THE UTILIZATION OF ASSISTIVE TECHNOLOGY TO ENHANCE EDUCATIONAL SUPPORT FOR ALL LEARNERS IN A MAINSTREAM SCHOOL

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DECLARATION

I declare that **THE UTILIZATION OF ASSISTIVE TECHNOLOGY TO ENHANCE EDUCATIONAL SUPPORT FOR ALL LEARNERS IN A MAINSTREAM SCHOOL** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

26 November, 2015

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ABSTRACT

This study focused on the use of Assistive Technology (AT) in enhancing the educational support of all learners in a mainstream school. The theoretical frameworks used in this study were Wellness Theory and Cultural Historical Activity Theory (CHAT).

The main aim of this study was to determine the efficacy of Assistive Technology in promoting the educational support of all learners in a mainstream school. This use of AT thus benefiting inclusion and inclusive practices and enhancing learning and support for all students in a mainstream school.

The study was embedded in an interpretivist paradigm and used a qualitative research approach. Sampling was purposive and participants were selected based on the researcher's pre-defined purpose for the study.

Ethical approval was sought from the University of South Africa and prior to conducting research consent forms were signed by all participants. Data were collected using questionnaires with open-ended questions, face to face interviews and document analysis. Data analysis was done through thematic coding (noting recurring patterns of information) and the development of major themes based on qualitative data collected.

Findings revealed the need for more technology in the research site (such as iPads and laptops), as well as the need for staff training in order to effectively use the technology. Furthermore, having more educational assistants to support students with more complex needs was also highlighted.

Findings from face-to-face interviews indicated themes articulating with the above mentioned. This included the need for time to plan for the use of Assistive Technology in the classroom, along with time to familiarize oneself with the various forms of technology available. Training to effectively implement and support the technology was highlighted, as was time to engage with other colleagues and develop a collegial enquiry for the effective use of Assistive Technology to support all learners in the mainstream class.

Findings from documents reviewed showed significant focus on the need for diagnosis to be able to select intervention strategies for the classroom and instruction. When staff were aware of a child's medical, cognitive or mental health diagnosis, appropriate supports could be explored. The school support documents reviewed indicated a clear requirement for updated testing and setting of goals for students, to be supported by the strategies.

Recommendations made for the effective use of AT included the promotion of professional development in staff and the establishment of professional learning communities which value the sharing and exchange of information regarding knowledge and skills. Furthermore, a framework is proposed which may be used by schools using assistive technology in supporting learners in mainstream schools so that learning may be enhanced. A further longitudinal study was recommended for the future to determine the impact of the use of AT to support inclusion when relevant staff training is available, applicable and ongoing.

Key terms

Educational enhancement, assistive technology, wellness theory, Universal Design for Learning, Cultural Historical Activity Theory, teacher professional development.

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ACRONYMS

AT	Assistive Technology
ASD	Autism Spectrum Disorder
CAST	Center for Applied Special Technology
CHAT	Cultural Historical Activity Theory
EATI	Equipment and Assistive Technology Initiative
IDEA	Individuals with Disabilities Education Act
IPP	Individual Program Plan
LD	Learning Disabilities
NCLB	No Child Left Behind Act
OBE	Outcomes Based Education
SET-BC	Special Education Technology, British Columbia
TCA	Thematic Content Analysis
UDL	Universal Design for Learning
WATI	Wisconsin Assistive Technology Institute
ZPD	Zone of Proximal Development

Note 1: Referencing has been done in accordance with the *Publication Manual of the American Psychological Association*, (6th ed., 2nd printing).

Note 2: Because of the setting of the thesis in Canada, American spelling rules have been used.

CHAPTER 1

OVERVIEW OF THE RESEARCH

1.1 INTRODUCTION

In recent times, the focus on additional support needs has moved away from the historical deficit medical model of education, where learners with additional support needs were seen to be deviant or deficient in certain ways and in need of 'fixing'. This merited specialized education, at a different school or campus from the one which their peers might attend. This focus moved to one which supported inclusion in a regular, mainstream community school. Currently, the focus is more on inclusion and teachers' provision of access to curriculum and learning opportunities, as well as provision of active, productive involvement in the learning process. The work of Bunch and Valeo (2004) emphasizes the notion that inclusion means including all students, regardless of exceptionalities, who are planned for by the regular classroom teacher. The teacher is thus "taking ownership" of all students in their class.

This articulates with the notion that inclusion means a community where all children are valued and supported to achieve their potential using their gifts and talents in tandem with educational support offered in their learning environment and community. Academic achievement, along with balanced social and emotional development, is important for all students, across the world, and is mandated in the many educational acts in various countries. These include the No Child Left Behind Act, 2001 (NCLB) of the United States Congress, which in turn influenced the Action on Inclusion initiative (2010) in Alberta, Canada. Both these documents articulate with the ideals of inclusion and equity as they pertain to North America and Canada in particular.

To effectively weigh up whether the use of Assistive Technology is able to enhance the support offered in the mainstream school setting, and promote inclusion, it is vital to have a working definition and clear understanding of what the terms ‘assistive technology’ and ‘inclusion’ mean.

1.2 BACKGROUND

A beginning frame of reference for the term ‘assistive technology’ can be found in the Assistive Technology Act of 1998 (United States Congress, 1998) which states, “assistive technology device means any item, piece of equipment or product system, whether acquired commercially, modified or customized, that is used to increase, maintain or improve functional capabilities of individuals with disabilities”. This means any item which can be used in a classroom. This includes calculators, blue or yellow overlays for reading, glasses, wheelchairs (physical wellness items), software or computers. Any item which increases the student or person’s ability to function and learn (increasing intellectual wellness and social participation), to access curriculum and grow and develop as a lifelong learner. It is important to note that the use of Assistive Technology is not remediation or the use of remediation strategies such as re-teach, chunking information or re-cueing the number of items competed in a set. It is an entirely different realm, working to support remediation, which in many cases has not been successful on its own. Hence there is a need for additional supports and strategies which can be used in tandem with differentiation and remediation to either help overcome student barriers to learning or add enrichment and extension of their learning experiences (Mittler, 2007).

The Assistive Technology Act of 1998 also includes recommendations and findings regarding the relationship between AT (Assistive Technology) and the ways in which it might be used by a person with a disability in order to carry out a task, engage with education or the work place and even to enhance social life interactions. This Act resonates with the goals of Industry Canada, and the Assistive Technology Workplace Accommodation Toolkit, as well as the Salamanca Statement (UNESCO, 1994). Furthermore, these articulate with work undertaken on an international level to enhance inclusion in the workplace, echoing the United Nations' documents on education, as well as the new Education Act, Inspiring Education, (Alberta Education, 2015).

A number of students, both with and without diagnosed learning disabilities, and students with exceptionalities such as giftedness, do experience barriers to their learning. This is inherent in the outline given in the Salamanca Statement (UNESCO, 1994) which declares that schools have a responsibility to accommodate every child, regardless of ability or disability, socio-economic standing, culture, religion or any other factor. However, support on offer may not always be appropriate. Remedial support is not a one-size-fits-all approach; as each learner is unique, so is the support they may require. In my teaching experience (Rowlands, 2010), I noted for example, that students with a diagnosed reading disability were often being assigned a "reader" for tests, examinations and evaluations rather than being taught to read or being taught to use developed software and Assistive Technology. These could assist them throughout their lives, rather than just for the duration of the test. Another such example was of students who had been diagnosed with Dyslexia, Dysgraphia or even with Apraxia who were being offered a "scribe" for written activities, rather than being taught the skills

necessary to access AT such as keyboarding, typing or using a pointing device for a floating keyboard program. The use of AT would have allowed the students to become more independent, and autonomous in their learning, instead of relying on the “crutch” of an aid or helper. Even for students who are not diagnosed with a disability, or who may be gifted, being able to access different ways of engaging in their learning (such as the use of media) or allowing for different ways of presenting their learning (such as word processing rather than writing) is beneficial to supporting their style of learning and retention of such.

Having explored the research of Dell, Newton and Petroff (2012), Mittler (2007), Robyler (2003) and Golden (1998), it is apparent that the integration of Assistive Technology can further not only the aims of educational enhancement for all students and inclusion, but also aid in the independence, self-esteem building, personal sense of worth, wellness and success of students. This is supported by Hettler’s (1979) Wellness Theory. Their research articulates with the large body of work undertaken by Edyburn (2000; 2006a; 2006b; 2006c; 2013) in promoting the utilization of AT to provide educational support for students with learning disabilities. The Individuals with Disabilities Education Act Amendments of 1997 (IDEA 97) (US Department of Education, 1997) state the requirement that every child must be considered for AT as a means to enhance their learning. This idea was further extended with the updates made to this Act in 2004. IDEA 2004 was important for AT in making reference to the inherent need for universal design. IDEA 2004 included a definition of Universal Design for Learning (UDL) which states that universal design is a philosophy for designing and delivering products and services that are usable by people with the widest possible

range of abilities.These can include both products and services that are directly accessible and thus do not require AT, as well as those that are made accessible and usable with AT (Section 3 of the Assistive Technology Act of 1998, as amended, 29 U.S.C. 3002.) This work further echoes the sentiments expressed in Hettler's (1979) wellness theory to support all dimensions of wellness and thus promote learning and social development in all students, of all abilities, across every section of society.

With so much emphasis on supporting the learning of all students, it was essential that research be undertaken into how AT might be used effectively to enhance the educational support for students who might experience barriers to learning, or who may require extended enrichment to further their giftedness.

This research project seeks to highlight areas in which AT can enhance educational support and increase student participation, inclusion and wellness in the mainstream classroom setting. Building on my previous research, (Rowlands, 2010) in which inclusion policy and practice within a school in Scotland was explored through action research, helped to inform my research in this pilot study.

It is the hope of the researcher that this study, set in a Canadian Junior High School (serving students in grade seven to nine) and using two Grade seven teachers and their shared educational assistant, along with their timetabled Grade seven classes (two classes each, totaling 118 students), could provide a solid basis to determine the use of AT to enhance educational support and wellness in the mainstream setting.

1.3 MOTIVATION

In my current role, as an educator and learning support coordinator within a Junior High School setting in Canada, along with previous learning support experience in South Africa and Scotland, I noted the real implementation and practical use of Assistive Technology (AT).

Having taught in the South African mainstream school settings and special needs settings for six years, followed by a unique special needs school setting in Scotland for five years and currently (and for the last 6 years) in Canada, I have gained significant international awareness of various inclusion policies and mandates on a wider international level.

My involvement in the school-based Extended Support for Learning Committee, which focuses on ways to support both staff and learners in making the curriculum accessible and relevant, has also provided valuable insights into what strategies are in place and actively being employed within the research site school environment. Furthermore, this committee is made aware of the various challenges staff and students face when dealing with learning support, and seeks to address them through supporting staff and students where possible. This includes such needs as students with Attention Deficit Hyper Activity, Autism Spectrum Disorders, Learning Disabilities with regard to Reading and Written Expression, to name some examples dealt with. This awareness of what teachers are actively doing, the supports they are using and what tools they have access to, or not, and the challenges faced in providing support, and the use of AT to enhance the educational support of all students in the regular, mainstream classroom,

provided impetus for this study. For the benefit of current and future students, in both mainstream and specialized settings, review of current policy and practice would be an ideal way to highlight the usefulness of establishing Assistive Technology in classrooms, as a means of meeting the inclusion agenda. This is inherent in the educational policy in Canada (for example the Alberta Education's Action on Inclusion Special Education (2011) and Setting the Direction (2009) documents). A review of current policy and research literature in the international arena provides a sound basis for debate and discussion. This could enhance teachers' professional growth and development in effectively using Assistive Technology in the classroom to make learning more equitable and accessible for all learners.

Porter and Smith (2011) highlight the need for innovation both in the class, and for classroom practices which include incorporating new technologies to support all students and foster their inclusion. This articulates with the Government of Alberta's (Canada), approach which saw inclusion identified as part of government's Inspiring Action on Education initiative (2010). Their initial document, *Setting the Direction*, was renamed *Action on Inclusion* to signal implementation of an inclusive education system which also made provision for the use of Assistive Technology to promote and maintain inclusion for all (Alberta Education, 2012).

These events in both my professional life, and the wider context of education on the international stage, all led to the research that was undertaken and helped to deepen my understanding and focus on the study at hand.

1.4 SIGNIFICANCE OF STUDY

This study was undertaken to explore how Assistive Technology can be utilized to enhance the educational support of all learners in a mainstream school. Benefiting from the study were various educational stakeholders, such as students, teachers and professional staff and curriculum planners.

1.4.1 The Students

The direct recipients of the output of this research may be the students who could more effectively be supported in mainstream classroom situations. Increases in the awareness and use of AT to enhance educational support for all students in a mainstream classroom setting should bring about more effective teaching and learning. Provision of access to what is being taught and learnt, the curriculum, and providing multiple ways of engaging with curriculum, and multiple ways to demonstrate or present skills and outcomes, should enhance educational outcomes for all students. Furthermore, this could help support the six wellness dimensions, as defined by Hettler (1979), for every learner.

1.4.2 The Teachers

This study may benefit teachers and professionals in education, across a global spectrum, to enhance educational support offered to all learners in mainstream classroom settings, and thus promote academic, social and emotional excellence in their teaching environments. Through this research, teachers may become aware of the power of intentional training and professional development in understanding and using AT. The purposeful selection, utilization and monitoring of AT to support all learners,

can be scaffolded as part of ongoing teacher training and built into the culture of the school learning community. Provision of scaffolding to support training, and professional development, as well as a clear understanding of how classroom supports can be effectively introduced, maintained and measured, to ensure access to learning for all students in the mainstream setting, can promote stronger, inclusive learning environments to enhance learning for all students.

1.4.3 Curriculum Planners

The research aims to illustrate that all students, regardless of ability or disability, with access to relevant and meaningful technology, can have a supported and enhanced learning experience in the mainstream classroom setting. Elements of wellness and enhanced education can be incorporated into curriculum planning and pedagogy through training and development of staff.

1.5 CONTRIBUTION TO THE BODY OF KNOWLEDGE

The goal of research is to find more knowledge and thus add to an existing body of knowledge. This current study which explores the use of Assistive Technology to enhance the educational support for all learners in a mainstream setting seeks to address the gap between knowing what works and actual implementation to meet learner needs.

1.5.1 Contribution to Theory

Extensive research was undertaken by such theorists as Edyburn (2000, 2006b, 2006c, 2013) in the realm of AT. This study sought to build on and extend this theory, and refine it by undertaking research and exploration. As Dubins (1978) states, the what,

how and why of a theory in a practical setting to contribute to the theoretical body of existing knowledge needed to be explored. The ideas of what and how are descriptive, while the why seeks to explain the theory or new contribution to that theory.

1.5.2 Contribution to Practice

Research has the power to raise awareness, develop insight into existing conditions and current perceptions, and to offer possible solutions and strategies to overcome the current conditions. By engaging in the pilot study in a Junior High school, Canadian setting, it is my hope that the use of AT to support all learners will create greater awareness of the practical implementation and uses of AT, and thus impact student participation. Active involvement can be fostered in a way that supports inclusion (in support of the Alberta Education Inspiring Education Act, 2015) through effective AT utilization, and barriers to learning can be removed in a way that paves the way for other practitioners to do the same. This research hopes to promote the use of a collaborative and integrated approach to the use of AT to promote inclusion, and promote participation for all students.

1.5.3 Contribution to Policy

Data gathered and recommendations made, can also help inform policy (both at a school level and a school division level to support a wider range of learners) with regard practice, professional development and teacher training programs to create awareness of AT, and how to effectively use AT, to enhance educational support for all students. Furthermore, professional development on an ongoing basis as a culture of learning

and enquiry in schools, could be a platform from which to launch AT interventions which articulate with wellness initiatives in schools and build across school divisions.

1.6 PROBLEM STATEMENT

The central question or problem for this research is: *How can the use of Assistive Technology enhance educational support for all students in a mainstream school, regardless of the barriers they may be experiencing to their learning?*

Being a special education teacher, and currently the Learning Support Coordinator for my school, it struck me that there were a number of students who were experiencing barriers to their learning. These included difficulty reading (both decoding and comprehension of text), grapho-motor issues (which hampered the mechanics of handwriting and speed of writing), attention difficulties and medical issues, as well as students with giftedness. I noted that often the support being offered, if available, was becoming more a crutch rather than a tool.

