% 0	10	5.10
posters	0.00% 0	0.00% 0	30.00% 3	0.00% 0	20.00% 2	40.00% 4	10.00% 1	10	3.00
diagrams	0.00% 0	0.00% 0	30.00% 3	20.00% 2	20.00% 2	20.00% 2	10.00% 1	10	3.40
visual schedules	50.00% 5	20.00% 2	0.00% 0	20.00% 2	10.00% 1	0.00% 0	0.00% 0	10	5.80
written instructions	0.00% 0	0.00% 0	10.00% 1	0.00% 0	10.00% 1	10.00% 1	70.00% 7	10	1.70
video tutorials	40.00% 4	10.00% 1	10.00% 1	0.00% 0	10.00% 1	20.00% 2	10.00% 1	10	4.70
illustrations	0.00% 0	20.00% 2	10.00% 1	50.00% 5	20.00% 2	0.00% 0	0.00% 0	10	4.30

Images provided by SurveyMonkey©

Graph 1

Summary of responses given in percentiles for Research question 1



Images provided by SurveyMonkey©

Question 2: Visual Learners: Please rank the following strategies for effectiveness: Self-assessment strategies

Table 12

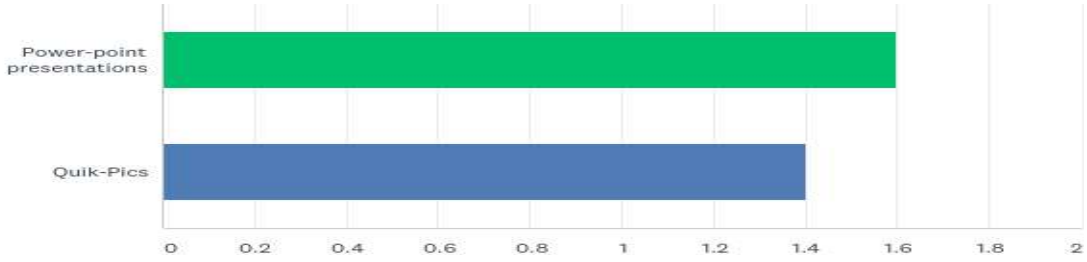
Summary of responses given in percentiles for Research question 2

	1	2	TOTAL	SCORE
Power-point presentations	60.00% 6	40.00% 4	10	1.60
Quik-Pics	40.00% 4	60.00% 6	10	1.40

Images provided by SurveyMonkey©

Graph 2

Summary of responses given in percentiles for Research question 2



Images provided by SurveyMonkey©

Question 3: Visual Learners: Please rank the following: self- regulation strategies

Table 13

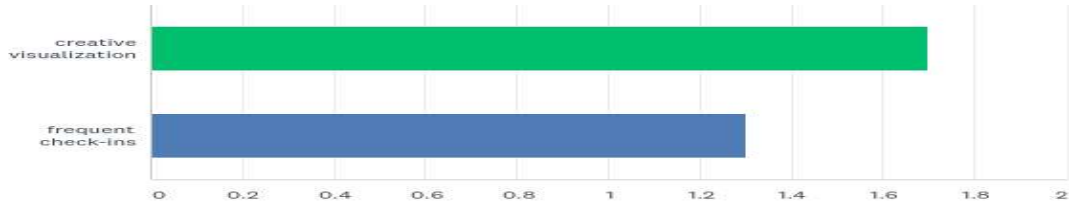
Summary of responses given in percentiles for Research question 3

	1	2	TOTAL	SCORE
creative visualization	70.00% 7	30.00% 3	10	1.70
frequent check-ins	30.00% 3	70.00% 7	10	1.30

Images provided by SurveyMonkey©

Graph 3

Summary of responses given in percentiles for Research question 3



Images provided by SurveyMonkey©

Question 4: Visual Learners: Please rank the following: Organizational strategies

Table 14

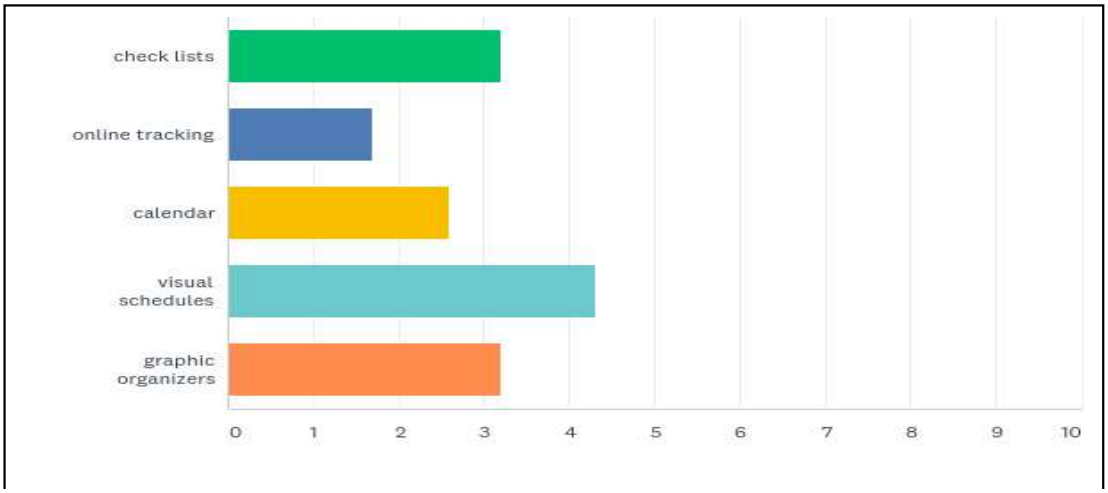
Summary of responses given in percentiles for Research question 4

	1	2	3	4	5	TOTAL	SCORE
check lists	20.00% 2	10.00% 1	40.00% 4	30.00% 3	0.00% 0	10	3.20
online tracking	0.00% 0	10.00% 1	10.00% 1	20.00% 2	60.00% 6	10	1.70
calendar	10.00% 1	20.00% 2	10.00% 1	40.00% 4	20.00% 2	10	2.60
visual schedules	60.00% 6	20.00% 2	10.00% 1	10.00% 1	0.00% 0	10	4.30
graphic organizers	10.00% 1	40.00% 4	30.00% 3	0.00% 0	20.00% 2	10	3.20

Images provided by SurveyMonkey©

Graph 4

Summary of responses given in percentiles for Research question 4



Images provided by SurveyMonkey©

Question 5: Visual Learners: Please rank the following: strategies to reinforce learning

Table 15

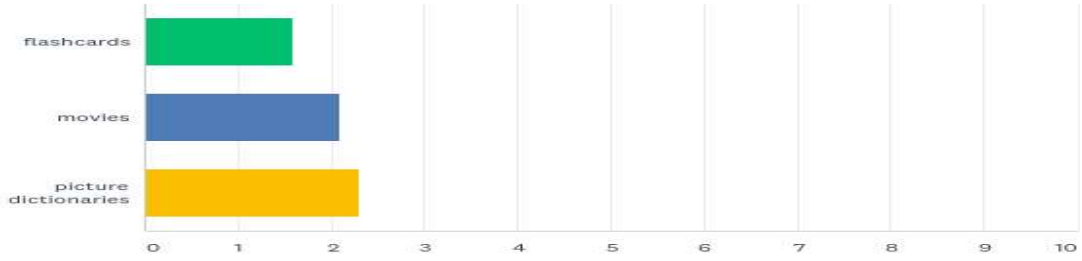
Summary of responses given in percentiles for Research question 5

	1	2	3	TOTAL	SCORE
flashcards	0.00% 0	60.00% 6	40.00% 4	10	1.60
movies	50.00% 5	10.00% 1	40.00% 4	10	2.10
picture dictionaries	50.00% 5	30.00% 3	20.00% 2	10	2.30

Images provided by SurveyMonkey©

Graph 5

Summary of responses given in percentiles for Research question 5



Images provided by SurveyMonkey©

Question 6: Please rank the following Online app's (Khan academy ©, Google Read and Write)