Research in the field of AT use to support inclusion is fairly narrow due to it being a relatively new phenomenon. The first studies made their appearance during the 1970s, so it is easy to see that the development and use of Assistive Technology for students in schools is a fledgling field of endeavor. This gap in research and development also spurred my desire to conduct research on the use of AT and how it enhances educational support in the specific setting of a Canadian Junior High School, serving students in grades seven to nine.

Another problem arose in determining whether students and parents would “buy in” to the use of new and innovative software or devices in the classroom, and whether

teachers of all subjects would be prepared to be consistent in the use of the Assistive Technology.

These questions highlight the issues and problems surrounding both the existing body of research and evidence that exist as well as the gap which gave rise to this study.

1.7 RESEARCH QUESTIONS

The main research question for the current study is: How can the use of Assistive Technology enhance educational support for all learners in a mainstream school?

Sub questions include:

- What are teacher perceptions of Assistive Technology to support instruction and participation?
- How can the use of Assistive Technology support wellness dimensions in mainstream classroom settings?
- How can appropriate Assistive Technology be determined to best suit an individual student's needs and promote their educational support in the mainstream class?
- Can a framework be developed for the use of Assistive Technologies to support all learners?

1.8 AIMS AND OBJECTIVES

The main aim of this study is to explore and describe the use of Assistive Technology to enhance the educational support of all learners in mainstream schools.

The objectives of this study are as follows:

- To describe what teacher perceptions of Assistive Technology are;
- To explore how the use of Assistive Technology may support wellness dimensions in mainstream classroom settings;
- To determine how to select appropriate Assistive Technology to meet an individual student's needs and foster their educational support in a mainstream class; and
- To develop a framework for the use of Assistive Technologies for the support of all learners.

1.8.1 Concept Clarification

To ensure clarification and commonality of language use, the following terms have been outlined and briefly explained with reference to this study.

- Assistive technology: This is any device, piece of equipment or product which can be made by an individual and customized to suit a particular need, or obtained via commercial purchase, which is designed to enhance, increase, maintain, or improve the functional capabilities of students or individual with an exceptionality or a disability. Cowan and Turner (1999) define AT as 'any device or system that allows an individual to perform a task that they would otherwise be unable to do, or increases the ease and safety with which the task can be performed.'

- Educational support: This refers to a wide range of services or resources which can be either provided to students or set up as structures in the classroom situation to enhance or enrich student learning. The role/purpose of educational support is to advance learning opportunities (Edyburn, 2013, Bunch & Valeo, 2004) and ensure that all students are provided with the tools they may need to access the curriculum and learning environment. This will help ensure progress and development for their learning to meet outcomes.
- Inclusion: inclusion means that all students can attend and are welcomed in their neighborhood schools, regardless of ability. All students will be supported to reach their potential through equitable access to opportunities to learn, contribute and participate as stated in the the Salamanca Statement (1994, p.15) which sets forth '*that schools should accommodate* ***all children*** *regardless of their physical, intellectual, social, emotional, linguistic or other conditions. This should include disabled and gifted children, street and working children, children from remote or nomadic populations, children from linguistic, ethnic or cultural minorities and children from other disadvantaged or marginalized areas or groups*'.
- Inclusive education: is a way of thinking and acting that demonstrates universal acceptance of, and belonging for, all students. It is a value-based approach to accepting responsibility for all students. It also means that all students will have equitable opportunity to be included in the typical learning environment or program of choice and that relevant supports are in place to support and sustain such mainstream placement and ensure equity of access and learning opportunities. The Education (Additional Support for Learning) Scotland Act (2004, p.20), defines

inclusive education as *'Inclusion means a community where **all** members, children and young people and adults, are strongly committed to the community's common concerns and support one another in pursuing them. Each person in our school brings qualities that add something positive to the whole school community … we would all lose out if anyone were not to be part of it'*.

- Mainstream classroom or school setting: the regular, general education setting in which the general school population of students would be situated and educated within a regular school – in Canada this means the local, community school which is co-educational and caters to the students who live in the area. These community schools are separated into Elementary (Kindergarten to grade 6), Junior High (grades seven to nine) and Senior High (grades ten to twelve).
- Restrictiveness: Champagne (1993, p.5) defines restrictiveness as "a gauge of the degree of opportunity a person has for proximity to, and communication with, the ordinary flow of persons in our society". The regular or general education environment is the least restrictive context as this context provides the most opportunity for interaction, participation and engagement in the "ordinary flow" (Champagne, 1993) of students in schools. Thus, the converse is true in that as a school loses its resemblance to the general education environment, the more restrictive it is considered (Gorn, 1996). The IDEA (amendments made in 2006) mandates placement of exceptional students to be in the least restrictive environment, essentially meaning the general, regular classroom setting. "To the maximum extent appropriate, children with disabilities, including children in public or private institutions or other care facilities, are educated with children who are not

disabled, and that special classes, separate schooling, or other removal of children with disabilities from the regular educational environment occurs only when the nature or severity of the disability is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily" (IDEA, 20 U.S.C. § 1412)

- Students: an individual who is actively engaged in the process of learning in a formal institution such as a school, college, university, or apprenticeship or in a more informal setting such as a mentoring situation.

1.9 RESEARCH DESIGN AND METHODOLOGY

1.9.1 Research Paradigm

For the purposes of my research project, I situated the research in the interpretivist/ social constructivist paradigm, which has the intention of understanding "the world of human experience" (Cohen & Manion, 1994, p. 36), suggesting that "reality is socially constructed" (Mertens, 2005, p. 12). The interpretivist/social constructivist researcher tends to rely upon the participants' views of the situation being studied (Creswell, 2003) and recognizes the impact on the research of their own background and experiences.

1.9.2 Research Method

1.9.2.1 Qualitative Research

This study's qualitative approach stemmed from the method of inquiry used when researchers aim to gather an in-depth understanding of human behavior, and the reasons that govern such behavior (Cohen, Manion & Morrison, 2009). Qualitative

research has been described as a systematic investigation (Burns, 1997) or inquiry whereby data is collected, analyzed and interpreted in some way in an effort to describe and understand the individual experience of their unique situation (Mertens, 2005). Qualitative research aims to address questions concerned with developing an understanding of the meaning and experience dimensions of humans' lives and social worlds. The qualitative method seeks to investigate the why and how of decision making. Hence, smaller but focused samples are more often needed than large samples (Cohen, Manion & Morrison, 2009). The roots of qualitative research can be found in the critical research and interpretivist paradigms. Social constructivism is often combined with interpretivism as this worldview, too, seeks to understand the world in which people live and work. People develop subjective meanings of their experiences and it is the goal of the researcher to focus on, and interpret, the meanings which participants hold in relation to the particular study they are engaged in, to better understand the world in which we live and work (Mertens, 1998).

Qualitative research has the means to deliver detailed information and provide value when investigating complex and sensitive issues. A questionnaire with open-ended questions completed by two Language Arts teachers involved in the pilot project at the school site, along with an extensive literature review on existing research to articulate with my own experience, were used to gather data.

1.9.2.2 Ethnographic Case Study

I used two approaches for this study in order to have a clearer understanding of how AT is used in a mainstream school to support all learners. In the subsequent paragraphs I

have explained how I used a case study and ethnography to get a deeper understanding of the current study.

This research followed the case study method to provide an up-close, detailed observation over the months spent at the research site. The research site was a single Junior High school in Alberta, Canada with a large student population in grades seven to nine. Over fifty teaching staff members work at this site and permission was granted for two staff to actively implement a pilot project in their classrooms over the course of the school year. The study involved four grade seven classes totaling 118 students across the four classes. According to Creswell (2009), data collection in a case study occurs over a prolonged period of time and helps to provide rich data for analysis.

Yin (2013, p19) defines the case study research method as an “empirical inquiry” which seeks to explore and investigate a phenomenon in a real-life setting using many different sources of evidence to inform the exploration. He states that case studies allow the research to “focus on ‘case’ and retain a holistic and real-world perspective” (2013, p. 5). Gerring (2009, p.1) describes the case study well when he refers to how one may choose to learn to build a house as an analogy “one can either study many houses being constructed or one house in particular”. This intensive scrutiny from a “within case” perspective (emic lens such as an ethnographer would have) brings added value to the staff by highlighting how people within the setting perceive, and understand their setting. Yin (2013) states that the value of the case study is that it has the ability to study phenomena in a natural setting and it enables the researcher to ask “how” and “why” questions, which is a key element of ethnography and the creation of deep, thick qualitative descriptions.

Furthermore, ethnography was used to add a further layer of depth, substance and data to the “thick description” of the research study and the pilot project. The term “thick description” was first used by Ryle (1949) and later by Geertz (1973) who applied it in ethnography and refers to the detailed account of field experiences in which the researcher explicitly notes patterns of social and /or cultural relationships and places these into a context (Holloway, 1997). Ethnography can be seen as both a qualitative research process and a product, with the goal of social and cultural interpretation. The ethnographer explores deeply the why and how of events, rather than merely reporting the events in a bid to gather meaning and generate understandings of social situations and culture. This is done through the use of the *emic* lens or perspective. Numerous sources of data help to serve as a foundation from which to build the dense, rich description for analysis when using ethnography. In this study, critical ethnography was relevant in generating an understanding from a holistic perspective with regard to a marginalized group. This group consisted of those students in grade seven, who may require additional supports to enhance their classroom experience, both in terms of educational progress, social/emotional development and wellness dimensions to enhance support and inclusion.

In this light, it was the researcher’s goal to add to the existing body of knowledge in an area, in this case, the use of AT to provide educational support in the mainstream secondary school and maintain student placements in the mainstream school, rather than removing students to specialized schools or classrooms.

1.10 SAMPLING

1.10.1 Purposive Sampling Techniques

Non-probability sampling, such as purposive or judgmental sampling, is a sample which is selected based on the researcher's pre-defined purpose. Paler-Calmorin and Calmorin (2007, p104) state this approach involves "selecting individuals according to the purposes of the researcher." Specific people were selected from within a specific population to engage with a specific research project. The point of the purposive selection is to include individuals who will be able to contribute to the project in a way that is relevant to the study. In this research instance, it was teachers and support staff who worked in the Junior High school at which I was based. The decisions about who to include in the sample were purposively made by the researcher. Although all the staff at the research site (fifty three) were asked to complete the self-completed, anonymous questionnaire, only two teachers and their shared educational assistant (so a total of three staff actively participated in the main study) were selected for actual AT implementation in their classes. The reasons for their selection included similar teaching course loads. Each taught a balance of Language Arts and Social Studies classes, both of these learning areas requiring significant literacy skills such as reading, writing, comprehension, speaking and responding, aural skills and group work or collaborative learning elements. Both teachers had an equal balance of classes in the grade seven level and shared a common educational assistant. Both teachers also indicated a willingness to be involved in the project when initially approached. This willingness to engage with new and potentially complicated technology, and actively plan for its use,

was a significant reason for their selection to ensure the research project was not jeopardized by teacher bias from the outset.

1.11. DATA COLLECTION: PHASE ONE – PILOT STUDY

A proposal was made to the school division to research the benefits of using Assistive Technology in classrooms to support all learners in the mainstream setting. A pilot study, using various specialized external expertise (such as an occupational therapist) as well as two grade seven teachers, who shared a common educational assistant, were included. This allowed four classes (total of 118 students) to be included in the pilot, and provided greater scope for trialing the AT. This could provide rich feedback and data regarding the use of various qualitative tools which were provided by the research. These teachers were not obligated to take part and it was made clear that they could, in fact, decline to participate at any time. The chosen date to start was September 2013 when the school year began in Canada.

1.12 DATA COLLECTION TOOLS: PHASE TWO

1.12.1 Interviews

Schultze and Avital (2011, p.3) support the use of interviews in research as means of generating knowledge between people. The interview has a clear purpose, highlighted through the use of questions. These are compiled into an interview guide beforehand, and provides structure to the interview so that it remains focused on finding answers to the research question. Semi-structured interviews were used in this study as they allowed for a more open, flexible approach. This provided space to expand on new ideas that became apparent in the course of the interview with the participants. Having

a framework in keeping with the topic of the study, allows the interviewer to guide the interview and not to be confined by the rigidity of a formal interview in which only the selected questions are asked or answered.

1.12.2 Self-Completed, Open-ended Questionnaires

The benefit of using questionnaires, as explained by Fox and Bayat (2007), is that they are practical and allow for large amounts of information to be gathered in a relatively short period of time. The questionnaire used a combination of closed ended, dichotomous questions as well as a number of open-ended questions to provide respondents the opportunity to expand on their thoughts and opinions.

1.12.3 Document Analysis

Document analysis is common in qualitative research (Bowen, 2009) and incorporates the interpretation of documents by the researcher. Engaging in this form of data collection involves the scrutiny of documents collected to allow for the coding of content into themes pertinent to the research issue. Fan, Wallace, Rich and Zhang (2006) articulate the value in document analysis through the sorting and sifting process in which the research sequences information and searches for processes, patterns or wholes which can add to the research question being studied.

1.13. DATA ANALYSIS

Analysis of the data enables the researcher to gather meaning and generate understandings of the study to translate into recommendations. In the analysis of the information collected, I looked for qualitative data on which to ground my recommendations. I was looking for common themes, and common and repeated

experiences to notice patterns and sequences which could be translated into hard data which would inform my research. Qualitative data analysis was done by means of thematic coding in terms of a coding framework.

1.14 TRUSTWORTHINESS

Qualitative researchers often grapple with the criteria used by quantitative researchers when evaluating their work: those of reliability, validity and generalizability and so have developed alternative criteria responsive to their unique research ideals. These criteria encompass various dimensions of ‘rigor’, ‘ethical integrity’ and ‘artistry’. One of the biggest challenges confronting qualitative researchers is how to assure the quality and trustworthiness of their research. Without this, qualitative researchers lay themselves open to criticism from those who regard qualitative research as “‘merely’ subjective assertions supported by unscientific method” (Ballinger & Finlay, 2006, p. 235).

By addressing similar issues, Guba’s (1994) constructs correspond to the criteria employed by the positivist (relying on quantitative measures) investigator as follows:

a) credibility (in preference to internal validity) through the use of multiple data collection methods and triangulation of data;
b) transferability (in preference to external validity/generalizability) to allow what is learnt in this study to be broadened to other similar educational contexts;
c) dependability (in preference to reliability) will measure the extent to which the results obtained and recommendations made are reliable and trustworthy;
d) confirmability (in preference to objectivity) based on data collected to represent the situation studied rather than the researcher’s own opinions or ideas.

Patton (2015, p.363) states that qualitative research has developed a maturity in recent years, and that an idea should be judged “by its utility in sensitizing us to how people experience the worlds in which they live and work”.

1.14.1 Credibility

Morse, Barrett, Mayan, Olson and Spiers (2008) argue that ensuring credibility is one of most important factors in establishing trustworthiness. In addressing credibility, investigators attempt to demonstrate that a true picture of the phenomenon under scrutiny is being presented. This may involve, but not be limited to, the use of multiple, well-established research methods as well as the triangulation of data so that you are not merely relying on one source of information. Peer scrutiny of the research is also important to ensure feedback and allow the researcher to engage in reflection and critique of their work. Articulating research with other research which can both support or negate the researcher’s own work is also important so that there is an awareness of what research is saying about the hypothesis or research questions and through this, support professional critique and constructive reflection.

1.14.2 Dependability

Akkerman, Admiral, Brekelmans and Oost (2006) suggest the use of a research audit as a means for assessing the process of inquiry to ascertain reliability in research as well as absence of bias. The auditor must review the inquiry processes to determine that they conform to norms of “good professional practice”. So the research design and the manner in which it is implemented, the research methodology and the data collection methods that the researcher has adopted, become part of the audit. This

review must be conducted to ensure recommendations drawn can be substantiated from the data. These tasks are vital in establishing the dependability of a research project and the confirmability of its conclusions. This audit helps the researcher maintain the integrity of the study and also engage in critical self-reflection.

1.14.3 Confirmability

To avoid biasness, Guba and Lincoln (1985), assert that an audit trail is necessary to ensure confirmability. In an attempt to achieve confirmability, the researcher took steps to demonstrate that findings emerge from the data and not from their own predispositions. A detailed methodological description enables the reader to determine how far the data and constructs emerging from the data analysis may be accepted. Critical to this process is the audit trail, which allows any observer to trace the course of the research step-by-step via the decisions made and procedures described. Record-keeping and detailing all aspects of the research project are vital in this phase as they can articulate with the audit trail laid in assuring dependability. Researchers have an obligation to ensure their research is not merely a pontification of what they believe to be true or their opinions, but rather that, through the use of various data collection methods and the triangulation of the data collected, conclusions and findings accurately represent a snapshot of the situation under review.

1.14.4 Transferability

Guba and Lincoln (1994) are among those who suggest that it is the responsibility of the investigator to ensure that sufficient contextual information about the fieldwork sites is provided to enable the reader to make transferability inferences. It is the researcher's

responsibility to provide holistic, accurate information so that the reader is able to make an informed opinion of the where, why and how of the research situation. It is also important that sufficient thick description of the phenomenon under investigation is provided to allow readers to have a proper understanding of it, thereby enabling them to compare the instances of the phenomenon described in the research report with those that they have seen emerge in their situations. The need for “a full description of all the contextual factors impinging on the inquiry” is recommended by Lincoln and Guba (1985, p. 47).

1.15 ETHICAL CONSIDERATIONS

Adherence to ethical norms whilst conducting research is essential. A primary reason is linked to the research itself. The pursuit of knowledge and truth, and as such rules against fabricating or falsifying research data, need to be in place and adhered to in order to promote the truth and assist the research in avoiding errors. This has implications for the wider academic world as fellow researchers, students and faculty rely on adherence to stringent ethical standards to promote values such as trust, accountability, mutual respect, and fairness as part of the research process. Quite often, the work of one researcher is cited by another and if the cited research has not been subject to ethical considerations, then it may unwittingly mislead another researcher thus skewing his or her work and potentially have a wider negative impact. Ethics in research, related to the research site and subjects, are pivotal to ensure researchers can be held accountable for such issues as conflict of interest and the protection of subjects/participants. Ethical standards, according to Paul and Elder (2006), consist of a set of concepts and principles which act as a guide for ensuring behavior is monitored

so that it does not cause harm to any subjects. Ethical lapses in research can significantly harm human/animal subjects, students, colleagues and staff and even the wider public (Harcourt & Sargeant, 2012). Finally, the kind of research which is undertaken can have a myriad of moral and social values. This includes social responsibility, human rights, animal welfare, compliance with the law, and health and safety, so it is essential that the ethical integrity of any study or project be subject to a strong code of ethical conduct, which is in keeping with both the academic guides of the research institution and with law of the land (Harcourt & Sargeant 2012; Ransome, 2013).

Ethical considerations for my own purposes included:

- Informed consent and the right to withdraw for the study at any time;
- Obtaining permission from the school board to note the use of Assistive Technology in my class and in those of consenting teachers who agreed to be interviewed and/or participate in the anonymous questionnaire;
- Confidentiality and the protection of participants and research subjects. The research was conducted solely among teaching staff and support staff who responded anonymously to a questionnaire and then, with their informed, signed consent, took part in a face-to-face interview with the researcher. All interviews adhered to strict confidentiality rules, with no names or identifying markers given;
- Debriefing and sharing of final study. Participants have a right to know what the final outcome and format of the study is. It is the researcher's responsibility to share this

1.16 OUTLINE

Chapter 1 provided the background to the study and an introduction to what the rest of the study will entail.

Chapter 2 is the theoretical and conceptual framework which underpins the research and frames the study.

Chapter 3 is the literature review chapter which examines what existing research has to say about Assistive Technology and its practical implementation.

Chapter 4 provides an in-depth account of the research methodology employed in the study.

Chapter 5 provides the analysis and interpretation of data, and summarizes the findings of the research.

Chapter 6 discusses the findings, draws conclusions and makes recommendations.

Chapter 7 provides an explanation of the model for use of AT that arises out of the research.

1.17 SUMMARY

This chapter focused on the background of the study and set out the aims of the research. The means of data collection and analysis were established and made clear

in keeping with ethical regulations to ensure an honest and transparent representation of the research information.

CHAPTER 2

CONCEPTUAL FRAMEWORK

2.1 INTRODUCTION

This chapter seeks to explore relevant literature as it pertains to the important concepts that underpin this study. These include such concepts as inclusive education in Canada, Assistive Technology as it pertains to use in mainstream schools to enhance support for a variety of learners and the concept of educational support. This literature will serve as a conceptual framework for the central question of this study – to determine the efficacy of Assistive Technology in promoting the educational support of all learners in a mainstream school.

BusinessDictionary.com (2015) defines a conceptual framework as “a theoretical structure of assumptions, principles, and rules that holds together the ideas comprising a broad concept” (n. p.). Hornby (2005, p.5) contends that “defining concepts is not an innocent exercise. Meanings/interpretations of concepts are largely influenced by their context. Concepts reflect theoretical concerns and ideological conflicts”. Because these resources use the term ‘theoretical’ this leads to possible misunderstanding of the differences between the terms ‘theoretical framework’ and ‘conceptual framework’. This therefore needs to be clarified. Liehr and Smith (1999, p.7) have ventured to give a definition of a concept as “an image or symbolic representation of an abstract idea” and see a framework for research as a structure that provides “guidance for the researcher as study questions are fine-tuned, methods for measuring variables are selected and

analyzes are planned" (1999, p. 13). Once data is collected and analyzed, the framework is used as a means to check whether the findings agree with the framework or whether there are some discrepancies. This is what constitutes a *conceptual* framework – that is, the specific perspective which a given researcher uses to explore, interpret or explain what is being studied. Chinn and Kramer (1999, p. 252) explain that concepts can be viewed as elements of a theory which "convey the abstract ideas within a theory". This chapter discusses specific elements of educational theory, wellness theory and Cultural Historical Activity Theory (CHAT). This chapter provides a discussion of the elements of each of these theories and forms the foundation for the next chapter in which the theories themselves are explicated.

The elements of theory that are discussed here are:

- Educational theory: inclusive education, including barriers and equity; and smart and good schools; this is contextualized in terms of Canadian education;
- Wellness theory: Hettler's six dimensions; and
- Cultural Historical Activity Theory: mediated action.

Finally the chapter explores the meaning of Assistive Technology as the core concept and focus of the entire thesis.

2.2 INCLUSIVE EDUCATION IN CANADA

2.2.1 Canadian Definition of Inclusive Education

The Government of New Brunswick (a province in Canada), Education department has set forth a definition of inclusion (2009) as a guide to their educational policy

development. This definition states that inclusive education is a “pairing of philosophy and pedagogical practices that allow each student to feel respected, confident and safe so that he or she can learn and develop to his or her full potential” (p. 1). Further to this, Inclusion British Columbia (2015) (another province in Canada) states that Inclusive education requires all students attend and be welcomed in their local schools, placed in “age-appropriate, regular classes and are supported to learn, contribute and participate in all aspects of the life of the school” (n. p). The local, neighborhood schools are essential to inclusion both educationally and in the wider social and societal setting. In Alberta, Canada, the Indicators of Inclusive Schools: Continuing the Conversation (2013) document states that “inclusive education is a way of thinking and acting that demonstrates universal acceptance of, and belonging for, all students. It is a value-based approach to accepting responsibility for all students. It also means that all students will have equitable opportunity to be included in the typical learning environment or program of choice. The creation of a truly inclusive education system in the province requires a shared responsibility of all educational stakeholders” (p. 5).

Thus inclusion is about social, emotional, personal, interpersonal as well as academic pursuits that all students, regardless of ability or socio-economic situation, will be given to improve their life chances. This articulates with an exploration of Wellness Theory, as developed by Hettler (1979) and a focus on the six dimensions of wellness he explores, as this study seeks to determine the efficacy of Assistive Technology in promoting the educational support of all learners in a mainstream school. The elements of this theory are discussed later in this chapter.

2.2.2 Gaps identified in Canadian Inclusive education

With a month dedicated to National Inclusive Education (February), Canada is incorporating Inclusive education as a mandate for every school, in all provinces, across Canada. Inclusive education is thus focused on the manner in which schools, classrooms and learning activities can be developed and designed to ensure all students can learn, engage, interact and participate together.

There has been very specific research aimed at Canadian settings, such as that by Penton (2010) which focused on the gaps in the provision of services for people with disabilities specifically in Newfoundland and Labrador. She highlighted that although the benefits of AT are recognized by service providers, the current mode of delivery, if it is even in place, is underutilized and ineffective in meeting end user/student needs. Penton (2010) highlights the dire need for training of both staff and service providers, as well as training for students/users as a strong requirement for success in using AT in Canadian environments to ensure enhanced support and promote inclusion.

Regardless of the focus on inclusion, as indicated in the National Inclusion month in Canada, the concept of inclusive education is not necessarily in effect in all schools yet. This was evidenced in the Supreme Court of Canada ruling against a British Columbia School Board, in the Jeffrey Moore case (TheStar.com, 2012). This suit was filed in 1997 with a claim that Jeffrey, a young man with a learning disability (dyslexia), was discriminated against and was not receiving adequate literacy instruction in his school. Therefore, he had been barred access to a basic educational right which should have been provided by the public school system. For Canadian school divisions and their

individual schools, this ruling was a watershed moment in that it asked a very serious question – are students with disabilities obtaining the supports they may need to allow them full access to, and participation in, school and the curriculum?

2.2.3 Barriers to Inclusion

Barriers to learning are highlighted in both Alberta Education's Action on Inclusion Special Education (2011) and Setting the Direction (2009) documents. These state that all learners may experience barriers at some stage during their school years. Barriers may include either a diagnosed learning disability, grief/loss, mental health disorders of both a short or long term duration, giftedness, illness and even medical issues. This broad spectrum of barriers indicates that barriers are not simply a learning disability, or exceptionality, but can come in many forms – social, emotional, behavioral and cognitive. As such, developing an awareness of the need to support all learners in the regular classroom environment is important.

There is a significant body of research in the realm of educational support and inclusion, such as Booth and Ainscow (1998), Hamil and Boyd (2000), mentioned previously, as well as the Learning Limits project (Hart, Dixon, Drummond & McIntyre, 2004), Dyson, Farrell, Polat, Hutcheson and Gallannaugh (2004), and Black-Hawkins, Florian and Rouse (2007), to name but a few. Much of this research has focused on strategies to include every member of the class, regardless of disability, and to allow them access to the curriculum and the opportunities presented therein. This current body of work highlights that it is the quality of provision, rather than whether it takes place in a mainstream or additional-support-needs environment, that matters. The Learning

without Limits (2004) project sought to highlight the link between inclusion and school achievement, for all learners within the school environment once barriers had been identified, actively planned for and support implemented. This current work articulates with the strategies for effective support discussed by Black-Hawkins, Florian and Rouse (2007); the three key areas studied were: participation and access, participation and collaboration and participation in diversity.

Copley and Ziviani (2006) identify a number of barriers, which articulate with those identified by Wehmeyer (1999) and also Edyburn (2006a and 2009) which include lack of staff and student training and support, insufficient assessment of needs and collaborative planning processes, funding, managing equipment, and time constraints. All of these researchers suggest that a collaborative or team approach for effective AT implementation be used to optimize the educational inclusion, participation and achievement of children with unique needs and exceptionalities.

The lack of knowledge which many professionals have about technology begins with limited training programs for special education teachers (Todis, 1996). For many teachers, both current and prospective, finding out about Assistive Technology is a personal adventure and is undertaken by teachers during their own time and at their own expense. This lack of professional development and primary teacher training in this area leads to a lack of ongoing support. As pointed out by Alper and Raharinirina (2006), and articulating with the research of Wehmeyer (1999), Copley and Ziviani (2006) and Edyburn (2006a and 2009), the issue for persons with disabilities, or exceptionalities and giftedness, and their families, is that purchased devices are often not successful due to:

- lack of understanding of the specific individual and their unique needs and abilities (Parette & Scherer, 2004; Croasdaile, Jones, Ligo, Oggel & Pruett, 2010)
- lack of consultation with the individual who will be using the AT (Scherer, 1996; setBC, 2007; Croasdaile et al., 2010)
- complicated operation (Scherer, 1996; setBC, 2007)
- costs (Todis, 1996; setbc 2007; Croasdaile et al, 2010)
- unstable technology (Scherer, 1996; Todis and Walker, 1993; Croasdaile et al, 2010);
- lack of technical support (Parette & Scherer, 2004; setBC, 2007); and
- negative attention and the idea of stigma when seen to be using Assistive Technology (Todis, 1996).

2.2.3.1 Historical barriers

The concept of special education (Albrecht, 1992, p. 42) found its roots in the deficit medical model of education (Rieser, 2000) which is based on the premise that a person with a disability has a deficit which needs to be corrected or made “normal”. Of course many social, emotional or cognitive conditions are not “correctable” which means the person with the disability will not become “normal”. The term "normal" is described by Amundson (2000) as a social judgment based in what is or is not acceptable and thus justify the disadvantages which confront people with disabilities. Special education thus perpetuates the deficit medical model of education and further entrenches the belief that students with disabilities are “less” than those without.

Historically, Canada has a rich history of valuing diversity and, in 1971, showed this to the world by being the first country to adopt multiculturalism as an official policy. This

action indicated Canada's affirmation of the intrinsic worth and dignity of all Canadian citizens regardless or religious, ethnic, racial, social economic or political affiliations. This fundamental belief that all citizens are equal is based on the concepts of mutual respect and recognition of the potential inherent in all humans (UN, 1948), and as such encourages all Canadians to integrate into their society and be an active participant in all aspects of life – social, cultural, educational, economic and political. All of these rights, are entrenched in the Canadian Constitution Act (1982), and the Canadian Charter of Rights and Freedoms (1982). Thus, building on these rights and freedoms extended to every Canadian, all children in all schools should be included regardless of ability or disability. Inclusion fosters the development of individual strengths and gifts, coupled with high and appropriate expectations for each child and fosters a school culture of respect and belonging. Inclusive education provides opportunities to learn about and accept individual differences thereby bringing about a positive impact on both school and community and further deepening the appreciation of diversity and inclusion on a broader

2.2.3.2 Overcoming barriers

The opportunities for, and pitfalls in, providing access and participation for students through the use of AT are manifold and highlighted in various international documents which inform the Canadian perspective. The Individuals with Disabilities Education Act Amendments of 2006 (US Department of Education, 2006) mandates that the AT needs of all students with disabilities be considered as part of the Individual Program Planning (IPP), which is an integral part of the school system in which I currently work. This is a legal document which underscores the instructional planning for students with

diagnosed barriers to learning. Zhang (2000) concluded that many of these students would benefit from enhanced supports and the use of specialized AT. For example, IDEA 97 places emphasis on allowing increased access to AT to access the curriculum as an effective means of supporting learning for students with unique needs. These sentiments were echoed in amendments to IDEA (2004 with final amendments in 2006) which again highlighted the importance of students' ability to have access to the curriculum and to supports which would enhance their learning experience.

Research undertaken by Slee (2011a) and Katz (2012) indicated that school environments which actively seek to promote inclusion, are more successful in achieving learning for all. However, there remain many settings in which students who experience learning difficulties or barriers to learning, of a variety of sources (social, emotional or cognitive) or exceptionalities, are segregated by means such as special remedial classrooms, separated instruction or simply from failure to recognize and thus address the needs of the student in the regular, mainstream classroom.

Slee (2011b) challenges this concept of disability and emphasizes the need to build capacity in education to be able to identify, plan for and develop skills in all leaners, including those who may experience challenges and present with a disability or exceptionality. In certain instances, inclusion has been part of the successful culture for some schools in Canada and the USA, as explored by Hehir and Katzman (2012). They examined three highly effective schools, each with a diverse population of students, including a range of students with disabilities. Their research articulates with the inclusion model of Katz (2012) proposed for Canadian schools which incorporates social and academic components to build inclusivity, develop belonging, worth and

competence, and create stimulating learning environments in keeping with Hettler's (1979) wellness theory.

2.2.4 Current Inclusion Focus in Canada

There is a significant body of research such as Timmons (2006), Valle and Connor (2011) and Katz (2011), highlighting the need for inclusion in Canadian schools. These resonate with such common themes and concepts as developing a sense of community, using sound instructional strategies such as Universal Design for Learning, and developing communities of practice with strong guidance from school and divisional leadership. The cutting edge research of Graham and Richardson (2012) and Jensen (2014) has specific application to the Canadian educational environment. These focus on the concept of aligning AT selection to best suit the needs of the learner to promote and enhance educational inclusion in the classroom setting.