Table 16

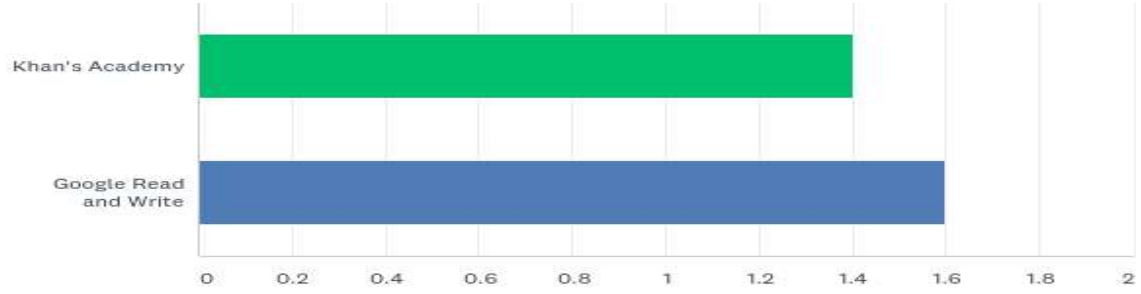
Summary of responses given in percentiles for Research question 6

	1	2	TOTAL	SCORE
Khan's Academy	40.00% 4	60.00% 6	10	1.40
Google Read and Write	60.00% 6	40.00% 4	10	1.60

Images provided by SurveyMonkey©

Graph 6

Summary of responses given in percentiles for Research question 6



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Question 7: Auditory Learners: Please rank the following: use of auditory aids in the classroom for instruction

Table 17

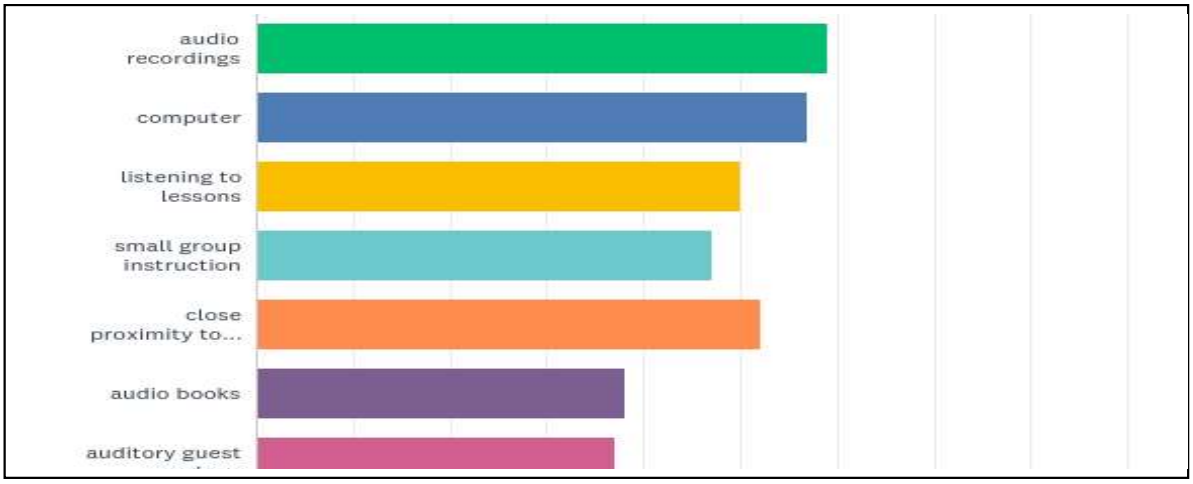
Summary of responses given in percentiles for Research question 7

	1	2	3	4	5	6	7	8	TOTAL	SCORE
audio recordings	20.00% 2	20.00% 2	20.00% 2	20.00% 2	10.00% 1	10.00% 1	0.00% 0	0.00% 0	10	5.90
computer	30.00% 3	10.00% 1	10.00% 1	10.00% 1	30.00% 3	10.00% 1	0.00% 0	0.00% 0	10	5.70
listening to lessons	10.00% 1	0.00% 0	40.00% 4	10.00% 1	20.00% 2	10.00% 1	10.00% 1	0.00% 0	10	5.00
small group instruction	20.00% 2	30.00% 3	10.00% 1	0.00% 0	0.00% 0	0.00% 0	0.00% 0	40.00% 4	10	4.70
close proximity to teacher	10.00% 1	30.00% 3	10.00% 1	20.00% 2	0.00% 0	10.00% 1	20.00% 2	0.00% 0	10	5.20
audio books	10.00% 1	0.00% 0	0.00% 0	10.00% 1	30.00% 3	40.00% 4	0.00% 0	10.00% 1	10	3.80
auditory guest speakers	0.00% 0	10.00% 1	10.00% 1	20.00% 2	0.00% 0	20.00% 2	40.00% 4	0.00% 0	10	3.70
open lectures	0.00% 0	0.00% 0	0.00% 0	10.00% 1	10.00% 1	0.00% 0	30.00% 3	50.00% 5	10	2.00

Images provided by SurveyMonkey©

Graph 7

Summary of responses given in percentiles for Research question 7



Images provided by SurveyMonkey©

Question 8: Auditory Learners: Please rank the following: Allowing students to self-assess

Table 18

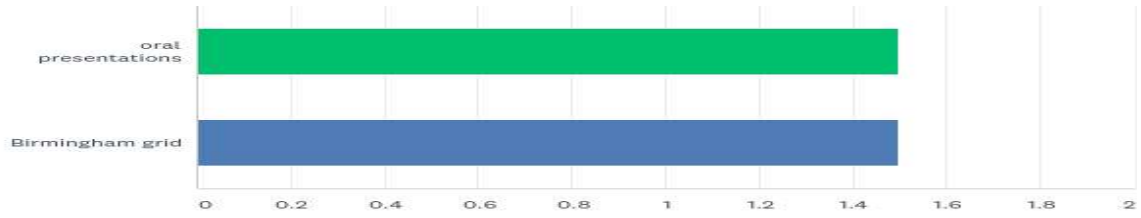
Summary of responses given in percentiles for Research question 8

	1	2	TOTAL	SCORE
oral presentations	50.00% 5	50.00% 5	10	1.50
Birmingham grid	50.00% 5	50.00% 5	10	1.50

Images provided by SurveyMonkey©

Graph 8

Summary of responses given in percentiles for Research question 8



Images provided by SurveyMonkey©

Question 9: Auditory Learners: Please rank the following: for self- regulation

Table 19

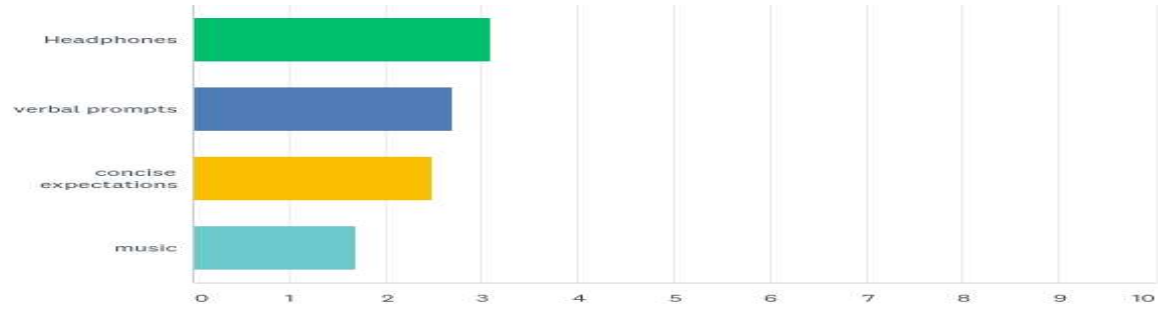
Summary of responses given in percentiles for Research question 9

	1	2	3	4	TOTAL	SCORE
Headphones	60.00% 6	10.00% 1	10.00% 1	20.00% 2	10	3.10
verbal prompts	10.00% 1	60.00% 6	20.00% 2	10.00% 1	10	2.70
concise expectations	30.00% 3	10.00% 1	40.00% 4	20.00% 2	10	2.50
music	0.00% 0	20.00% 2	30.00% 3	50.00% 5	10	1.70

Images provided by SurveyMonkey©

Graph 9

Summary of responses given in percentiles for Research question 9



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Question 10: Auditory Learners: There were no responses given for organizing

Question 11: Auditory Learners: Please rank the following: strategies to reinforce learning

Table 20

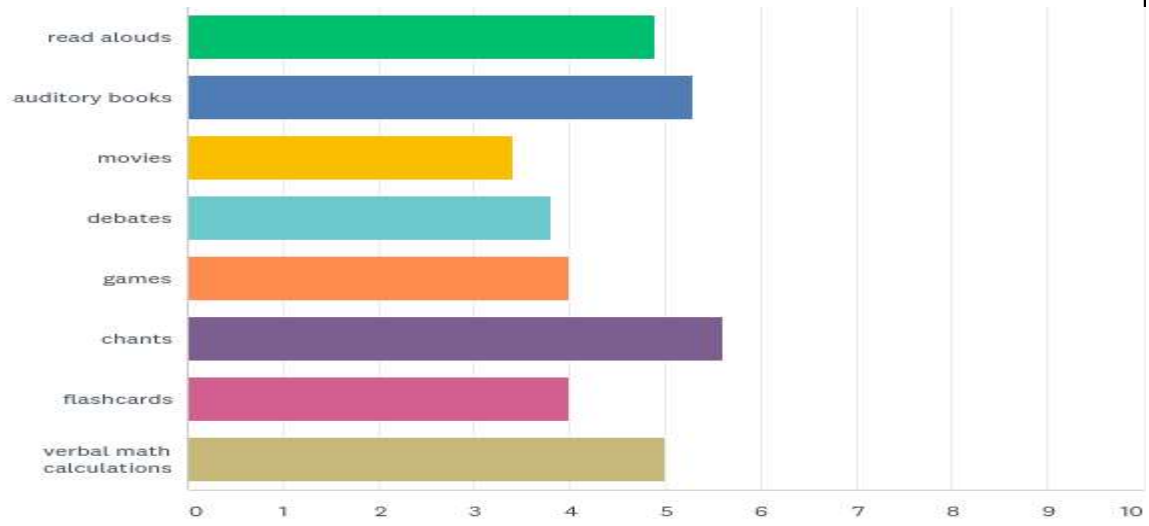
Summary of responses given in percentiles for Research question 10

	1	2	3	4	5	6	7	8	TOTAL	SCORE
read alouds	10.00% 1	20.00% 2	20.00% 2	0.00% 0	20.00% 2	10.00% 1	20.00% 2	0.00% 0	10	4.90
auditory books	20.00% 2	20.00% 2	20.00% 2	0.00% 0	0.00% 0	30.00% 3	10.00% 1	0.00% 0	10	5.30
movies	10.00% 1	10.00% 1	10.00% 1	0.00% 0	0.00% 0	10.00% 1	40.00% 4	20.00% 2	10	3.40
debates	20.00% 2	0.00% 0	10.00% 1	0.00% 0	20.00% 2	10.00% 1	10.00% 1	30.00% 3	10	3.80
games	10.00% 1	0.00% 0	10.00% 1	30.00% 3	10.00% 1	10.00% 1	10.00% 1	20.00% 2	10	4.00
chants	20.00% 2	10.00% 1	20.00% 2	30.00% 3	10.00% 1	0.00% 0	10.00% 1	0.00% 0	10	5.60
flashcards	10.00% 1	10.00% 1	0.00% 0	30.00% 3	10.00% 1	10.00% 1	0.00% 0	30.00% 3	10	4.00
verbal math calculations	0.00% 0	30.00% 3	10.00% 1	10.00% 1	30.00% 3	20.00% 2	0.00% 0	0.00% 0	10	5.00

Images provided by SurveyMonkey©

Graph 10

Summary of responses given in percentiles for Research question 10



Images provided by SurveyMonkey©

Question 12: Auditory Learners: Please rank the following: for online apps

Table 21

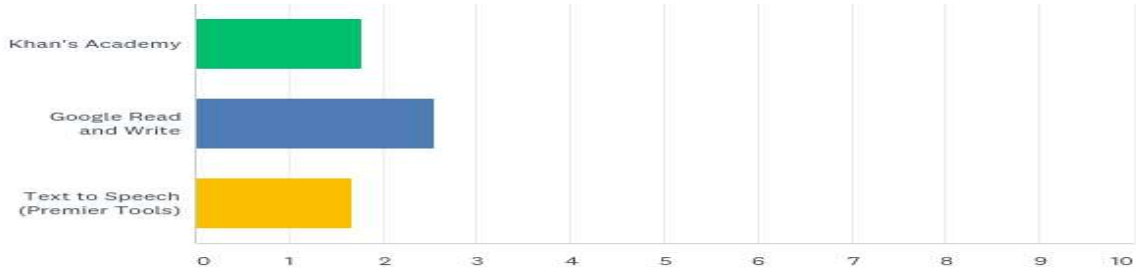
Summary of responses given in percentiles for Research question 11

	1	2	3	TOTAL	SCORE
Khan's Academy	11.11% 1	55.56% 5	33.33% 3	9	1.78
Google Read and Write	66.67% 6	22.22% 2	11.11% 1	9	2.56
Text to Speech (Premier Tools)	22.22% 2	22.22% 2	55.56% 5	9	1.67

Images provided by SurveyMonkey©

Graph 11

Summary of responses given in percentiles for Research question 11



Images provided by SurveyMonkey©

Question 13: Kinesthetic Learners: Please rank the following: strategies for kinesthetic aids in the classroom for instruction

Table 22

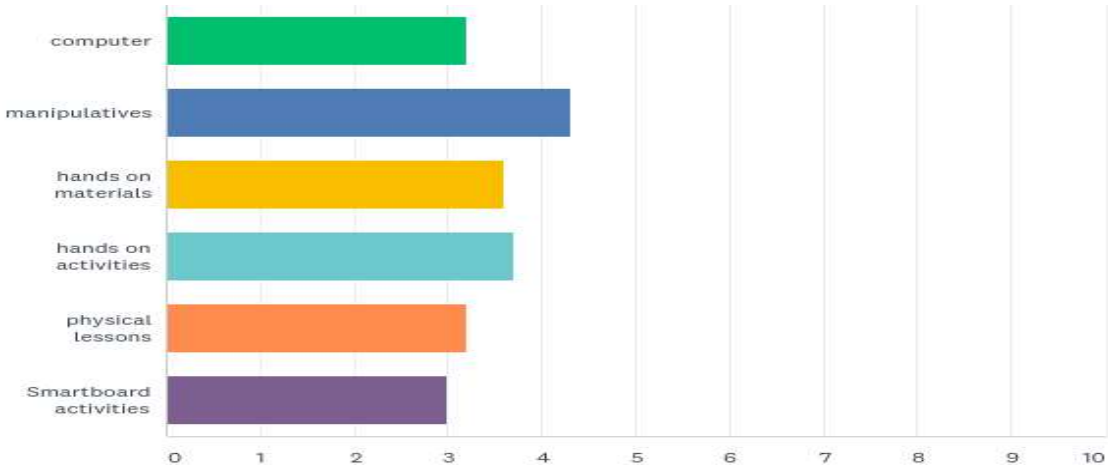
Summary of responses given in percentiles for Research question 12

	1	2	3	4	5	6	TOTAL	SCORE
computer	40.00% 4	0.00% 0	0.00% 0	0.00% 0	20.00% 2	40.00% 4	10	3.20
manipulatives	20.00% 2	40.00% 4	0.00% 0	30.00% 3	10.00% 1	0.00% 0	10	4.30
hands on materials	10.00% 1	0.00% 0	50.00% 5	20.00% 2	20.00% 2	0.00% 0	10	3.60
hands on activities	0.00% 0	30.00% 3	20.00% 2	40.00% 4	10.00% 1	0.00% 0	10	3.70
physical lessons	20.00% 2	0.00% 0	30.00% 3	10.00% 1	10.00% 1	30.00% 3	10	3.20
Smartboard activities	10.00% 1	30.00% 3	0.00% 0	0.00% 0	30.00% 3	30.00% 3	10	3.00

Images provided by SurveyMonkey©

Graph 12

Summary of responses given in percentiles for Research question 12



Images provided by SurveyMonkey©

Question 14: Kinesthetic Learners: Please rank the following: student self-assessment