Since the current research is situated in a Junior High school in Alberta, Canada, understanding the Alberta Education department's own view of inclusive education is essential to frame the research. Alberta Education supports educational practices that are flexible and responsive to the strengths and needs of individual students create inclusive learning experiences that ensure all students are successful. The Inspiring Education Vision (2010), as proposed by Alberta Education, includes a goal of implementing supports to promote success for all students and ensure inclusive classrooms are created in a wider, inclusive education system. In the words of the Alberta Education (2010), 'The world around us is evolving at an unprecedented rate and the speed of change is increasing every day. We need to prepare Alberta's

students for their future – not our past. The way in which we've previously delivered education is no longer sufficient. So, together, we're changing our way of thinking". (n. p.)

In order to reach this lofty goal, there is a need to focus on the learner as the center of inclusion, and leverage the technologies which exist to provide differentiated instruction to facilitate inclusion. Inspiring Education supports the implementation of various forms of AT as a means by which teachers can increase inclusion and provide support for all learners in their classrooms and schools. In order to do this, teachers need to be given the skills to build capacity to provide the flexible, responsive forms of support that students may need. Aside from professional development for teachers, with an aim of increasing teacher capacity, competency and confidence to deliver focused, targeted AT interventions, implementing the use of AT can support the learning of individual students. AT supports students with wide differences in their abilities, allowing them to participate fully, and engage with not just the curriculum, but their peers in the classroom too. Inspiring Education highlights the many ways that AT in the mainstream setting can be used to meet the diverse learning needs teachers may face, and emphasizes the need for well-planned selection, intentional planning and careful implementation.

For purposes of this study, being the learning support coordinator and responsible for such segregated programs in a Junior High school in a Canadian setting, it became increasingly apparent to me that inclusive education needed to become a priority to support all students. To truly build a learning community committed to the academic and wellness enhancement of every learner, inclusion needed to be a primary focus. This

need was as much a personal drive as it was a mandate in the Inspiring Education directive with which I was working at the time. As the person responsible for working alongside teachers to best support learners, it was incumbent on me to ensure I was basing my decision on sound research. This extended to current policy directing school divisions from a provincial level, and my moral commitment to ensure that my choices for all students in my care, stemmed from an inclusive mind set and not one of “deficit”. The use of AT was the means by which I sought to build and enhance the educational support for students and thus contribute to the inclusiveness of the school culture. The challenge to equip and empower the teachers at my school, and students, with the capacity to effectively use and engage with AT to enhance the support received in the mainstream was thus framed in the context of inclusion in Canada as a whole.

2.2.5 Equity and Inclusion

The concept of inclusion, as defined by the Alberta Education’s Standards for Special Education as amended (2004) states that “‘inclusive setting/inclusion’ means specially designed instruction and support for students with special education needs in regular classrooms and neighborhood schools” (p. 3). As explored in the preceding paragraphs, there has been a shift from the deficit model of education to one that has begun to see inclusion as a child-centered philosophy and approach that allows students to reach their full potential. This inclusive approach seeks to provide all students with the best learning opportunities, which will meet their needs by removing barriers to their participation. In the words of Singleton and Linton (2006), equity in education is focused on “raising the achievement of all students while: narrowing the gaps between the highest- and lowest-performing students” (p. 46) which articulates with the ideas of AT

to remove barriers to learning, support participation and engagement and promote the ideas of inclusion and wellness in all students, regardless of ability or disability. The very ideas contained within this concept of inclusion are unable to be separated from the concept of equity.

The government of Ontario's Education Department Equity and Inclusion (2009) document states that equity is "A condition or state of fair, inclusive and respectful treatment of all people. Equity does not mean treating people the same without regard for individual differences" (p. 2). Inclusive schools recognize and celebrate diversity, value students and staff and see differences as valuable resources to support learning.

In relation to the Action on Inclusion Act (2010), the challenge to educators has been intensified and the bar raised in terms of equity and inclusion in education and provision for supports to enhance education in the mainstream setting. The idea that each child is able to learn has evolved rapidly, and Canada's own policies are echoed international as seen with the mandate of NCLB (2002). This set forth minimum reading and mathematical benchmarks to be achieved by 2014, to now state that every child *must* learn.

2.2.4 Smart and Good Schools

Articulating with the work of inclusion and equity in Canada, a massive seminal study was undertaken by Lickona and Davidson (2005) focusing on the development of ethical learning communities whose members support and challenge each other to "do their best work *(performance character)* and be their best ethical self *(moral character)"*. This work was a national study of twenty-six socio-economically diverse American high

schools, and included hundreds of interviews, research review, input from the National Experts Panel and National Student Leaders Panel to develop and support the final report. Their work reveals not only a vision of educational excellence designed to foster human flourishing over a lifetime, but also practical strategies to ensure this can in fact happen, through using inclusionary methods and promoting equity across all barriers or exceptionalities – social, emotional, physical, intellectual and even socioeconomic. The underpinning premise of their work is the belief that both performance character and moral character - excellence and ethics - are essential to promote productive, successful and ethical lives. They support the use of all the tools available both in the school, the wider community and the lives of the students (and their families) as a means of developing performance character and moral character. Lickona and Davidson (2005) believe that smart and good schools will actively create an ethical learning community, in which all staff, students, parents, and the wider-community are included to provide support. They are also challenged to engage in continuous self-development and review of best practice to ensure that they remain good and smart, and do not lose their focus on providing equitable learning opportunities, maintaining a shared purpose and promoting a culture of inclusion and equity. These work to improve performance and character development. This vision and purpose is echoed in the Wellness Theory and the six dimensions of wellness as developed by Hettler (1979). In the words of Albert Einstein (1950) as cited in Dukes and Hoffmann (2013), “the most important human endeavor striving is for morality in our actions. … To make this is a living force and bring it to clear consciousness is perhaps the foremost task of education”. By this, a society is defined by its core ethical values such as integrity, a

sense of justice and compassion, and the extent that the society respects the dignity and worth of every member of that society, regardless of ability or disability, including the most vulnerable among us.

2.3 ASSISTIVE TECHNOLOGY IN MAINSTREAM SCHOOLS

When one considers the broad definition of AT, as put forth by Cowan and Turner (1999), as 'any device or system that allows an individual to perform a task that they would otherwise be unable to do, or increases the ease and safety with which the task can be performed' (cited in McCreadie & Tinker, 2005, p.911) the applications AT within the classroom can become limitless.

Added to this, in Canada, the recent implementation of the Learning and Technology Policy Framework (2013), has set the stage for the active use of AT mainstream classrooms to support all learners. This document sets forth five "policy directions" (p. 1) to guide the use of technology in respect of student centered learning, supported by research, leadership and professional learning.

2.3.1 Research to support AT use in the classroom

Hemmingsson, Lindstrom and Nygard (2009) undertook a research initiative on the use of AT in mainstream schools and concluded that integration of AT devices into educational practice was essential to ensure that students could experience immediate benefits for their function in everyday school activities without detrimental effects on their social participation. They stated that the latter, the social participation, was often more important than being able to perform activities independently which articulates with the work of Edyburn (2006a, 2013), Ainscow, Booth and Dyson (2006), as well as

that of Baxter, Enderby, Judge and Evans (2012). Further to their research, the work of Lewis (1998) historically explored how the implementation of AT, in all its forms (both “high” and “low” tech) had the power to build on the strengths of students with exceptionalities or disabilities, and thus help them increase their participation and engagement by minimizing or bypassing their limitation or disability. Lewis (1998) proposed a model for conceptualizing assistive technology in terms of its usefulness in classrooms and has developed three pervasive facets to be considered for the current and future implementation of AT. These themes include equity of access to technology and ease of technology use. This model serves as a foundation for other researchers exploring the efficacy of AT in classrooms to promote academic and social engagement such as Zabala (2002), Herzoni and Schrieber (2004) and Heiman and Dorit (2012).

The research articulates with the mandates set out in the Alberta Education Learning and Technology Framework (2013) which actively states that “students use technology, online learning and digital learning to access, share and create knowledge” (p. 2). The research also indicates that implementing AT in mainstream schools requires a delicate balance between appropriate selection to meet student needs, teacher knowledge, confidence and competence to effectively incorporate the AT into the classroom to best support the students and the most convenient AT for the student to use to increase student buy in and avoid AT that is cumbersome or unwieldy. Using yet another definition of AT, as items that are utilized to increase, maintain, or improve the capabilities of a student with a disability (Dell, Newton & Petroff, 2012), the need to actively consider AT for student use is highlighted.

2.3.2 Advantages of AT use in the Mainstream Class

The question posed in the introduction is underscored in the preceding discussion: to determine the efficacy of Assistive Technology in promoting the educational support of all learners in a mainstream school.

The mainstream use of AT allows every student to be included academically through accessing and engaging with the curriculum, as well as socially in that students are no longer removed from the regular classroom setting to receive targeted intervention in another location. AT in the mainstream helps students feel like they fit in. The current reality of such practices as google classroom, Moodle or online learning, all accessible on a smartphone IPad or tablet, students can now access assistive capabilities on technologies that are smaller, more mobile, more integrated and pervasive among their peers in the mainstream classroom. Watson, Ito, Smith and Andersen (2010) state that when contrasted with other interventions, AT has a substantially greater effect in helping students who experience barriers to their learning. They indicate that AT works as a two-pronged approach in that a student, when matched with appropriate AT, can learn how to complete a function or task as well as circumvent the area of challenge. For example, using text-to-speech software (such as Dragon Speak) allows the student to listen to the textbook chapter being read to them, thereby bypassing the barrier to their learning and class participation. This further allows the student to learn new or unfamiliar words as each word is highlighted on screen for the student.

An example of this was recently presented at the Special Education Technology Needs (SETN) Conference in Sydney Australia (SETN, 2015). Consider the manner in which

AT has the ability to facilitate participation in mainstream life for a student with Autism. In the same way that people may use their smartphones, tablets or I-devices to play games, send/ receive text or email messages or listen to music with their earphones, the student with autism can use a mobile device. This can allow them to check a daily timetable, read a social story (prepared by a teacher or parent) in an application such as iBooks. This may help them self-regulate before going to school, or another social situation which could potentially be overwhelming, and using the headphones to perhaps listen to a step-by-step sequencing narrative to help them focus and feel confident before entering the specific situation. To look at this student, they would appear to be no different from any other student with a phone and set of headphones. The AT being used is uniquely suitable for their needs and fosters both social and educational support to enhance inclusion. This seamless marriage of mainstream technology with AT promotes inclusion in a fluent merging of support and mainstream inclusion.

Technology can be the great equalizer in a classroom with diverse learners. Assistive Technology can be the conduit by which teachers can personalize lessons, modify presentation methods to suit unique learning styles, and provide enrichment and skills enhancement tailored to the needs of each learner. Today, with the prevalence of technology in the mainstream, students often have better technology skills than their teachers and can be drawn to computers and other gadgets, so using them in the classroom makes perfect sense. For example, a student with a physical impairment, may be provided with technology such as an E-reader, to access a digital textbook and as such there is no need to apply dexterity for turning pages and thus be excluded from

the mainstream class happenings. The widely-used teacher education textbook, *Educating Exceptional Children* (Kirk, Gallagher, Coleman & Anastasiow, 2014) has a special section in each chapter focused on assistive technology, explaining how it is used with exceptionalities ranging from giftedness to autism and thus enhances inclusion in the mainstream and promotes greater teacher awareness and professional development in terms of AT in the mainstream.

However, despite all the available technology, if the selected AT does not suit the student, it is likely to be abandoned. Early studies by Phillips and Zhao (1993) highlighted the predictors of abandonment of AT and stated four factors: lack of end user consideration when selecting AT, the ease with which devices could be obtained, poor performance of AT, and evolving needs of the user, as indicators which could most effectively determine use or non-use of AT. Thus concepts such as end user involvement, and active consideration of both the current and future needs of the user are essential to ensure sustained AT use and thus promote enhanced inclusion in the learning environment.

2.3.3 Impact of AT in the Mainstream Class

The impact of mainstreaming AT is helping to develop awareness of the principles of Universal Design for Learning (UDL) and the importance of these in using AT in a mainstream setting. Universal Design for Learning is a framework of principles to guide curriculum development and focuses on three simple pillars: allowing multiple forms of representation of learning, multiple forms to express learning, and multiple forms to engage in and with learning. In a bid to ensure that all individuals are given equal

opportunities to learn, and that there is equity in providing access to the curriculum, UDL can serve an important role. These guiding principles encourage the use of various forms of AT in that AT can easily be extended to any student who needs support and thus enhance participation and inclusion. There exist powerful digital technologies which, when applied using the principles of UDL, can support effective customization of curricula for learners who may require these to better understand, navigate, and engage with their unique learning situation or environment. In essence, there is a symbiotic relationship between the complementary roles of UDL and Assistive Technology which is outlined in the work of Rose, Hasselbring, Stahl and Zabala (2005). Simply using technology does not mean UDL is being built into the classroom, or vice versa.

2.3.4 Student Engagement

Student engagement in both learning and everyday school life is a vital element in creating schools that are inclusive and which value student diversity. As teachers and educators, we need to ensure that we serve our students in providing relevant, meaningful learning experiences that motivate and stimulate them and further ensure that we provide the correct tools to enable the students to do so. The Individuals with Disabilities Education Act Amendments of 2006 (US Department of Education, 2006), mentioned earlier, highlights the need for every student to be “considered” for AT if the use of such will enhance their learning and support their inclusion in their local, neighborhood schools. IDEA 2004 with final amendments in 2006) makes specific reference to UDL as a route by which services and products that are usable by people with the widest possible range of abilities can be made available.

However, as mentioned, there is data with regard to specific projects which indicate the positive results gained from using AT in classrooms to support students who have barriers to learning such as difficulty reading (both decoding and comprehension), grapho-motor issues (impacting writing), attention difficulties, social and emotional difficulties, medical issues as well as students with giftedness. Stremel (2005) suggested that the use of technology is important as it can allow students to access curriculum and reach the goals and outcomes set. This idea is further expanded by Jackson (2009) who argued that students should develop their information processing skills to assist them not only in school but outside the class in the modern, technologically complex world. This supports the use of “smart technologies” such as IPads, IPhones and the SMART response systems as used in the classrooms in the pilot study, which facilitate participation for students who may heretofore have been excluded. However, researchers caution that, while the access to the appropriate technology is important, the success of a student using these technologies is highly dependent on a teacher’s ability to integrate that technology into the classroom and curriculum (Bergen, 2000) and thus the need for training and competence in using the AT.

This foreshadows another historical concern for the effective implementation of AT: the teacher’s ability to implement it. Studies by various researchers (Reiser 2001; Floyd, Smith, Canter, Jeffs & Judge, 2008) indicate that in order for teachers to use AT in a manner that brings forth a strong, positive impact, they must be confident and well-trained to do so.

2.4 ASSISTIVE TECHNOLOGY IN THE GLOBAL CONTEXT

The use of Assistive Technology in class rooms across the globe is becoming more prevalent. Several studies have been done in the United States of America, such as The Analysis of Technology Assistance for Children (1996), and the Accessing Curriculum Through Technology Tools project at Western Illinois University, regarding the access, use and efficacy of AT in schools across North America (MacLachlan & Swartz, 2009; Baxter, Enderby, Judge & Evans, 2012).

In Scotland and the United Kingdom, there is a significant amount of legislation pertaining to the implementation of AT use and provision in schools. This includes such general documentation as the United Nations Convention on the Rights of People with Disabilities (2006) and the Digital Agenda 2010 to facilitate a general guide or framework for AT consideration, to more focused legislation applicable to Scotland and the United Kingdom itself, such as the Equality Act 2010, in particular Section 20(6). This section underscores the requirement to provide curriculum and information in a manner that is accessible by all. Education (Additional Support for Learning – ASL) (Scotland) Act 2004/9 mentioned previously in this text makes specific reference to school-age students and is explicit in offering guidance on implementation of the inclusion policy to ensure all school authorities and providers make decisions that address the needs of all students, regardless of ability or disability.

Exploring AT globally is a challenge, as many developing countries simply do not have the resources in place to implement AT to support inclusion and enhance support for students. While the benefits of AT have been shared in the preceding research

explored, the relatively small number of target users in relation to the wider population often make AT very expensive to acquire and use, especially in developing countries. Thus research in such countries is fairly limited although it is encouraging to note some recent studies such as Borg, Lindstrom and Larsson (2011).