Table 23

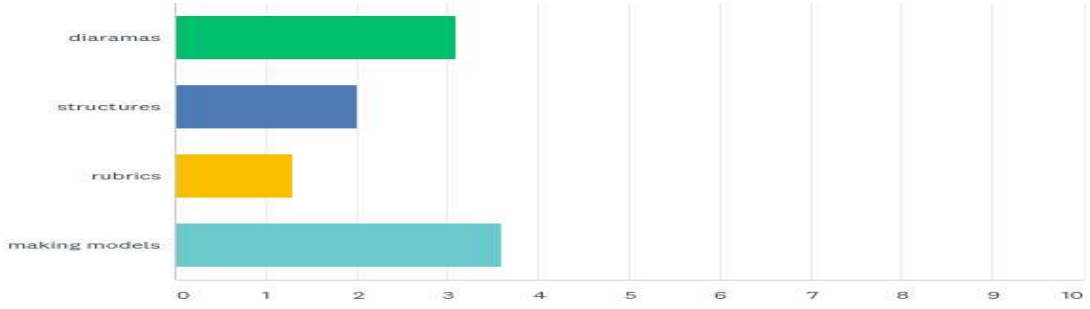
Summary of responses given in percentiles for Research question 13

	1	2	3	4	TOTAL	SCORE
diaramas	20.00% 2	70.00% 7	10.00% 1	0.00% 0	10	3.10
structures	0.00% 0	10.00% 1	80.00% 8	10.00% 1	10	2.00
rubrics	10.00% 1	0.00% 0	0.00% 0	90.00% 9	10	1.30
making models	70.00% 7	20.00% 2	10.00% 1	0.00% 0	10	3.60

Images provided by SurveyMonkey©

Graph 13

Summary of responses given in percentiles for Research question 13



Images provided by SurveyMonkey©

Question 15: Kinesthetic Learners: Please rank the following: strategies for self – regulation

Table 24

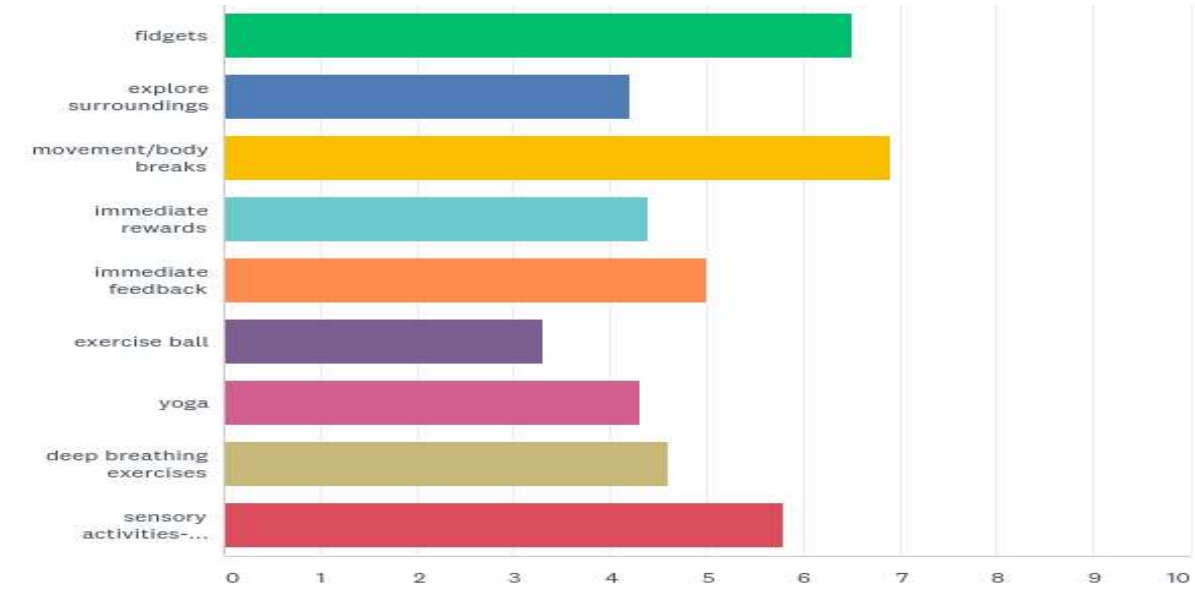
Summary of responses given in percentiles for Research question 15

	1	2	3	4	5	6	7	8	9	TOTAL	SCORE
fidgets	20.00% 2	30.00% 3	20.00% 2	10.00% 1	0.00% 0	0.00% 0	0.00% 0	10.00% 1	10.00% 1	10	6.50
explore surroundings	10.00% 1	10.00% 1	0.00% 0	20.00% 2	10.00% 1	0.00% 0	10.00% 1	10.00% 1	30.00% 3	10	4.20
movement/body breaks	50.00% 5	10.00% 1	10.00% 1	0.00% 0	0.00% 0	10.00% 1	10.00% 1	10.00% 1	0.00% 0	10	6.90
immediate rewards	20.00% 2	10.00% 1	0.00% 0	10.00% 1	10.00% 1	0.00% 0	0.00% 0	20.00% 2	30.00% 3	10	4.40
immediate feedback	0.00% 0	10.00% 1	30.00% 3	10.00% 1	0.00% 0	30.00% 3	0.00% 0	10.00% 1	10.00% 1	10	5.00
exercise ball	0.00% 0	10.00% 1	0.00% 0	10.00% 1	0.00% 0	0.00% 0	40.00% 4	30.00% 3	10.00% 1	10	3.30
yoga	0.00% 0	0.00% 0	0.00% 0	10.00% 1	30.00% 3	40.00% 4	20.00% 2	0.00% 0	0.00% 0	10	4.30
deep breathing exercises	0.00% 0	10.00% 1	0.00% 0	20.00% 2	30.00% 3	20.00% 2	0.00% 0	10.00% 1	10.00% 1	10	4.60
sensory activities- such as drawing in the sand or rock and read	0.00% 0	10.00% 1	40.00% 4	10.00% 1	20.00% 2	0.00% 0	20.00% 2	0.00% 0	0.00% 0	10	5.80

Images provided by SurveyMonkey©

Graph 14

Summary of responses given in percentiles for Research question 14



Images provided by SurveyMonkey©

Question 16: Kinesthetic Learners: No Table of Graph, only one answer was given

Question 17: Kinesthetic Learners: Please rank the following: to reinforce learning

Table 25

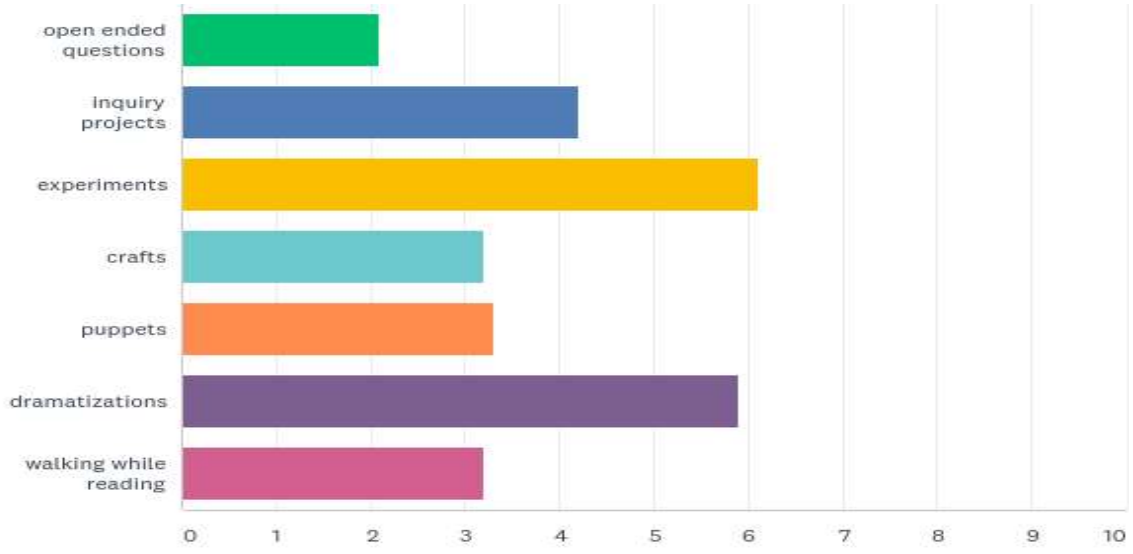
Summary of responses given in percentiles for Research question 17