Edyburn (2015) has been a significant supporter of the use of AT to enhance educational support for students with disabilities in the general culture of the mainstream classroom. Edyburn (2015) argues that while there is a focus on the burgeoning field of study, and the powerful potential to apply AT has been explored in various studies, there is still room to explore such issues as determining who needs the AT, and how to track the benefits and progress the AT may provide for students. Edyburn (2105) suggests that an international classification system (ISO, 2011) may be beneficial to all education systems in a global context. This idea is further extended by the work of Bassi, Somoncello and Frattura (2012) which suggests that AT interventions, in a bid to be more globally applicable and reach more students, should align with the World Health Organization's Classification of Functioning (ICF) Health and Disability. A number of comprehensive research projects (Alper & Raharinirina, 2006; Okolo & Bouck, 2007; Anttila, Samuelson, Salminen & Brandt, 2012; Ndombo, Ojo, Osunmakinde & Pasha, 2013; Foley & Masinga, 2015), have been undertaken in the last three decades to evaluate the efficacy of AT interventions. These have global significance in that they have explored AT devices, services and outcomes in various educational landscapes and countries.

2.4.1 Frameworks developed for AT Use

Internationally, various frameworks have been developed to support evaluation of AT outcomes to best meet student and user needs, both in school and in the wider community. One popular framework is the Matching Persons and Technology (MPT) Model (Fuhrer, Jutai, Scherer & Deruyter, 2003) which has application for adults and children in the Matching Assistive Technology and Child (MATCH) version. The approach draws on the medical model of disability and aims to determine 'limitations' on functioning and identify goals and technologies that could be used to improve functioning. The approach also considers characteristics of the person, environment or technology that might lead to inappropriate use or abandonment of these technologies.

A second framework which encompasses three descriptors such as effectiveness, social significance and subjective well-being, is proposed by the Consortium for Assistive Technology Outcomes Research (CATOR). This framework is aligned with the International Classification of Functioning Disability and Health (ICF) (WHO, 2001) mentioned previously. These models help to provide the guidance for engaging in systematic evaluation of the use of the AT available for use in classrooms to support inclusion and enhance supports available to all students in mainstream schools. This evaluation promotes identification of good design features along with any disadvantages associated with the AT selected so that improvements can be instituted to benefit the student or end user.

In a similar vein, Cook and Polgar (2014) explore the principle and practice of using AT in a variety of everyday settings to enhance functionality in these. They base much of

their work on a model they refer to as the Human Activity Assistive Technology (HAAT) model. This model emphasizes the relationship between the user and the assisted activity within specific contexts, such as the classroom environment and other everyday situations. Significantly, they focus much of their work and attention towards a variety of global issues with specific reference to highlighting technology applications and service delivery in developing countries.

2.4.2 Growing International Awareness

Perhaps one of the most important developments in spreading awareness of AT and its impact and benefits for enhancing inclusion and supports for all learners in the mainstream setting, is the growing number of reputable, peer reviewed journals which exist, dedicated to the issues facing the use of AT across various countries. Such publications as Journal of Special Education Technology, Assistive Technology, Technology and Disability to name a few bring to the fore pressing issues in the realm of AT use in schools, and other settings, to benefit students and persons with disabilities or exceptionalities. In reading such journals, notice must be taken of the vast number of articles dedicated to highlighting both benefits, obstacles and barriers to the use of AT and the recommendations made by acclaimed researchers in the field of AT.

The need to better equip both Canadian teachers and schools, and the wider, global, educational community with the skills, knowledge and confidence needed to effectively select, implement and evaluate AT for use by all students, is becoming pressing. Higher education establishments are also impacted by these AT choices.

Most universities offer assistive technology features in their programs and courses. These can range from online courses, accessibility features, text-to-speech and vice versa as basic tools. A simple online search of various universities reveals many web pages for each university dedicated to AT and student support services available to students. Many of these universities have dedicated Student Services departments which focus on providing AT supports to enhance the learning of the students registered in these Higher Education institutions. Research undertaken by Wilkinson, Viney and Draffan (2012) indicated that 85% of those students who were in receipt of Disabled Students Allowance (United Kingdom) had not used AT before entering Higher Education and of these, 49% of the students had not been identified until entering their chosen post-secondary institution. In their survey of these students, 67.5% students indicated they used their AT daily and 70% said that their kit “helps them keep up”. This AT landscape reflects an imbalance of sorts in that post secondary and higher education establishments seem better able to equip students, whilst schools do not. This concept serves as an impetus for this study, to determine how the use of AT can provide enhanced support for students in the mainstream school setting. Furthermore, Wilkinson, Viney and Draffan (2012) found in their survey, that approximately 80% of respondents found AT training helpful and were better equipped to handle their unique technologies to access and support their own learning, building their feelings of self-esteem, worth and sense of belonging to their classes.

In light of this, there appears to be a significant disconnect between what schools are doing, and how they are preparing students for post-secondary education, and what their post-secondary institutions offer.

2.5 SUMMARY

This chapter reviewed the elements of elements of inclusive educational theory, wellness theory and Cultural Historical Activity Theory (CHAT), all of which contribute to the concept of inclusivity in mainstream schooling. The concept of inclusion is one which is growing in strength and momentum. No more are educational stakeholders accepting the traditional “deficit” model of education, rather they are moving towards a flexible, respectful paradigm which embraces diversity and difference. Education is evolving and valuing the richness which diversity brings to classrooms around the world.

In a bid to promote and maintain inclusion, and enhanced support for all learners, AT devices are being viewed as a means by which enhanced support can be offered to promote and sustain inclusion in mainstream settings, both in Canada and around the world.

CHAPTER 3

THEORETICAL FRAMEWORKS UNDERPINNING ASSISTIVE TECHNOLOGY

3.1 INTRODUCTION

This chapter focuses on theories such as Cultural Historical Activity Theory, Wellness Theory and Universal Design for Learning which serve as the lens for the current study. This chapter further focuses on the extensive work of Edyburn (2015, 2013, 2006, 2002), Blackhurst (1965), the research of Dell, Newton and Petroff (2012), Golden (1998) and Roblyer (2003) and their research which has been instrumental in shaping the understanding of AT both at a local level as well as internationally.

This chapter explores how AT, in all its forms, can be used to promote Hettler's (1979) dimensions of wellness, as well as promote Universal Design for Learning (UDL), Cultural Historical Activity Theory (CHAT), inclusion and enhanced participation.

3.2 THEORETICAL FRAMEWORKS

Chinn and Kramer (1999, p.258) define a theory as an "expression of knowledge….a creative and rigorous structuring of ideas that project a tentative, purposeful, and systematic view of phenomena". A theoretical framework is able to provide a general representation of relationships between variables in a given study situation.

3.3 CULTURAL HISTORICAL ACTIVITY THEORY

3.3.1 The Origins and Development of the Theory

For purposes of this study, Cultural Historical Activity Theory (CHAT) is a lens through which human activities are seen as a series of processes contained within a bounded

system. Vygotsky (1978) asserted that knowledge was first seen at a social level, and then later translated into the individual level of understanding. The basis of socio-cultural theory, therefore, posits that a person's individual development is intertwined with his or her social environment. Leont'ev (1978) introduced activity as the unit of analysis in the socio-cultural framework and incorporated human behavior with mental development. These processes allow conscious meaning-making of activities in which the student chooses to participate. Within an activity, the events and consequences of the participation in those events can change the participants and their knowledge of their environment, culture and beliefs. This idea was carried further through the work of Engeström's (1999) Activity Systems Analysis which mapped the interaction and effect of and between individuals or groups and their environment and vice versa.

Cultural Historical Activity Theory, as developed by Vygotsky (1978) and as further developed by Leont'ev (1978) and refined by Engeström (1999) postulates that aspects of culture, such as values, beliefs, customs and skills, are transmitted from one generation to the next through social interaction, especially involvement with knowledgeable community or family members. It is concerned with the process of mediation: how practical activity shapes and is shaped by cognitive functioning. This, in turn, aids children in acquiring the thought processes and behaviors deemed valuable and specific to their culture or society. The changes or growth that children experience as a result of these social interactions vary between cultures and this variance allows children to become competent in tasks seen as important or necessary in their particular society or culture. Vygotsky (1978) explained this interaction in terms of "mediated action" (p. 40) in which participants are not passive but active as they interact with

artefacts or tools and use these interactions to make meaning of their environment, or evolve and change their current meanings. Vygotsky (1981) explained this “genetic law of cultural development” (p. 163) as interactions which occur on two levels; first between people interacting together and secondly, within an individual as this social knowledge and learning become entrenched in memory.

CHAT is a theory that addresses human activities as they relate to artefacts, shared practices and institutions. As people study, work and play, they show an accumulated set of habits and values which indicates that learning is not an isolated act. Learning is situated in time and place, influenced by the surrounding resources and subject to the reciprocal influence of learners themselves in that context, thus adding to and changing the learning.

CHAT addresses the central tenet of Assistive Technology in that learners experiencing a barrier to learning can be placed in a context and given the correct tools (technology) to enable interaction with the resources/artefacts (technology) and thus build their learning experiences and knowledge. Again, the idea that learning is not isolated but works in tandem with the environment and tools in that environment which can either support or hinder learning and the acquisition of new skills or knowledge is highlighted.

Functioning within this dynamic whole, incongruence or contradictions arise, in what the student knows or does not know. The concept of contradictions is explored by Engeström (1999) and is seen as new ways of thinking or doing that come into conflict with traditional or currently accepted thinking and ways of doing. These contradictions exist among the elements, or between elements, or among activities in Vygotsky’s

triangulation concept of CHAT. However, these contradictions serve a unique purpose in the learning cycle, becoming a platform from which to launch new learning. Engeström (1987) described this as “expansive learning” (p. 137), in which changing activity systems can aid innovation and improvement in educational practice. By forcing the participants in that learning system to think differently or change their practice, this expansive learning brings about change through the engaging with the contradictions or incongruence that arises. Activity systems do not reside in a vacuum but are constantly influenced by the conditions in which they are situated, including other related activity systems and the persons who engage in the activities themselves. The system is continually striving for balance while encountering tension and contradiction, thus it is a learning cycle similar to Vygotsky’s (1978) Zone of Proximal Development (ZPD). The nature of this model of research is inherently interventionist and thus aptly suited to research on the use of Assistive Technology to promote inclusion of all students in the mainstream classroom.

3.3.2 The High School Learner, Cultural Historical Activity Theory and Assistive Technology

In a classroom situation, CHAT would be best exemplified if students were allowed to choose the manner in which they engage or participate in the activity. When children choose the mode of activity, they also become emotionally engaged and the learning, which is an expansion of one’s action possibilities, is a by-product of the pursuit of motives and goals.

3.3.2.1 A practical, research example of CHAT

In a 5-year study conducted by Kolokouri, Theodouraki and Plakitsi (2012), based on a CHAT perspective, a chosen learning area, Science, was seen as a dynamic activity system. The participants/students, the schools/institutions, the methods, the tools and the objects were connected in a cultural, historical and social process. Their study illustrated how students could choose their means of engagement to demonstrate knowledge in the combination of Natural Sciences and History lessons in the classroom. In this sense, learning becomes an ongoing process affected by societal and historical conditions in which the interactions of science, culture and society play a central role. This is reminiscent of both Vygotsky (1978) and Engeström's (1987) work in the CHAT arena. In their laboratory lesson, Kolokouri et al. (2012) included such participation methods as story narration, making comics of the ideas, debates, drawing and predictions to include every student:

This approach to activity-based, participatory-focused and outcomes-based teaching and learning is further illustrated in the Outcomes Based Education (OBE) approach, often referred to as standards based education, as developed by Spady (1995). This approach is built on three premises: all students can learn and succeed (but not on the same day, or in the same way); success breeds success; and schools control the conditions of success. In the OBE approach to learning, the focus is student-centered and contrasts with traditional education, which primarily focuses on the resources that are available to the student, which are called inputs. OBE requires the students to demonstrate the skills and course content that they are required to learn, using a variety of methods (such as the use of comic strips mentioned above) to engage with and

display their new knowledge. OBE generally promotes curricula and assessment based on constructivist methods. It discourages traditional education approaches based on direct instruction of facts and standard methods. This approach neatly coincides with the CHAT theory which encourages the collective, the group, to help control the conditions in the learning environment. Activity theorists believe the collective control increases the individual's control over his/her own learning and thus enhances learning. Activity theorists further acknowledge the diversity of student populations and how this enhances the learning, since diversity promotes the "cogenerative dialogue" (Ritchie, 2012, p. 10) that mediated action brings out and thus adds to the knowledge in the classroom.

Language used by the students whilst engaging in the activities can be seen as a means to mediate the concrete realization of the goals the students have set for themselves during their participation in a classroom activity or assigned task, using their chosen means of engagement as a tool for acquiring new knowledge and mediating their learning. Thus the person's individual development is intertwined with his/her unique social environment.

Often said to be one of the best kept secrets of academia (Engeström, 1993), CHAT offers the possibility to overcome some of the obstacles inherent in the "talk and chalk" approach to teaching and learning. Empowering students to advocate and help choose their means of participation, which echoes the work of Gardner (1983) and the multiple intelligences theories, can help overcome barriers to learning. The CHAT theory is of immense interest to education and learning as it can be helpful in analyzing data recorded in real classrooms and designing for change. It also permits the introduction of

artefacts to allow for mediated action, when barriers are revealed and need to be overcome to allow students with such barriers to be included in mainstream classes and actively participate. An excellent example of AT increasing participation in classrooms is available in the South Carolina Education system which uses the Individuals with Disabilities Act (2006) to underpin its philosophy (South Carolina Department of Education, 2015). Students with physical, sensory or cognitive disabilities face barriers to learning which can be overcome with high tech, low tech and even no tech options. For example, a student with motor disabilities may not be able to hold a pencil to write answers on a test, or a compass to do a math lesson, but with pointing devices, pencil grips, speech-to-text software, voice recognition software or scanning devices, these barriers can be overcome. Further extensions of this enhanced participation may be seen in such examples as a student with poor vision using enlarged text; a student with motor difficulties making use of an enlarged, simplified computer keyboard or even the use of talking switches to allow a non-verbal student to be the caller for a game of Red Light/Green Light. A student who can comprehend history at the 6th grade level, but can read only at the 3rd grade level, can use a digital textbook with the help of a computer that scans and reads text or even scans in their teacher's materials by using software such as the Read Out Loud 6 program which was used in this research study.

The flexibility of Assistive Technology allows a teacher to build tools and materials that address students' strengths as well as their weaknesses. When Assistive Technology is appropriately integrated into the classroom, students are provided with multiple means of completing their work and focus on achieving academic standards. These multiple methods resonate with both CHAT and UDL principles. For students with disabilities

that interfere with their communication, learning, social relationships or active participation, Assistive Technology supports their participation in learning experiences in the least restrictive environment. Assistive Technology can be the lifeline that increases a student's opportunities for education, social interactions, and meaningful employment. Implementation of AT devices and services to assist individuals in compensating for disabilities and/or utilizing functional capabilities to meet environmental demands, have major implications for individuals with learning disabilities (LD) regarding environmental and curricular accessibility, and compensatory strategies. The barriers which students experience can effectively be minimized and, in some cases, removed through effective implementation of AT coupled with teacher training and support. These can ensure that AT is able to achieve longevity and promote lifelong learning, rather than being inappropriate for the student and thus creating further barriers and even exclusion.

In elementary schools, CHAT can most clearly be seen through the "learning through play" element that exists in Kindergarten and lower elementary classes. "Play is the highest form of research" (a quote attributed to Albert Einstein) manifests as young children engage with objects and use imagination to build conceptual knowledge and understanding of their world and society, such as is indicated in Vygotsky's (1978) mediated action. Just as the young child is absorbed in learning through play, the older high school student transforms this "play" into the interaction with their chosen artefact/tool to begin the mediated action process. Students engage with learning tools, such as AT, along with the curriculum, to best suit their learning style and learning profile and thus learn new knowledge and build new schemata and connections to society and the wider world.

The secondary school curriculum has evolved into a set of formal learning outcomes, clearly illustrated in various curricula from the countries referred to in this research, such as the Alberta Education (2014b) Program of Studies descriptors, or even those in the South African National Qualification Framework guidelines (South African Qualifications Authority, 2008). Outcomes lead teachers to adopt a methodology where they have complete control over the nature of the learning process, the criteria by which success will be measured, and the duration of the learning experience. Cultural Historical Activity Theory (CHAT), on the other hand, encourages students to advocate for and be active participants when choosing their means of participation in classroom activities and curriculum, thus promoting engagement and motivation.