	1	2	3	4	5	6	7	TOTAL	SCORE
open ended questions	0.00% 0	10.00% 1	0.00% 0	10.00% 1	0.00% 0	30.00% 3	50.00% 5	10	2.10
inquiry projects	20.00% 2	10.00% 1	10.00% 1	0.00% 0	50.00% 5	10.00% 1	0.00% 0	10	4.20
experiments	50.00% 5	20.00% 2	20.00% 2	10.00% 1	0.00% 0	0.00% 0	0.00% 0	10	6.10
crafts	0.00% 0	0.00% 0	10.00% 1	30.00% 3	30.00% 3	30.00% 3	0.00% 0	10	3.20
puppets	0.00% 0	10.00% 1	20.00% 2	20.00% 2	10.00% 1	20.00% 2	20.00% 2	10	3.30
dramatizations	30.00% 3	40.00% 4	20.00% 2	10.00% 1	0.00% 0	0.00% 0	0.00% 0	10	5.90
walking while reading	0.00% 0	10.00% 1	20.00% 2	20.00% 2	10.00% 1	10.00% 1	30.00% 3	10	3.20

Images provided by SurveyMonkey©

Graph 15

Summary of responses given in percentiles for Research question 17



Images provided by SurveyMonkey©

Question 18: Kinesthetic Learners: Please rank the following; Online apps

Table 26

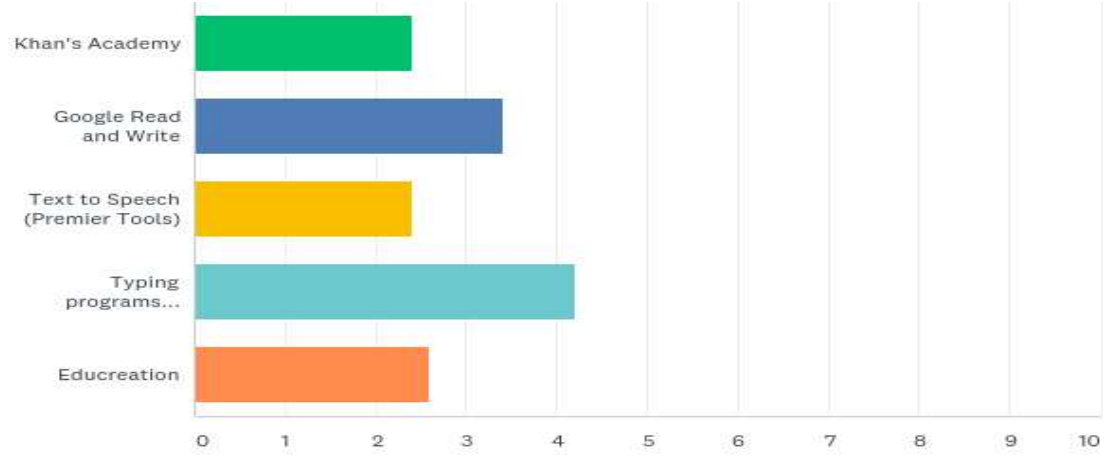
Summary of responses given in percentiles for Research question 18

	1	2	3	4	5	TOTAL	SCORE
Khan's Academy	0.00% 0	30.00% 3	20.00% 2	10.00% 1	40.00% 4	10	2.40
Google Read and Write	20.00% 2	20.00% 2	40.00% 4	20.00% 2	0.00% 0	10	3.40
Text to Speech (Premier Tools)	0.00% 0	20.00% 2	10.00% 1	60.00% 6	10.00% 1	10	2.40
Typing programs (Dancemat typing)	70.00% 7	0.00% 0	20.00% 2	0.00% 0	10.00% 1	10	4.20
Educreation	10.00% 1	30.00% 3	10.00% 1	10.00% 1	40.00% 4	10	2.60

Images provided by SurveyMonkey©

Graph 16

Summary of responses given in percentiles for Research question 18



Images completed using SurveyMonkey©

Findings that emerged from the data analysis were compared to those presented in the literature review. Although differentiated instruction was heavily represented throughout the literature review (Gardner, 1973, 2004, 2006, 2008, 2009, 2011), tools and strategies named within the research study, were not mentioned explicitly. Of the seven tools and strategies that were provided from question 1, aids for visual learners in the classroom, visual schedules, anchor charts and video tutorials were ranked the top three. Gardner (1973, 2004, 2006, 2008, 2009, 2011) believed that visual-spatial learners think best in physical spatial terms and could better demonstrate their learning through the use of charts, graphs, videos and pictures.

Question two focused on providing visual learners with the ability to demonstrate their learning through self-assessment. There were two strategies provided by the experts, the use of PowerPoint© presentations and the use of Quick-Pic's. Although a study completed by Bostrom (2012) suggests that students perceptions of themselves as a learner did not match their true learning styles, a study completed by Houff, Klinger and Coffman (2015) stated students learn more effectively when they are provided with relevant opportunities that focus on their strengths. This may indicate the teacher requiring a better understanding of their learners, ways to determine their strengths and needs.

Question three focused on providing visual learners with the ability to self-regulate. There were two tools and strategies provided, creative visualization and frequent check-ins. Snowing & Hulme, 2011 stated, students with ADHD had the worst grades, high dropout rates, and were more likely to be placed on academic probation. Cooley (2007) stated that teachers should provide frequent check-ins as an

accommodation to reduce anxiety, prompt students to stay on task and help those students who struggle. In contrast, have the student check-in with you if they are having trouble.

The results from question four provided five tools and strategies for visual learners to enhance their organizational strategies. The top three statistically were the use of visual schedules, graphic organizers, and checklists. Budd et al., stated, due to poor time management many of these students are unable to complete tasks on time. As the classroom teacher, incorporating these tools and strategies may enable students to stay in the learning zone for a greater length of time.

Question five looked at providing visual learners with tools and strategies to reinforce learning. There were three strategies provided from the expert panel. Statistically they ranked in order of picture dictionary, watching movies, and the use of flashcards. Gardner (2004) believed that visual students required the use of models, videos, and pictures to reinforce learning.

There were two responses provided by the experts concerning online applications to enhance student learning, of neither which could be classified as an app, Khan's Academy© and Google Read and Write©. Khan's Academy© is a non-profit educational organization that provides tools to help educate students. Its founder, educator Salman Khan, provides educators with short online videos to assist students. Google Read and Write© is an extension through Google© products. The software extension enables students with low literacy skills to create documents using oral recordings and read back features, as well as a number of other capabilities.

In response to question seven, which looked at enhancing instruction for the auditory learner, eight responses were given. Of the eight, the top three statistically were

the use of audio recordings, the use of a computer and close proximity to the teacher. Dietze and Kashin (2013) stated that children come to school with the knowledge and experience of technology and this can be a great launching opportunity to improve teaching and learning practices. Furthermore, the authors state that when students are given the opportunity to play with, use, and examine technology in various settings, they become facilitators their own learning.

Question eight asked experts to weigh in on tools and strategies to allow auditory learners to self-assess. There were two responses given, the use of oral presentations and The Birmingham Grid©. The Birmingham Grid© is a website where students can log on and determine where their strengths are based upon Gardner's Multiple Intelligences. Abdulkader, Gundogdu, & Eissa (2009) studied the effectiveness of Multiple Intelligence and tailor made instructions. Findings indicated students who received instruction geared to their predominant intelligence, and were diagnosed with a learning disability; effectively improved their reading comprehension and word recognition skills, however, students in the controlled group had also increased their word recognition skills. Gardner (2004) stated students whose strength lie in linguistics, demonstrated their understanding of knowledge while using words.

The tools and strategies that were ranked for question nine were based upon the auditory learner and their ability to self-regulate. Of the four strategies that were provided, the top three statistically were headphones, verbal prompts, and concise expectations. Algozzine et al., (2012) investigated the coexistence of ADD, ADHD, Conduct Disorder and learning disabilities and the impact on academic skills. The researchers determined it was not the disability that appeared to be limiting the students'

academic ability but rather, ineffective instruction, and/or inability to stay focused. Adelman et al., (2012), agreed with this assumption.

In response to question 10, there were no tools and strategies provided for helping the auditory learner with organizational strategies, however, there were several tools and strategies to help the visual learner and only one strategy was provided for the kinesthetic learners. Question 11 focused on obtaining tools and strategies for auditory learners to reinforce their learning. Of the 8 tools and strategies provided the top three were chants, auditory books, and verbal math calculations. Gardner (2004) stated that students with strengths in mathematics learn best when experimenting and investigating. Combined with a student who is auditory, having students use their words to think through the problem is advised. Gardner (2004) also recommends the use of chants, as students love beats and speaking rhythmically. The use of assistive technology has provided students with the ability listen to auditory book enabling them to hear read-a-louds by many actors, authors, and illustrators (Belo, et al., 2016). Many studies have pointed to the benefits of assistive technology, and auditory books to enhance language development (Abrami, Meyer, & Wade, 2013; Cviko, McKenney & Voogt, 2012).

In response to question 12, there were three tools and strategies provided for the auditory learner and technology: Khan's academy©, Google Read and Write© and text to speech software. These same strategies were provided in response to visual learners, with the exception of text to speech software. Mull and Sitlington (2003) stated it is important for students with learning disabilities to have access to assistive technology, as technology helps students to compensate for their particular area of difficulty.

Kinesthetic learners were the focus of the next set of questions with regards to the

six themes. Question 13 focused on providing kinesthetic learners with aids to enhance classroom instruction. Statistically the highest three tools and strategies were; providing manipulatives, hands on activities, and hands on materials. While the focus for question 14 was the use of self-assessments for the kinesthetic learner. Of the four tools and strategies provided the top three were, making models, creating dioramas, and building structures. Carbonell, (2013) stated, "A new vision of the learner as an active sense-maker suggesting new instructional methods that emphasize discussion, as well as hands on activity is the mantra of the constructivist revolution" (p. 31). Gardner (2004) stated that kinesthetic learners learn best when they can communicate through touch.

Question 15 had nine tools and strategies to aid kinesthetic learners with self-regulation. Of the nine strategies, the top three statistically were body or movement breaks, fidgets and sensory activities. Greenspan & Greenspan (2010) stated traditional techniques fail to incorporate the use of multi-sensory techniques. Houff, Klinger & Coffman, (2015) stated that teacher who incorporate the use of brain based learning incorporate a holistic approach to instruction, providing students with a multi-process to learning.

As mentioned previously, only one strategy was provided for kinesthetic learners to aid with organization, which was the use of a visual schedule. Tools and strategies to reinforce learning for the kinesthetic learner were the following; open-ended questions, inquiry projects, experiments, crafts, puppets, dramatizations, walking while reading, however the top three statistically were experiments, dramatizations and inquiry projects. Dietze & Kashin (2012) stated, there is a lack of professional learning surrounding technology and inquiry projects which may attribute to its lack of use. Gardner (2004)

suggests that role playing and acting out is strength to aid in educating the bodily-kinesthetic learner.

In response to question 18, which was the use of technology and online apps to aid in helping kinesthetic learners, there were five responses provided. The top three statistically were, typing programs, Google Read and Write© and Educreation©. Educreation© is an online app that will turn your iPad into a recordable device, allowing students to record their voices. The app allows students to create their own videos, record their handwriting, insert pictures, and share their work online (www.appsinclass.com/educreations.html).

Summary

For the purpose of this study, a qualitative e-Delphi approach was selected. The study was to provide teachers with proven tools and strategies that would enable all students within the general classroom, an equal and equitable opportunity to access the curriculum. The qualifying participants included teachers who met the eligibility criteria, teaching for at least seven years, worked with students diagnosed with a learning disabilities for a minimum of five years and have completed an additional qualification course, Special Education Part 1. If the teacher was retired for more than 3 years, they must still work within the educational field. There were no demographics collected on the participants, as this was a completely anonymous study.

In the first round of open-ended questions, participants were asked to provide tools and strategies for students considered predominantly visual, auditory, or kinesthetic. The data collection for this study began with the analysis of these three open-ended questions retrieved using SurveyMonkey©. The responses were then categorized,

themed, and coded in order to construct round two questions for this study (Yin, 2014). Each response was compiled and tabulated into a table (Creswell, 2013). The second round of questions (18), ranked in order of efficacy, the list of tools and strategies provided by the first round of questions.

Of the 18 questions that were asked for each of the three categories, visual, auditory, and kinesthetic, technology was a tool that was repeated throughout. Haq (2015) states that technology has been used for intervention purposes, enabling students to access more academic tasks. Campigotto, McEwen, & Demmans Epp, (2013) state that research is beginning to suggest that technology is becoming a vital tool to aid in helping students with academics, and Belo, McKenney, Voogt, & Bradley (2016) state that electronics has provided a positive benefit with the combination of literacy and technology (Beschorner & Hutchison, 2013). However, more studies are needed (Belo et al., 2016; Cordero et al., 2015: Haq, 2015).

All ethical guidelines were created to ensure the health, safety, and well-being of all participants were met (NCU. IRB Confidentiality and Anonymity, 2014). Each participant received a copy of the informed consent prior to the completion of the survey (Alby et al., 2014). The data collection was completed in a manner that ensured all participant anonymity, as all anonymity buttons were selected on SurveyMonkey©.

Chapter 5: Implications, Recommendations, and Conclusions

The problem addressed in this e-Delphi study was the lack of teacher resources, to ensure students an equal and equitable access to the curriculum. Teachers must now prove they have incorporated a number of proven tools and strategies that would enable all students' academic success, prior to obtaining the diagnosis of a learning disability (Al-Yagon, et al, 2013, Tannock, 2014). With the development and new criteria as outlined within the DSM-V, teachers, along with clinicians, school staff, and psychologist will require a more rigorous approach to their interventions, prior to accessing the special education department (Al-Yagon, et al., 2013; Tannock, 2014). This is to ensure that the gap in learning is not due to traditional, antiquated teaching techniques (Demailes, 2008, Gardner, 2004, 2008, 2009, 2012), that fail to incorporate the use of multi-sensory (Greenspan & Greenspan, 2015), holistic approach (Houff, Klinger & Coffman, 2015) to instructions.

The purpose of this non-experimental, qualitative method, e-Delphi study was to elicit expert consensus (Heitner, Kahn & Sherman, 2013; Salancik, Wenger, & Helfer, 1971) for the most effective tools and strategies that would enable all students within the general classroom, a fair and equitable access to curriculum. This study incorporated the use of a snowball methodology which solicited samplings restricted to those pundits, who have worked a minimum of seven years as educators, with five of those years working extensively with students diagnosed with a learning disability and must of completed an additional qualification course in Special Education. A snowball sampling is a sampling procedure whereby the researcher identifies a number of qualified participants who meet the desired qualifications and asks those participants to identify other members (Creswell,

2014). In the case of an e-Delphi study, the qualifications pertain to experts, individuals who are considered knowledgeable about the subject being investigated (Hsu et al, 2007). The identification of appropriate stakeholders for this study was solicited based upon, individuals who have credibility among the target audience, as noted by their years of experience working with struggling students (Pinsen et al., 2014). The initial email was sent out through a recruiter, who did not participate in the survey. The participants received an invitation email via the recruiter, with the eligibility requirements, and a link to the survey. Those eligible participants were then asked to provide their most effective tools and strategies currently being implemented with effective results, using SurveyMonkey ©. There were two rounds of questions in total. The first survey questionnaire consisted of three open-ended questions, allowing the participants to focus on tools and strategies for the visual, auditory, and kinesthetic learners. These questions were driven by an extensive review of the literature. The results from the first round of questions were analyzed and used to construct the final round of survey questions that included the ranking of the results, and further consensus. Links to round two questions were sent out via the recruiter from the first round, only after IRB approval was obtained. Rationales for the responses of the participants were not solicited. Upon publication of the study, each participant will receive a copy of the final analysis. The researcher used the results of this study to provide a list of tools and strategies that could be incorporated into the general classroom prior to accessing the special education department for student identification.

Implications

The implications of this study, in relation to the research questions are discussed below. Prospective factors from the collected data are presented with the recommendations for current practices, in the general classroom and future research. This chapter will conclude with a summary.

As of May 18th, 2013, the DSM-V criteria to determine if and when a teacher may access the special education department, to diagnosis a student with a learning disability had changed (International Dyslexia Association, 2014). The purpose of this study was to provide teachers with proven tools and strategies that would enable all students within the general classroom access to the curriculum. Implications for this study were drawn from the collected data from round one and round two of this study. Questions for round one were open-ended and sought to obtain tools and strategies recommended by experts for students identified as visual, auditory and kinesthetic learners. Of the 10 participants who completed the study, the following strategies were given for working with visual learners; anchor charts, posters, diagrams, visual schedules, written instructions, video tutorials, illustrations, cartoons, Power-Point presentations, Quick-Pics, creative visualization, frequent check-ins, checklists, onscreen tracking, calendars, graphic organizers, highlighters, flashcards, movies, picture dictionary, and several online applications (Khan Academy and Google, Read and Write).