3.4 WELLNESS THEORY

This wellness theory can be applied to education as a whole in various ways. As a policy for staff to create happy, healthy schools which act as agents of learning as well as providing safe, nurturing environments which equip students with both academic and life skills. As well as to specific educational techniques such as the use of AT in the classroom. Hart, Dixon, Drummond and McIntyre (2004, p.203) state that “There is no room in a classroom dedicated to learning without limits for learning opportunities that only benefit some people”. This statement encapsulates the very heart of wellness theory, especially as it applies to learning and the promotion of equity and inclusion. Learning is for all, and equity in learning means not that everyone is treated the same, because we are all different, but rather that we are given the same opportunity to access learning but in ways which meet our needs. When a group of students knows they are recognized and have value in and to a class, they develop solidarity and the

community of learning (Wenger, 2002) is maintained. It is centered around including all students, and providing as many opportunities in a variety of ways so that every learner's particular learning style (Gardner, 1985) may be accommodated. This idea of togetherness can be seen in the pioneering work of Freire (1972). He believed in "co-intentionality" in that both teacher and student share the same space in a classroom and so should learn from each developing relationship and eroding oppression. An educator or teacher causes a process to start and then acts to keep the process in motion by generating or stimulating the learning environment. This is especially true when considering Hettler's (1979) overarching definition of wellness to be that of an active process through which people become aware of, and make choices toward, a more successful existence. The National Wellness Institute in Wisconsin devised three significant questions that can guide persons and organizations, such as schools and higher education institutions, in evaluating the degree to which wellness is included in their programs.

These in turn articulate with the questions educators need to ask in terms of using AT in a classroom, as follows:

- Is it appropriate to the unique needs/exceptionalities of the student?
- Will it help, extend or hinder their progress?
- Does it capitalize on their strengths so as to build esteem and autonomy to facilitate lifelong learning and inclusion in the mainstream classroom where possible?

Academic growth, progress or achievement is important for students across the world, and is mandated in the many educational acts such as the Action on Inclusion Initiative (2010) in Canada.

The five dimensions Goleman (1995) defined for growth, namely, self-awareness, self-regulation, internal motivation, empathy and social skills dovetail with the six dimensions of Hettler's theory (briefly discussed in Chapter 2). These articulate with the overarching questions which AT seeks to answer to ensure inclusion of students experiencing barriers to their learning, be it through a disability or as a gifted student.

Wellness is a construct in which the individual, as an indivisible being, attains a positive state of integration of mind, body, and spirit with the environmental contexts. Academic achievement for children occurs within the construct of wellness, as there is mutual influence between academic factors and non-academic factors for a child. Common dimensions across Hettler and Goleman's models are social, occupational (which could be considered school work for children), spiritual, physical, intellectual, emotional, and environmental contexts. Achieving wellness is a sum of the seven composites and life contexts and is considered to be a measurement of general well-being (Myers & Sweeney, 2005).

3.4.1 Physical Wellness Dimensions and Assistive Technology

Ratey's (2008) seminal work, "Spark Revolution", documents longitudinal studies of the positive impacts of physical exercise on academic performance for both students coded with Attention Deficit Hyperactivity Disorder (ADHD), Attention Deficit Disorder (ADD) as well as student who are not diagnosed with any learning or behavioral disability. The

mind-body connection was famously documented in the Naperville, Illinois school district project with Ratey (2008) over a series of years which resulted in the school district attaining record results in their science achievement tests. This provided support for maintaining Physical Education in schools during a time when budget cuts were eliminating such programs from US schools. The heightened focus and retention allowed students to be more successful, and findings showed that students reported feeling more confident, alert and in control of their emotions. The research site has mandated Physical Education for one hour every day, which is in keeping with the research of Bailey (2006) who stated that a broad spectrum of benefits can be attributed to physical education. These include aiding “children to develop respect for the body - their own and others’, contributes toward the integrated development of mind and body and develops an understanding of the role of aerobic and anaerobic physical activity in health” (p. 397).

AT has contributed to the physical wellness dimension of Hettler’s work in that the use of assistive devices such as wheelchairs, and even medical devices such as prosthetic limbs (to name but a few) all contribute to the enhancement of physical wellness and the ability to be mobile, interactive and active. Use of pointing head devices, special keyboards and camera devices to enhance participation in classrooms / work places along with the existence of software to promote personal awareness of safety, healthy eating and nutrition which are freely available on “app” (application) stores. These devices articulate with this particular dimension’s path to optimal wellness, which can have a dual impact in that the physical benefits of feeling well tend to build confidence,

which in turn can lead to the psychological benefits of enhanced self-esteem, self-control, determination and a sense of direction (McNaughton & Light, 2013) .

3.4.1.1 Health care, physical wellness and Assistive Technology

The idea of physical wellness encompasses the use of AT as it is linked to developing personal responsibility for one's healthcare. An example is seen in the work of Desroches, Aissaoui and Bourbonnais (2006) which explores wheel chair tilt to provide optimum support. Taking personal control of health issues and making positive lifestyle choices to ensure physical wellness can include decisions to use AT devices such as wheelchairs, eye glasses, hearing aids, walking aids and even prosthetic limbs. One prime example of the excellent advance in medical assistive technologies has allowed wheelchair users who have difficulty sitting upright, or who have postural abnormalities, to benefit from customized seating and positioning systems. The systems use modified back supports, seating components, and tilt or recline features to meet an individual's needs. The systems are designed so that users can achieve the best possible posture and can improve their performance of everyday activities, such as attending lessons in mainstream classes and not being sidelined to resource rooms or special classes.

The Annual "Fit In Conference" (October 2013), hosted jointly by the Institute for Human Performance, New York and the Golisano Children's Hospital and supported by research from the Syracuse University School of Education, further highlighted the importance of physical wellness for all students and people (Afya, Samant, Scherer & Morris, 2012). Their research articulates with the United Nation's Millennium Development Goals (United Nations, 2011) which highlight the need for professionals

and staff working with students and people with a disability to have a knowledge base in evidence-based practices. These are practices that improve well-being and participation in all life events for people with disabilities, through effective service delivery of Assistive Technology. This, in turn, dovetails with the World Health Organization's International Classification of Functioning, Disability and Health (ICF) (2001) and their goals for inclusion and support of physical wellness and the use of AT to improve quality of life and access to participation in all areas of one's life. The inclusive fitness movement supports the use of assistive technologies in ensuring students are given the opportunity to engage in physical fitness initiatives to stimulate wellness. According to Zieff and Veri (Eds.) (2003), the growing impact of the Special Olympics and sports such as wheelchair soccer, basketball and even rugby, articulate with the paradigm shift to empowering all people to pursue sports and physical activities simply by adapting existing medical technologies to create the specialized wheelchairs needed for such sports.

Another fitting example from research is the use of FM systems for the hearing impaired. Research shows that all students, especially those with attention deficit problems and aural learners, also benefit from this technology (Evans, 2001; Gertel & Schoff, 2004; Vockley, 2005). This is an example of how the implementation of AT in the classroom serves to promote inclusion for all students, and thus enhances not only achievement in the classroom, but attainment of dimensions of physical, intellectual, emotional and occupational wellness, and can be seamlessly fused with general classroom delivery methods. The work of Lickona and Davidson (2005), in the project "Smart and Good Schools", (Chapter 2, S2.3.1) highlights this need to develop the

whole person, to achieve the ultimate goal of all schools – to build strength of character that helps students lead productive, ethical, fulfilled lives, and promote academic achievement. This means a focus on the six dimensions of wellness as a means of expanding, deepening and enriching character, moral and performance character development in schools. Lickona and Davidson (2005) found that high performing schools were connected, cohesive and collaborative, with well-articulated goals regarding wellness dimension development to enhance academic achievement, performance and strengthen student capacity to develop a life of balance.

3.4.2 Intellectual Wellness Dimension and Assistive Technology

According to Hettler (1979), an intellectually well person effectively uses the intellectual and cultural activities in the classroom to expand knowledge, improve skills and experience life more fully. Intellectual wellness refers to active participation in academic, cultural, and community activities and involves assimilating what is learned in the classroom with life experience. AT promotes intellectual wellness in that it couples assistive technologies with instructional technologies. These promote reading and writing, which further enhance not only inclusion, but development of skills and the opportunities for students in terms of the classroom and even future work placements. In their research in Ontario Schools, Sider and Maich (2014) indicated that AT use can support students by enabling them to perform and complete tasks with greater autonomy and independence through scaffolding of literacy supports. Integrating such AT devices as interactive white boards, text-to-speech software and classroom amplification systems help to promote inclusion of all learners and provide flexible learning opportunities to enhance engagement and participation in the classroom.

Students who face barriers to participation, and those who do not, in terms of language development and literacy can now access such AT as Kurzweil, for example, which converts scanned text to speech providing a multimodal experience that supports decoding letters, sounds and words by listening to text read aloud. This AT is portable and transferable to a variety of different situations such as home, school or even work place. Text-to-speech accessibility is now more common (Raskind & Higgins, 1999), being added to a wide variety of cheaper, commercially available laptops, phones and even watches (iWatch). This AT can support not only reading and writing fluency skill development, but also executive functioning such as organization, fine motor coordination, keyboarding and, more importantly, independence.

3.4.2.1 Scaffolding support and Assistive Technology

The idea of sharing skills, talents and scaffolding to create an inclusive learning community, can work for all students in the class. Gifted students, or students with exceptionalities, can scaffold and support their peers in peer mentoring programs to enhance overall classroom participation and inclusion (Goleman, 2005). This further entrenches the principles of equity to build inclusive learning environments which is the basis from which the “Education for All” (EFA) goals and the “Millennium Development Goals” (MDGs), set forth by UNICEF (2000), evolve. There is a greater spotlight on reaching the hard-to-reach students, students at risk, those who are excluded, marginalized, disadvantaged or disengaged in terms educational opportunity. At the heart of inclusive education are the edicts of the Universal Declaration of Human Rights (1948, art 21.3), the United Nations Convention on the Rights of the Child (1989) (UNCRC) and its core belief that “all children ... receive education without discrimination

on any grounds". The rich learner diversity, be it cultural, religious, socio-economic, cognitive, emotionally or socially, present in classrooms around the world (whether South Africa, Scotland or Canada) challenges educators to rethink how they approach what they teach, and more importantly for AT and UDL, how they choose to teach. By recognizing this diversity, and providing supports to maintain equity in classrooms to enhance this diversity, they recognize that diversity adds to the rich culture of their classroom. Respecting diversity is a conduit through which society can benefit, thus respecting the wellness dimensions inherent in diverse student populations.

The research conducted by Lancioni et al. (2009), coupled with Hettler's (1979) wellness theory research, articulates with the Alberta Government's Action on Inclusion (Alberta Education, 2010) work, and the wider world such as IDEA (2006), all of which seek to include every learner, across a wide and diverse set of learning needs, mandated by statute. The Alberta Government's Action on Inclusion (2010) document set forth requirements which schools in Alberta are required to apply in offering support and placing structures that enable all students to succeed and access services or technology that is realistic and reasonable for the school situation.

3.4.2.2 Creating virtual learning

Research undertaken by Edyburn (2000), a widely acknowledged leading expert in the field of educational AT, highlights the importance of AT in supporting inclusion. Learners with exceptional needs, most specifically those with a mild to moderate disability (linked to both intellectual and physical wellness), experience an impact on cognitive and executive functioning, which, in turn, has an impact on their ability to function in a

classroom. However, the use of AT is not limited to cognitive delay or deficit only. Students who are termed “gifted and talented” need to be enriched and have their learning extended. Providing access to technology which can take them out of the classroom, and help them learn in virtual classrooms at a higher level, is equally essential to improving the outcomes for their learning. Troxclair (2000) extrapolated the significance of using AT to enhance the learning of students who are gifted, using technology like the internet to stimulate thinking and create higher order learning opportunities. Using technology to replace an existing delivery method and promote independent study, mentoring and even offer the ability for acceleration and the taking of additional courses or dual credits from online institutions, can all add to and enrich the learning experience of gifted students. Creating virtual learning environments, and allowing students to access web-based learning sites such as Khan Academy (freely available on the internet) to promote higher order operations and the virtual teaching of such, allows the gifted child to be enriched. It also provides an opportunity for the teacher to remain part of their learning and help to plan a program for this, whilst still delivering a program of studies to others in the class who may not be at this level. AT can therefore benefit those who face challenges and those who need enrichment and further challenge.

This is true too, for students who may experience a sensory disability – blindness, deafness, mutism or even a medical condition such as Attention Deficit Disorder, Attention Deficit Hyperactivity Disorder, Autism, Pervasive Developmental Delay, Global Development Delay as well as social and emotional disorders such as Reactive Attachment Disorder or Oppositional Defiance Disorder and diagnosed learning

disabilities such as Reading Disorder, Disorder of Written Expression or Mathematics. AT can enhance the students' ability to participate in the classroom and to increase the opportunities to learn and grow, if the appropriate AT is selected ((Marr & Sall, 1994). Special Education Technology, British Columbia (SET-BC) is a government establishment whose sole purpose is to offer training, advice and assist students in school district to be successful and allow access to the curriculum (Ministry of Education, British Columbia, 2013). They can help select and loan out assistive technologies (reading, writing, and communication tools) where necessary to ensure students' access to educational programs, and further assist school districts in providing the necessary training for students and educators in the use of these technologies. This supports the selection process which is paramount in ensuring the successful use of AT to promote inclusion: with the correct tools, students can feel they are valued in the classroom, can participate and grow as intellectual and academic beings.

Many research studies such as Booth and Ainscow (1998), the Learning Without Limits project, (Hart, Dixon, Drummond & McIntyre, 2004) and others like Dyson, Farrell, Polat, Hutcheson and Gallannaugh (2004), and Black-Hawkins, Florian and Rouse (2007), to name but a few, were undertaken on the use of AT to include every member of the class, regardless of ability/giftedness or disability, and to allow them access to the curriculum and the opportunities presented. Each of these studies found that use of AT promoted the intellectual wellness of the student.

3.4.2.3 Negativity associated with Assistive Technology

The negative feelings often associated with learning disability, or being singled out for supports (whether as a gifted or challenged student) can be mitigated through the use of appropriate AT which can allow greater integration of all students and aid their access to lifelong learning. Whereas before the implementation of AT, students may not have been able to access the presented curriculum fully, or who required enrichment for their learning, with the use of AT, these students can now participate fully and thus have a wider range of opportunities opened to them. Examples already cited include access to the printed word through audio or software readers (which could allow for various levels of teaching in the same classroom to enhance enrichment programs), the use of laptops and speech-to-text apparatus to allow for the written element of production, and even simply adjusting the environment of the students through the use of appropriate furniture to enhance student engagement and participation.

3.4.3 Emotional Wellness Dimension and Assistive Technology

According to the University of Illinois Wellness Center (n. d.: n. p.), the emotional dimension of wellness involves “developing awareness and acceptance of one's feelings. Emotionally well people are able to express feelings freely and manage feelings effectively”. This is not “an end stage but a continual process of change and growth”, enabling one to maintain “satisfying relationships, deal with conflict and remain grounded during stressful times”.

AT in the classrooms can be instrumental in supporting this building up of emotional intelligence and the idea of a “can do” attitude. Being able to do something in a

classroom, such as read independently through the use of audio books or text-to-speech software (Dragon Speak or Read Out Loud 6), can boost confidence and develop self-esteem in learners (Raskind & Higgins, 1999). The previously hard-to-include can now be included and contribute to the classroom environment and learn alongside their peers if AT is used appropriately and efficiently. This is not limited to only reading, but also to the use of computers to assist in writing. The use of speech-to-text software is instrumental in supporting this. Assistive Technology allows students to benefit from technologies that enable them to perform tasks that they were formerly unable to accomplish, or had great difficulty accomplishing (Okolo & Diedrich, 2014). The New York City Education board has an AT department within it (known as the Technology Solutions Office) to assess and evaluate the augmentative and alternate forms of technology that may be required for students. This department constructively assesses the appropriateness of selected AT for students to enhance inclusion, and thus promote their growth and development (NYC Department of Education, n. d.).