The data collected was then themed and categorized. The categories were pre-determined based upon the three learning styles, visual, auditory, and kinesthetic. The themes that were uncovered during the process of data collection were as a result of the questions asked. The questionnaire sought to disclose the effectiveness of tools and strategies that had been provided from round one survey questions. All 18 questions

were constructed based upon the results of the first round of question's responses. Each participant was asked to provide the strategies they felt were most effective in regards to visual, auditory, and kinesthetic students. The participant's responses were then themed into one of the following six themes: instructional strategies, self-assessments, self-regulations, organizational skills, strategies to reinforce learning, and online apps (technology).

For the educator, this study provides specific tools and strategies that can be used within the general classroom. Many teachers struggle to deliver instruction in variation to meet the vast needs of students within their classrooms (Bedir, 2015; Bosier, 2007; Bostrom, 2012; Brackenreed, 2011; Brassell, 2009; Cavindish et al., 2013; Fletcher, 2007; Gardner, 1973, 2004, 2006, 2008, 2009, 2012; Goodwin, 2013; Graham-Lawrence, 2014; Grunke & Morrison, 2016; Patall, 2013). This study provides specific resources that can be used prior to accessing the special education department, which if incorporated will allow the teacher to affirm the gap in learning is not due to limited teaching methods.

Providing teachers with alternative instructional methods enables all students to express their understanding of the curriculum, which otherwise may go unnoticed, leading to gaps in their learning (Gardner, 2013; Goodwin & Miller, 2013; Houff, Klinger, & Coffman, 2015). These interventions fall largely upon the classroom teacher, as they will be required to profile each student, teach according to their strengths, and gather the necessary documentation of intervention strategies tried and failed (Davies, 2016). The results of this study will provide teachers with a battery of tools and strategies they can incorporate.

Student achievement may improve. Szpringer, Kopik, & Formella, (2014) stated, that student achievement rose when comparing instruction that was geared towards the learning styles and strengths of each student. Duman (2010) and Restaino, (2011) stated by incorporating brain based learning strategies would results in student success and by incorporating the learning styles of each student during daily lessons, students had demonstrated improved academics (O'Neil-Blackwood, 2012).

Finally, the results of this study may improve classroom management. As mentioned within the Literature Review, many students who struggle academically in the general classroom, are influenced by multiple variables. Known as the "alphabet students" (Assouline & Whiteman, 2011; Baum & Olenchak, 2002, p. 77; Dare & Nowicki, 2015; Schnitzer, Andries & Lebeer, 2007) these students struggle to remain focused. Active participation leads to student achievement (Conderman, Bedner & Hedner, 2012; Theisen, 2016; Piaget, 1945). Not only will teachers have the tools and strategies to vary their instruction plans but also, these strategies may enable students to remain in the learning zone for a greater period of time.

Recommendations

Taking into consideration the data collection, the limitations and the implications, there are several recommendations for the practical use of this data and for future research. The expert panel for this study provided a number of tools and strategies that teachers could incorporate into their daily routines, which in turn, would enable all students' access to the curriculum, which may in turn lead to a greater degree of knowledge acquisition.

Future research needs to address learning styles and effective strategies as it pertains to students with learning disabilities, and what impact this might have on student achievement (Balido-Dean, Kupczynski, & Fedynich, 2010; Buttner & Hasselhorn, 2012). Environmental studies are needed to explore the co-morbidity of students with learning disabilities and social, emotional, and behavioral disorders (Bell et al., 2008; Bellah et al., 2008; Sternberg, et al, 2008). Gardner's Multiple Intelligences, learning styles, differentiated instruction, and VAK preference studies are required (De Jesus, 2012; Gardner, 2012). Studies to determine the effectiveness of assessments is required (Rosenberg, 2009) but also, gather the information to develop amenable instruction based on student strengths (Mummaw, 2010; National Joint Committee on Learning Disabilities, 2010; Snowing and Hulme, 2011). Should students receive instruction geared to their dominant hemisphere and/or preferred learning style? What considerations need to be met, in order to reach all students and what implications would this have on the diagnosis of a learning disability?

Although the term-differentiated instruction was not used to define the tools and strategies that were sought, the wording of the questions allowed the experts to present the resources in a way that would benefit the learning styles of various students (Gardner, 2010). Gardner (2004, 2008, 2009, 2010, 2012) believed that students were intelligent in multi-ways and would be able to demonstrate those strengths if the material taught was delivered in a way conducive to their own learning preference. Gardner (2004) stated that multiple intelligence was not a single method or strategy but rather, it incorporated the use of strategies, techniques, programs and methods that would appear differently to all students (Bender, 2008).

Limitations

The potential limitations for this study included several areas. As this was a completely anonymous study, ensuring continuity was not a guarantee. The researcher had no knowledge as to who received the initial email. The researcher did not control the emails that were forwarded, or whether or not the link was accessed. It was based upon the honesty of the participants, that the participants met the self-reported eligibility criteria.

This study was limited to teachers who had been teaching for a minimum of seven years, five of which must be with students with a learning disability. These teachers must hold a valid Special Education Part one additional qualification certificate. The population of the participants was unknown, and no demographics were collected in the course of this study. The results were based entirely upon the responses of those individuals who chose to participate, and those responses reflect their own experiences. Various levels of intelligence, knowledge, and experience were assumed. When applied to a different set of participants, the results, thus generalization of the study could be much different.

As the researcher was limited to the wording of each response and only the data, as no contact between participants occurred, the researcher was limited to interpret the data collected. Feedback from participants could have influenced the results of the study, as well as, feedback to the participants. None of which occurred.

Another limitation to this study was the time allotted to the participants for the completion of the survey. Participants were given two weeks to complete the survey, in both rounds. Some individuals may not have had the time to complete the study.

Attrition rates were also a concern. As stated earlier, attrition rates are dependent upon the context of the study (Amico, 2009) and Song and Herman (2010) noted there is no empirical basis that currently exists for an explicit criterion for attrition. Although the initial emails were sent to the same participants, whether or not these same individuals chose to complete both rounds of the study remained anonymous. Similarly, who received the forwarded emails and chose to complete both rounds of the study also remained anonymous.

Several measures were taken to ensure ethical guidelines were maintained throughout the process of this study. This study had to meet the principles and standards of the IRB (Institutional Review Board). The application was submitted and three revisions were completed in order to ensure ethical practices. The IRB received a copy of the Informed Consent letter. Each participant was asked to acknowledge and retain a copy of the Informed Consent for his or her own record. The IRB received a copy of the initial questions prior to data collection in both rounds. Anonymity using SurveyMonkey © was completed using the anonymity response button. Encrypted responses were collected and although each participant had access to contact information, no contact was ever made.

Recommendations for General Classroom

In order to meet the needs of all students in the general classroom, the first recommendations from this study believes more profession development is needed; professional development interventions that focuses on technology and specific applications and extensions to assist with specific deficits. Findings from previous studies suggest that training and support must be provided for teachers in order for them

to provide their students with a variety of instructional tools and strategies (Dietze & Kashin, 2012; Hawkins et al., 2015).

The second recommendation is to provide teachers with an array of learning styles test and resources to ensure they understand and know how the student learns best. Restaino (2011) suggests that the brain only has a limited amount of time to attend to lessons and those strategies for students, should be implemented in such a way that allows all students to understand the material being taught. Bostrom (2012) states that teachers are not prepared to address the needs of their students in a variety of ways. Teachers could attend PD sessions that target specific learning needs.

The third recommendation is to provide each classroom with an array of resources such as, fidgets, headphones, and yoga balls. Many students struggle with executive functioning skills (Feifer & Rattan, 2007), which are described as the ability to reason, plan, inhibit, focus attention and cognitive flexibility (Weyandt, 2009). Diamond & Lee (2011) state that these students are impacted with these characteristics which in turn, affects their ability to be successful in school. Providing students with an array of resources may help them with attention, and allow them to remain in the learning zone for a greater period of time.