In Canada, “pull out” or remedial programs exist which require students to leave their regular classroom to receive remediated instruction and supports with a teacher or teaching assistant (Mussman, 2011). The “pull out” model that provides additional, remedial instruction to identified students, has garnered much criticism such as the teaching time lost in removing the student to a different location (Allington et al., 1988) and the negative effects of labeling students (Glass & Smith, 1977; Leinhardt & Pallay, 1982). This “exclusionary” practice is something I have witnessed and even orchestrated at times. It is because of this practice that my own desire to minimize this situation where children are separated from the mainstream led to research in the field

of AT to lessen and even eradicate barriers for my students. This “exclusion” from the regular classroom can be minimized by the use of AT (Alquraini, 2011) which seeks to include the child in the activities of the classroom and thus incorporate the principles of CHAT (Vygotsky, 1987). These principles foster students working together to build shared understandings, and share knowledge exchange, in a natural setting and not the contrived “pull out” setting where they may be battling social isolation issues and potential blows to their self-esteem. Providing tools through AT to allow students to work in their classrooms/homerooms and work towards building autonomy and independence can develop not only academic skills, but life skills and independent functioning skills.

3.4.3.1 Emotional wellness and independence

Further enhancing emotional wellness, and promoting the development of self-worth and self-esteem in students through the increase in independence and autonomy, the use of AT can help facilitate students to complete basic life skills and function independently. Raskind and Higgins (1999) explored the effects of improved, more discreet speech recognition technologies, while the work of MacArthur (2009) focused on writing technologies, and both found that they promote feelings of self-worth and improve self-esteem in learners. For example, telephone systems/communication devices with Braille supports for blind and visually impaired students, the use of hearing aids and communication devices to facilitate the increased social interactions for students with a hearing impairment with their peer group and the wider world, can all contribute to the promotion of self-esteem and self-worth. Creating the skills to use social networking sites like Twitter or Facebook for students with anxiety issues can

help establish initial contacts and involvement in buddy groups or friendship circles and thus promote emotional wellness and lessen anxiety for these students.

Hettler (1979) stressed that mental and emotional wellbeing is essential to effective functioning in the other areas of wellness, thus ensuring students who face challenges to their learning, whether from a disability or from a need for further enrichment, can be effective participants in the other areas in their lives. This sentiment is echoed in research undertaken by medical doctors and psychiatrists, Greenberg, Weissberg, O'Brien, Zins, Fredericks, Resnik and Elias, (2003), educational theorists like Goleman (2005), Rose and Gallup (2000) and Metlife (2002), and classroom teachers such as myself. One study conducted by the U.S. Department of Health (cited in Greenberg et al., 2003) showed that approximately 20 percent of young people experience mental health problems and of these, 80 percent do not receive appropriate interventions (U.S. Department of Health and Human Services, 1999). Another study by Benson, Scales, Leffert and Roehlkepartain (1999) indicated that large numbers of students with mental health concerns and social-emotional problems, also have learning difficulties. Dryfoos (1997) found that almost a third of 14-17 year old students in schools were likely to engage in risky behaviors and jeopardize their chances of success in school and in later life, due to emotional issues and concerns. More recently, Kieling, Baker-Henningham, Belfer et al. (2011) found that mental health problems affect 10-20% of children and adolescents worldwide. They illustrated that these problems do not seem to have been addressed over many years, and concluded that "[d]espite their relevance as a leading cause of health-related disability in this age group and their long-lasting effects throughout life, the mental health needs of children and adolescents are neglected" (p.

1). One factor identified in their study was that mental health problems were strongly associated with academic difficulties with contributory factors such as bullying, family dysfunction, child labor, physical and sexual abuse, use of tobacco, alcohol, and drugs, pathological use of the internet, obesity and teenage pregnancy, exacerbating the lack of intellectual and emotional development.

The promotion of emotional competency, as seen from this perspective, is thus paramount to ensuring a successful educational experience and inherent in promoting academic success and promoting life skills and resiliency. Emotional competency helps to reduce risky behaviors and promotes academic gains as is illustrated in the research of Hawkins (1997) and Payton, Wardlaw, Graczyk, Bloodworth, Tompsett, and Weissberg (2000). The Alberta School Act of 2015 (Alberta Education, 2015) has dedicated many resources to ensuring “safe and caring schools” (p. 43) within the province in a bid to ensure all learners’ challenges, from bullying and marginalization to disabilities, are met within a nurturing, safe environment that promote the holistic and healthy emotional, social and academic development of the students in schools.

The overarching goal of any school should be to promote teaching and learning, and ensure that all students can access these processes by being mentally confident and emotionally safe. This idea was the guiding force behind the establishment of the coordinated social, emotional and academic learning approach adopted by Weissberg and Greenberg (1998), Perry (1999) and Mrazek and Haggerty (1994). The approach sought to enhance protective mechanisms for emotional competency to support academic progress through coordinated planning. It is built on the premise that support efforts are most beneficial when they are explicitly planned and coordinated with others

in the learning and wider community. The idea of careful planning to enhance the supports for all students is again paramount, as is inherent in the AT process.

In my previous work (Rowlands, 2010), over the course of the Scottish academic session 2009/2010, it became clear that inclusion and an inclusionary approach to education meant creating a community in which all members are valued and provided with equity and access to curriculum and learning opportunities. Daniels and Garner (2000) state that:

> "inclusive education is not integration and is not concerned with assimilation or accommodation of discriminated groups or individuals within existing socio-economic conditions and relations. It's is not about making people as 'normal' as possible. Nor is it about the well-being of a particular oppressed or excluded group. Thus, the concerns go well beyond those of disablement. Inclusive education is not an end in itself, but a means to an end- the creation and maintenance of an inclusive society" (p. 58).

3.2.7 Social Wellness Dimension and Assistive Technology

Values such as equity, encourage further values such as belonging and feeling valued as a contributing member of the society in which we live. Equity means understanding the unique needs of a person and trying to meet these in way that provides a full, healthy life. Equality, on the other hand seeks to ensure that everyone is treated the same way, regardless of circumstances in a means to a full, healthy life. Like equity, equality aims to support the ideals of fairness and justice; however, unlike equity, equality is only successful when everyone starts from the same place, and needs the

same things. The government of Ontario, Canada has gone so far as to create a directive, the “Equity and Inclusive Education Strategy” (2009) regarding equity to ensure that all students have the opportunity to reach their highest potential in the society in which they live, learn and grow. Assistive Technology seeks to further this goal as it inherently aims to promote and enhance overall quality of life. The province of British Columbia in Canada has established the Equipment and Assistive Technology Initiative (EATI) to provides a source of funding for assessment, trialing, purchasing and/or training with equipment and assistive devices that promote social and occupational inclusion (BC Personal Supports Network, 2011). Currently, the BC Coalition of People with Disabilities (BCCPD), CMHA-BC Division, Inclusion BC and SPARC BC are working with the Ministry of Social Development and Social Innovation (MSDSI) to facilitate the development of community-based demonstration projects that will contribute to improved social inclusion outcomes for people receiving Persons with Disabilities (PWD) assistance (Disability Alliance BC, 2015).

Another example of using AT to facilitate involvement in the wider community could be the use of micro-switches and computer-aided systems as shown in the research of Lancioni et al. (2009). Being able to actively participate in one’s environment and community can develop a strong sense of belonging and feeling of self-worth, the impact of which Goleman (1995) believes is invaluable. The use of AT, whether in its low tech or high tech form, can help build the feelings of self-worth and sense of direction of students. Software exists, such as Photo Story, which can help students with Autism, Asperger’s and other Autistic Spectrum Disorders (ASD) develop social stories for use in sharing their frustrations, learning vicariously and also mapping out

what they see in society and being able to plan to respond accordingly, thus promoting feelings of safety and confidence and minimizing feelings of uncertainty and anxiety (Autism in Education, 2015). One such example is that of Stigma the Dragon, a photo story posted on Youtube regarding the social stigma often associated with living with Autism. The work of Grandin (1995), a celebrated author, senior lecturer in animal husbandry at the University of Colorado and person diagnosed with Autism, also underscores the value in using AT to empower students with an Autism Spectrum Disorder (ASD) to interact socially, participate in and be part of the wider world. Grandin's book, "Thinking in Pictures" (1995) echoed the importance of using visual cues and pre-teaching through social stories to prepare students diagnosed with ASD to handle the social world of human existence and not be isolated from it.

3.2.8 Spiritual Wellness Dimension and Assistive Technology

The spiritual dimension of wellness involves seeking meaning and purpose in human existence. It is a personal matter involving values and beliefs that provide a purpose in our lives (University of Arkansas for Medical Sciences, 2015).

Through the inclusionary process, improvements in quality of participation, promotion of feelings of self-worth and purpose were noted. Naik (2012) conducted a vast research project under the auspices of the University of Melbourne which examined wellness in detail and focused on AT to support such as robotics, smart homes and social connectedness (not being isolated form the community and world at large) to promote quality of life, especially in the older generations. This research, while based on the elderly, had overarching recommendations linked to wellness and the ideas of Universal

Design, which can be transferred to education and the need to enhance the spiritual wellness of students. Recommendations included promoting belonging, feeling safe and nurtured and promoted independence to create a positive life perspective.

3.2.9 Occupational Wellness and Assistive Technology

Occupational wellness is the ability to achieve a balance between work and leisure time, addressing workplace stress and building relationships with co-workers. Included in this concept are personal satisfaction and enrichment in one's life through work (University of California, 2015). This articulates with education in that the AT processes and procedures implemented at school level, to enhance performance, independence and participation, can be followed through into post-secondary and working environments. An example of this could be reasonable accommodations such as the removal of physical barriers to allow wheelchairs to access previously inaccessible buildings. Schools and universities built with ramps, wider doorways and corridors, and wheelchair accessible bathrooms are all physical accommodations that can be made to support wellness in the schools and in the wider world of occupations.

There is a growing trend in Canada for schools, many of which are in the school division in which I teach, to institute Knowledge and Employability (K and E) courses for students who may otherwise not complete a more rigorous academic curriculum. Alberta Education (2014a) has been structuring such courses since 2008. These courses are designed for students who learn best through experiences that integrate essential literacy and basic mathematics outcomes and employability skills in occupational contexts. The courses provide students with opportunities to enter into

employment or continue their education and are part of the formal curriculum in Canada. Courses such as these help promote the apprenticeship program employers are required to institute to comply with policies for hiring, training, retention, and promotion of members of any designated/minority groups in a population. An apprentice program is directed toward people with disabilities. Training with specialized equipment and AT allows them to fully participate in, and access the working environment, using the skills taught at school and needed in the working world.

Schools can further provide AT (as done in the pilot study for this research) in the form of speech-to-text and text-to-speech programs, laptops, live scribe pens and computers. Lower technology options such as specialized chairs (such as the Hokki stool used in this research project and illustrated in Appendix D1) or desks, pencil grips and fidgets (Appendix D2) to help students maintain focus and attention, and progress in their learning, are also available to help acquire skills necessary for the work place or post-secondary studies. These same pieces of equipment or environmental changes can be applied in the world of work, to facilitate the inclusion of people with disabilities in occupations.

At the center of occupational wellness is the premise that occupational development is related to one's attitude about one's work. The choice of profession, job satisfaction, career ambitions, and personal performance are all important components of one's journey in occupational wellness. The implementation of AT which sustains these choices, allows the individual to develop functional, transferable skills through structured involvement opportunities rather than remaining inactive and uninvolved.

AT becomes relevant and essential when one subscribes to a theory of inclusion and the need to incorporate the six wellness dimensions in ensuring all students are included at their level, using their unique learning styles (Gardner, 1983) and preferences. The use of AT echoes the principles of CHAT (Vygotsky, 1978) and underpin the ideals of inclusion and equity in education. My question of why one would use AT in a classroom seems to be straightforward then – AT promotes inclusion and wellness, as well as enhancing the experience of all students, not just students with learning disabilities, in a mainstream classroom to support learning for all. However, many schools do not use AT, as was the case in the pilot study school.

3.4 UNIVERSAL DESIGN FOR LEARNING

Further highlighting the discussion thus far, is the theory of Universal Design for Learning (UDL) – designing both environment and curriculum that includes all students – embedding the social wellness theory of contributing to the wider community and the common good. Universal Design ensures that what has been produced, whether it is a building or a product, can be used by the widest group of people including those who may have a disability. UDL seeks to enhance learning materials, methods, assignments and evaluations, which are created to ensure that all students have the opportunity to participate fully in the teaching and learning environment (Rose & Meyer, 2002). UDL is not merely a method of accommodating students who have a disability. It goes far beyond that, including the implementation of AT which allows students who may otherwise not be able to be included in the classroom and wider community activities, to now be included. The work of Rose, Hasselbring, Stahl and Zabala (2004) in this area has been seminal in highlighting that UDL and AT enhance and support each other in

creating lifelong learning opportunities and promoting wellness in all dimensions. This could be as basic as having ramps for wheelchairs, handles for those using walking aides and wider doors and entry ways to allow those users to be part of the classroom/group and thus enhance social interaction. A more technical inclusion could be the use of video-conferencing, allowing students who are at home for medical reasons to be included in the daily events in the classroom.

Universal Design for Learning (UDL) works from a bottom up design in that it starts to plan from the point of most need or the lowest common denominator. It draws on medical, engineering and educational theories that state inclusion of students with a disability or barrier to learning should not be an afterthought, but rather part of the planning process from the onset. UDL encapsulates respect for diversity and embraces inclusion as it seeks to provide supports to support and enhance the learning experiences of all learners.

One concern, however, is the access in schools – retrofitting access to classrooms, ramps and doorways all have to be considered to allow for the inclusion process to be further facilitated. The concept of Universal Design for Learning seeks to redress this imbalance. The Alberta School Act and in particular the Standards for Special Education (Alberta Learning, 2004) make explicit provision for all students to receive equitable access to schooling with their peers, seeking to create a community where every student is valued and included where possible. This right to access is echoed internationally in the No Child Left Behind Act (USA Congress: 2002), the South African Schools Act (1996) and the Additional Support for Learning, Scotland Act (Scottish Executive Education Department, 2004), all of which highlight the need to be inclusive

where possible, and to create communities of learning where all members are dedicated to supporting and enhancing the learning experience of all, regardless of ability (perhaps gifted) or disability, with the aim of empowering each person to use his/her unique gifts and talents.

3.4.1 The Articulation of Assistive Technology, Universal Design for Learning, Wellness Theory, Cultural Historical Activity Theory and Inclusion.

The planning element of using AT as an intervention to support inclusion and enhanced learning support in the mainstream classroom among students who experience barriers to learning, is the most important step in using AT and is often commented on in research studies (Murry and Murry, 2000). Theorists such as Edyburn (2002, 2006a) support a simple process of posing three questions when considering implementing AT for students. These include assessing the disability (what), the impacts or limitations of learning (why) and what equipment/AT will be best suited to accommodate this learner (how).

These three questions articulate with the three overarching principles of Universal Design for Learning as well as the basic premise of Wellness Theory (as explained above) and the foundation principles of Inclusion. Universal Design for Learning (UDL), as explained by Rose and Meyer (2006), explores the pedagogical, neuro-scientific, and practical underpinnings of UDL and the three principles on which UDL is built. Their work is further supported by the Center for Applied Special Technology (CAST) (2013) which clarifies the guiding principles of UDL as:

- Representation – to offer learners various ways of acquiring information and knowledge;
- Expression – to provide students alternatives for demonstrating what they know; and
- Engagement – to tap into students' interests, challenge them appropriately, and motivate them to learn.

3.4.1.1 Principle One

The first principle of UDL highlights the "what" of learning (CAST, 2015) by underscoring that every learner is unique and thus learns in a unique manner. Each learner is different in the manner that they perceive, process and understand information that they are presented with. Thus, students with a sensory disability such as blindness, or a learning disability or even those who may have language or cultural differences, such as Second English Language learners, each need a different means of working with presented information. For example, some leaners can more easily and efficiently connect with information through seeing or hearing (visual or aural) means. Others prefer printed text, while still other students may require modifications to access presented information. Learning, and transfer of knowledge, is best facilitated when various representations are used in tandem with each other. This facilitates learners making connections between themselves and the new information/concept (such as is indicated in the premise of CHAT) which allows students to interact with the learning both at an inter and intra-personal level (Vygotsky, 1981)

3.4.1.2 Principle Two

The second principle of UDL addresses the “how” of learning (CAST, 2015). Given that each student is a unique learner, they choose to navigate learning environments and express what they know in multimodal manners. An example of this could be the student who has a mobility impairment and is unable to print/handwrite. Thus use of head pointing devices to type on a keyboard and present their work in digital format would be appropriate. For students with diverse disabilities and abilities, their approach to learning tasks can be varied as some may be able to express themselves well in written text but not speech, and vice versa. In a classroom or learning environment, providing multiple means for students to participate and then demonstrate and express their learning and new skills or knowledge is vital. This again underscores the fundamental principle of inclusion – providing multiple ways of learning for all learners, to demonstrate their knowledge and show what they have learnt.