Recommendations for future research

The first recommendation brought forth as a result of this study is to duplicate this study, however utilizing a wider range of individuals. The first round of this study yielded 10 participants, and the second round yielded 10 participants. Suggestions of 10-15 participants (Aloe et al., 2010), 12- 20 (Skulmoski et al., 2007) but a number less than 50 (Hsu & Sanford, 2007), were advised however, there appears to be no standard or

norms surrounding expert panels for a Delphi study (Akins, 2005; Avella, 2016; Nworie, 2011). Although there are no set norms for participation, a greater number of participants might yield a greater number of strategies.

The second recommendation for future research is to conduct the study using targeted participants. This study was completed using a snowball approach, whereby participants forwarded the invitational email to individuals they felt would meet the criteria and would want to partake in this study. A future study could be conducted targeting professionals who would offer specific tools and strategies for specific deficits. For the purpose of this study, the definition of "expert" was based upon the eligibility criteria: teaching for seven years or longer, teaching students identified as learning disability, for five years or more, and have Special Education Part 1. Avella (2016) states, who qualifies as an "expert" invited to participate is of critical importance" (p. 307) however, Davidson (2013) states, "the expert panel is up the researcher, but the defense of the definition is also the responsibility of the researcher (p. 63).

Finally, the third recommendation for future research is to expand the study to include other professionals working with struggling students, administrators, educational assistants, psychologists, speech and language pathologist, ABA and IBI facilitators and child and youth counsellors. These professionals may not have specific academic tools and strategies, but they may provide a host of tools and strategies that would enable the student to access the curriculum. New teachers may have new insights to relevant strategies that are up and coming. Clotfelter, Hemelt & Ladd (2016) examined the role of the teacher assistant and other personnel, as it pertained to student outcomes in the elementary classroom. The researchers concluded, a most important finding

> The remarkably strong and consistent evidence on the role of teaching assistants, a staffing category that has been growing over time, and that has been woefully unstudied. Positive effects of teaching assistants emerge for most of the outcome measures and across most of the specifications that we present" (p. 27).

Conclusion

With the new criteria outlined by the DSM-V, each teacher must prove he or she has incorporated numerous tools and teaching strategies that would enable all students' access to the curriculum, prior to accessing the identification process. Learning disabilities have become the largest student population of individuals identified under the exceptionality umbrella (Buttner & Hasselhorn, 2012; OME, 2014; McGilchrist, 2013). Empirical studies have indicated that early evidence interventions have proven effective if delivered in a timely manner (Swanson, 2014) however, intervention for students with learning disabilities is difficult as the exact causes are numerous, and clear implications are vast (Snowing, & Hulme, 2011). The existence of students' comorbidity with a learning disability such as ADD, ADHD, CD, and any number of social-behaviour disorders is high (Algozzine et al, 2012; Snowing & Hulme, 2011). All of these factors as well as traditional and antiquated teaching techniques have led to an increasing gap between struggling students and their cohorts (Gardner, 2013; Goodwin & Miller, 2013; Houff, Klinger, & Coffman, 2015). Gardner believed that students should be allowed to demonstrate their understanding of the curriculum, and could, if they were not limited to the subject matters of math and literacy taught in archaic methods (Demailes, 2008, Gardner, 2004, 2008, 2009, 2012). Piaget (1945) stated that students must to be actively engaged during instruction, if the acquisition of knowledge is to occur (Bostrom, 2012;

Carbonell, 2013). With the development of neuroscience, and theories such as brain lateralization, brain regions, and the neuroplasticity of the brain, various educational strategies and techniques have developed (Blair, 2007; Burns, 2011; Casner, & Chung, 2012; Connell, 2009; Geake, 2007; Sperry; 1968, 1973). Many teachers are unaware of the numerous tools and strategies available. As teachers, they feel unprepared to meet the necessities of the varying student's needs they encounter daily (Bloom, 2009; Cavindish et al., 2013; Lombardi, 2012; People for Education, 2016).

In conclusion, findings from this qualitative e-Delphi study will be helpful to share with teachers. The research design incorporated the use of an online survey to gather tools and strategies from those self-reported experts. The implications from the results of this study as they pertain to the problem statement have been provided for in this chapter. The recommendations for the general classroom have been supported by the findings presented in the Literature Review. Numerous tools and strategies have been gathered as a result of this study that will enable struggling students and their teachers various ways to enhance knowledge acquisition prior to accessing the special education department.

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Appendix A

Recruitment email

Good morning,

You are being asked to participate in a research study, entitled "An E-Delphi Proactive Approach to Meeting the Needs of Struggling Students in the General Education Classroom. The study seeks to elicit expert opinions on the use of tools and strategies that will enable all students to access the Ontario curriculum. The study will last no more than 28 days, during which time you will be asked to complete 3 rounds of survey questions, taking no more than 30 minutes each time. You are eligible to participate in this study if you meet the following criteria.

1. Have you been teaching for at least seven years?

2. Have you been teaching students with a learning disability for five years or longer?

3. Have you completed Special Education Part 1?

4. If you are retired, it must have been within the past three years, or you must still work within the school system as an educator

If you decide to participate, there are no direct benefits to you for participating in this study.

Contact information:

If you have questions about your rights in the research, or if a problem has occurred, or if you are injured during your participation, please contact the Institutional Review Board at: irb@ncu.edu or 1-888-327-2877 ext 8014.

Shelley Felix is a doctoral student at Northcentral University. She can be reached at S.Felix4223@ncu.edu.

Dr. Miranda Jennings (chair) Mjennings@ncu.edu

If you are interested in participating in this study, please click the link provided for more information.

Thank you for taking the time to read this recruitment email.

Appendix B

Copy of Consent form

Introduction

My name is Shelley Felix. I am a graduate student at Northcentral University. I am conducting a research study to gather different approaches that will enable struggling students, to be more successful in the general classroom. I am completing this research as part of my graduate degree in Education. I invite you to participate in my study. My goal is to have 30 participants.

Activities

If you participate in this research, you will be asked to click on a link to a survey program, Survey Monkey. Answer the survey questions. This should take no more than 20 minutes. You will have 2 weeks to finish the survey. You are asked to complete 3 separate rounds of questions. Round 1 is to gather the strategies. Round 2 is to offer feedback to participants. Round 3 is to offer feedback and gather a final consensus. Each participant will receive a copy of the final report.

Eligibility

You are suitable to participate in this research if you have been teaching for seven years or longer. You have been teaching students with a learning disability for five years or more. You have Special Education Part 1.

You are not eligible to participate in this research if you have not been teaching full-time for at least seven years. You have not worked with student identified with a learning disability for five years or more. You have not completed Special Education Part 1. If you are retired, you must have retired within the past three years and you must still be teaching.

Risks

There are minimal risks in this study. Some of the information may be personally sensitive. You may withdraw at any time. You may choose not to answer any one of the question that make you feel uneasy.

Benefits

If you decide to participate, there are no direct benefits to you for participating in this study. There are no incentives being offered to you, for participating in this study.

Confidentiality

No personal information will be collected during the course of this study

The information you provide will be kept confidential to the extent allowable by law.

All data collected in this study will be kept private. All data will be stored on the computer of the researcher, in my home office, protected by a password. There will be no link to your personal information. No participants' names or personal information will not be used in way for this study. The only persons who will have access to your responses, other than me, are Dr. Miranda Jennings. The Institutional Review Board may also review my research and view your responses. I will keep your data for seven years. I will delete electronic data and destroy paper data after seven years by fire. This is an anonymous study.

Voluntary Participation

Your participation is voluntary. If you decide not to participate, or if you stop participation after you start, there will be no penalty to you. You will not lose any benefit to which you are otherwise entitled.

Contact Information

Please contact

If you have questions about your rights in the research, or if a problem has occurred, or if you are injured during your participation, please contact the Institutional Review Board at: irb@ncu.edu or 1-888-327-2877 ext 8014**.**

Shelley Felix, my email is S.Felix4223@email.ncu.edu.

Miranda Jennings, her email is mjennings@ncu.edu.

Institutional Review Board at irb@ncu.edu or 1-888-327-2877 ext. 8014.

Please contact if you have questions about your rights in the research.
Please contact if a problem has occurred.
Please contact if you are injured during your participation.

By clicking on this button, you will consent to the participation of this study. Please print a copy of this document for your files.