3.4.1.3 Principle Three

The final principle of UDL illustrates the “why” of learning – the provision of multiple means of engagement (CAST, 2015). This principle most closely parallels with the wellness theory of Hettler (1979). According to the National Center on Universal Design for Learning (2015, n. p.) “affect represents a crucial element to learning, and learners differ markedly in the ways in which they can be engaged or motivated to learn”. There are a number of sources, as explored in the work of Goleman (1995) and Black-Hawkins et al. (2007) that can impact individual difference in affect. These can include culture, personal life experiences, biology and neurology as well as personal socio-

economic situations. The “Inclusion and Achievement in School” project undertaken by Black-Hawkins et al. (2007) highlighted the fundamental requirement for multiple means of participation and demonstration of learning to meet the diverse learners in a classroom or learning situation. Every learner is different: some flourish in busy, spontaneous environments, while others find this overwhelming and frightening, preferring routine and rigidity to fluid ever-changing environments. Some like to work alone, while others prefer to work with their peers. In reality, there is not one means of engagement that will be optimal for all learners in all contexts. Providing multiple options for engagement is essential and articulates with the work of Gardner (1983) and multiple intelligences.

3.4.1.4 Universal Design for Learning and curriculum planning

The principles inherent in UDL and the planned use of AT have commonality in that they are focused on reaching and engaging the maximum number of learners. Recognizing that students possess different skills, experiences, and learning styles; these principles emphasize flexible and customizable curricula, using multiple modes of presenting content, engaging students, and assessing comprehension. These principles, applied to curriculum development, seek to give all individuals equal opportunities to learn and can provide a blueprint for creating instructional goals, methods, materials, and assessments that work for everyone. Ideas which are actively advocated for in the research of Vygotsky (1978), Goleman (1995), Bruner (1996), Dyson and Milward (2000), Black Hawkins et al. (2007) and Edyburn (2006a, 2013), among others, rather than a single, one-size-fits-all solution that can be found in many schools, which by its very nature goes against the ideas entrenched in the wellness theory of Hettler (1979).

The use of standardized testing, such as the Provincial Achievement Exams in Alberta, Canada, excludes the flexible approach in that a single knowledge-based examination is used. These are not skills-based examinations which could allow diverse or multiple ways of demonstrating acquired skills, a concept propounded by UDL, AT and wellness theorists that can be customized and adjusted for individual needs, regardless of ability of disability. While concessions and accommodations exist in Canada such as the use of a scribe, reader, extra time and body breaks, the actual test being administered is the same (whether in enlarged font or not) and is very content and subject specific. Individuals bring a huge variety of skills, needs, and interests to learning. In every area of the school curriculum, the key to using UDL is to reduce or eliminate barriers to student learning, which highlights the inclusionary nature of UDL, the need to use assistive technologies to promote engagement and its focus on wellness for every student. This requires applying UDL's three main principles of representation, action and expression, and engagement in a systematic way. Table 3.1 below summarizes the UDL Guidelines.

Table 3.1: Universal Design for Learning Guidelines

PRINCIPLE 1: What **REPRESENTATION**	**PRINCIPLE 2: How** **ACTION AND EXPRESSION**	**PRINCIPLE 3: Why** **ENGAGEMENT**
*Provide varied examples and ways to present content using multiple media and	*Model skills in various ways and give students the opportunity to practice with scaffolds and supports.	*Offer choices of content and tools *Provide adjustable levels of

formats like magazines, photos, speeches, textbooks, newspapers, etc. *Build and activate prior learning and knowledge *Offer print and digital graphic organizers *Be intentional in highlighting specific and important information	*Provide corrective and timeous feedback *Allow alternatives for students to express or demonstrate their learning such as providing opportunities for creating projects, written reports, multimedia, interviews, etc. *Provide specific examples to guide student learning *Conference with students throughout the learning process *Provide a rubric that outlines expectations	challenge *Utilize flexible grouping *Allow students to work individually or in groups *Offer opportunities to publish, display, and present final products (school website, student assembly, Back-to-School night, local library, etc.) *Provide checklists so that students can monitor their progress and make adjustments as they increase their knowledge and learning

Adapted from CAST (2011)

3.4.1.5 Universal Design and School Planning

Special Education Technology, British Columbia (SET-BC) (Ministry of Education, British Columbia, n. d.) stated that effective Assistive Technology implementation is only as good as the plan that guides that implementation. Using the principles of UDL, a

successful plan that seeks to entrench inclusion and wellness, can be created to enhance the learning, active participation and wellness of every student. Successful implementation seeks to address the three questions posed at the start of this discussion as well as incorporate planning to include equipment support tasks, staff and student training, methods for integrating technology into the student's program and finally, techniques for assessing the effectiveness of the AT implementation. All four areas are important to the plan since a lack of direction in any one area will affect the others. For example, if there is no plan in place for solving technical problems, there will be unnecessary delays in repairing the equipment causing frustration and loss of implementation time. Similarly, ineffective or nonexistent plans for staff training will lead to confusion and inconsistent or ineffectual use of the technology. These sentiments are echoed in the research of Marino, Mariono and Shaw (2006) as well as the work of Raskind and Higgins (1998) which highlights the imperative nature of implementing appropriate technology and realistic service delivery in a bid to support students and their inclusion in schools and post-secondary institutions.

3.4.1.6 Factors impacting the AT selection process

Teachers need to be very aware of certain contributing factors when choosing to implement AT in a classroom to promote inclusion for all, such as:

- What is the exceptionality – is it an impairment, disability/loss of function or gifted and talented exceptionalities? How does this impact participation?

- What is the best tool, item or piece of equipment (from a plethora of options such as indicated in Appendix B) that can mediate this restriction, and is it practical and fit for purpose?

These questions tie in with the work of both Edyburn (2006), who suggests three steps for educators to be cognizant of, and the Wellness Theory of Hettler (1979):

- recognizing an academic performance exceptionality or problem/disability (physical, social, emotional or intellectual wellness dimensions);
- identifying a trigger event, or antecedent factors which influence the students' progress (environmental, social and emotional dimensions of wellness); and
- calculating the remediation vs. compensation equation to best support the needs of the student to ensure enhanced classroom participation and progress.

3.4.1.6.1 Recognition of a barrier to participation

Schools and teachers routinely evaluate academic performance as testing and evaluation form part of the everyday happenings in a classroom – be it summative or formative in nature. Most teachers have a variety of systems in place to identify failure, satisfactory and/or exceptional performance. Rather than addressing the fundamental issues of poor performance, educators often search for reasons to explain poor performance (tiredness, sickness, lack of preparation), and so fail to intervene with appropriate supports for the student who is evidencing this poor performance. Whilst environmental factors may contribute to poor performance, a student who has been struggling to read and has been in remedial reading programs for years, without success or showing much progress, requires intervention. Supports and intervention

need to be implemented in a differentiated manner to ensure the student can learn and access curriculum, but not be excluded from his/her class. Armed with an extensive paperwork trail from testing and evaluation, a teacher should not hesitate to intervene and recommend support strategies which can include the use of AT. Poor academic performance should be a trigger (antecedent) for Assistive Technology consideration. This does not mean giving up teaching explicit strategies to assist all students, with or without a barrier to their learning. It is instead about identifying that it is time to switch tactics that previous instructional strategies are not successful on their own and implementing additional supports like AT, and infusing the dimensions of wellness into the classroom, may now be of assistance.

Particularly problematic when considering the use of AT is a decision implicit in the Assistive Technology consideration process: remediation vs. compensation (Edyburn, 2002). That is, how do we decide if the best course of action is remediation (such as additional instructional time, different instructional approaches) versus compensation (recognizing that remediation has failed and that compensatory approaches are needed to produce the desired level of participation)?

3.4.1.6.2 Remediation versus compensation

Assistive Technology theorists (King 1999; Edyburn, 2002; Cook & Hussey, 2002) suggest we have a critical decision to make: remediate or compensate. For example, if someone damages a leg in a vehicle collision and thus cannot complete certain tasks without their leg, additional therapy may be an option if they are recovering from surgery, but not an option if they have had an amputation. The guidelines for

remediation and compensation are clearer in situations involving mobility and sensory impairments, that is, if a child requires a pair of glasses to assist vision or a cochlear implant to assist with hearing. Unquestionably, compensatory approaches are often used because there are simply no other ways to complete the task.

Teachers are extremely comfortable with the variety of strategies available when offering remediation (Edyburn, 2002): re-teach the information, use alternative instructional strategies, break the tasks down into smaller parts (chunking) to analyze what the child knows and what components are problematic, reduce the number of items that must be completed, provide additional practice, engage in one-on-one tutoring, to name but a few. These are strategies that every good teacher is well versed in and often engages in without consciously thinking about. For the purposes of Assistive Technology, one needs to consider that if these remediation strategies were foolproof on their own, and had a high success rate, we would seldom require them for use in the upper elementary and secondary school situation and we would not still be seeing students struggling with developmental tasks like decoding, comprehension and fluency, solving basic math facts, and handwriting that interfere with higher level performance. Edyburn (2002) has suggested that one means of addressing the remediation vs. compensation problem is to consider that these are not mutually exclusive options, rather they can be complementary and work in tandem with each other, just as AT does not work alone, requiring buy-in from the user, effective matching with the user and effective utilization and implementation from the staff supporting the learning.

3.4.1.6.3 Teacher choice

Another consideration when using AT, is awareness of what exists in this realm, in the plethora of technology and how teachers, who have an ever more demanding job, can be aware of what is available and the steps to take to ensure correct matching with students. Knowing that resources such as Dragon speak (speech recognition software that uses speech-to-text) which is good for students who have trouble with grapho-motor skills (such as Dysgraphia), Word Q and Read and Write Gold (text-to-speech software) exist is important. These options support students with a written expression disability as well as a reading disability, and can support their mainstream inclusion. Webspiration, and other graphic organizer software, can be extremely effective for a student diagnosed with ADHD/ADD and the use of screen magnifiers, Zoom Text and JAWS software can be instrumental in allowing a visually impaired person to access curriculum. Whether the AT is in the form of Braille, an FM system (for hearing impaired students) or in the form of software such as Speak Q or the Dasher Keyboarding system, it exists to serve a very unique purposes and again presents yet another research objective and question– how to choose the right AT to match the student and be fit for purpose?

The implementation of AT in the classroom to support the inclusion of diverse students is fraught with assumptions about the role of technology to support learning and performance, which can further hinder staff from making informed choices with students. For example: does using AT mean success is guaranteed; or does AT provide an unfair advantage to students using it and thus somehow enhance their academic results? This can be best illustrated by considering the fact that most AT was banned

from being used with standardized tests such as the Grade 3, 6 and 9 Provincial Achievement tests in Canada, or the Matriculation examinations in South Africa. This is similar to the situation when calculators were first introduced and not allowed to be used in a test situation. As a result, there is much confusion about why, how, and when technology should be used by struggling students.

Again, referring to a framework of guiding questions as mentioned previously, can assist and clarify the intervention strategy most appropriate for the student:

- What is the exceptionality/disability/ impairment or loss of function?
- What is the activity limitation?
- How does this restrict participation in the classroom setting?

For example, loss of hearing would be an impairment of loss of function, not being able to hear someone speak on the phone would be a limitation to the activities being performed, and the participation restriction could be that the person cannot participate in a classroom as they cannot hear what is being said, or even seek gainful employment in certain roles such as a secretary or personal assistant, as they are unable to hear a phone ring to answer it nor can they engage in a conversation with the person on the phone. In this scenario, the physical, emotional, social and occupational wellness dimensions have been undercut and are not actively being pursued to enhance the life and total wellness of the person.

Using this simple illustration as a template, a teacher could consider what would be best for a student in this situation as follows and apply AT in the following ways. Use a simple light flash when the phone rings coupled with a speech-to-text program (such as

Dragon Naturally speaking) to convert what is being said so the person with the hearing impairment can read it, and a text-to-speech program (such as Read Out Loud 6, or Windows Accessibility options freely available on all computers with Windows as an operating system) to convert what they type for the hearing person to then hear. These options would be a quick and relatively economical solution to this person's restrictions or limitations, and thus allow them to be included in the work force or applied to a classroom situation. This would serve to encourage the development of the emotional, social and occupational wellness of the person/student and thus help them achieve greater balance in the pursuit of personal wellness, as both Hettler (1979) and Goleman (2005) espouse as being significant in achieving life balance and personal fulfillment.

Edyburn's (2002, 2006, 2013) work is considered by many to be seminal in the implementation of Assistive Technology (AT) to support students with disabilities. AT is more readily available today, in our age of technological advancements, to help students who present with varying needs and disabilities – from cognitive problems to physical impairment. The use of AT to enhance learning for all students can be an effective approach for many students who are then able to experience greater success, both in the class and in developing functional life skills, when they are allowed to use their abilities (strengths) to work around their disabilities (challenges). AT combines the best of both of these practices and thereby works to promote life-long learning, life balance and wellness and foster greater independence in students.

3.4.1.7 Impact of AT on Inclusion

Inclusion is no longer simply a trend or buzzword; it is a reality and educators need to strive to develop means to overcome barriers and make this reality present in their classrooms. Students who had previously been removed from mainstream settings to receive intensive remedial instruction can now be included in classrooms. AT exists which can work around, or bypass, the area the students find challenging and use the students' strengths to promote both learning and personal wellness. Again, the example given earlier, of the student who could use an audio version of the book applies. Provision of the correct tools externally, allows students to use their internal strengths to bypass the barriers they experience and thus access the curriculum, be included in the classroom and feel greater self-worth and personal autonomy thus promoting wellness. In a classroom setting, where the teacher has perhaps assigned silent reading of a chapter and then answering a series of questions based on that reading, this student may previously have been removed to work with an educational assistant elsewhere. Now, however, if the audio book application were to be used, they could remain in class and with the use of earphones, complete tasks whilst being included. This simple technology could in fact benefit all the students, not just the student with the diagnosed reading disability.

By combining both AT, Wellness Theory knowledge and the principles of UDL, the best possible learning environment can be created and increase the chance of success for every student, regardless of ability or disability. A plethora of valuable information exists to support educators and staff working with students, who would benefit from or require Assistive Technology, such as the SET-BC project, or the Wisconsin Assistive

Technology Initiative, 2005 (WATI) shown as Appendix B. These are invaluable in providing information on what technology exists and which specific disabilities they were designed for, how to use the devices and how to support students. This information serves to promote effective, appropriate implementation in keeping with the recommendations of Edyburn (2002, 2006, 2013), Marino et al. (2006) and Raskind and Higgins (1998).

3.4.1.7.1 Communities of practice and inclusion

In order to provide effective implementation, professional cooperation and collaboration is essential. The idea of professional learning communities, which are held every Friday afternoon in the school division in which I am involved, brings with it a unique opportunity to collaborate professionally. The word 'community' is explored by Wenger (1998) who states that communities of practice are groups of people with a mutual concern or interest in something which they do, and then learn how to improve their interest through regular interaction with others. As Wenger (1998) stated, 'over time, this collective learning results in practices that reflect both the pursuit of our enterprises and the attendant social relations. These practices are thus the property of a kind of community created over time by the sustained pursuit of a shared enterprise. It makes sense, therefore to call these kinds of communities, "communities of practice" (p. 45). Echoing these beliefs is the work of Johnson and Johnson (1994) in which they state the "purpose of co-operative learning is to make each member a stronger individual in his/her own way" (p. 89). For the sake of my research, the school community in which I was present, with the pilot study teachers and the wider school division, I hoped would be strengthened by cooperation. In keeping with Wenger's (1998) ideas of communities

of practice, is the work undertaken by Boreham (2000). He believed that “when there is a need for collective activity such as co-operation and communication, competence depends on building a sense of inter-connectedness which will transcend the fragmenting tendencies of allegiances to subgroup” (p. 4). With my involvement in facilitating the AT and inclusion agenda, I fervently hoped that a community of practice could be established through the building of interconnectedness and a sound, shared knowledge about the use of AT to support wellness and build the UDL approach in the school, which would benefit all the students.

In order for this shared activity and understanding to begin, professional collaboration would need to be in place. Again, collaboration can be affected by one’s perception and understanding of what it means to collaborate. The Oxford Dictionary (2010) definition of collaborate is “when two or more people work together to create or achieve the same thing; to work with someone else for a special purpose”. Professional collaboration in the classroom can be indicative of teaching staff and support staff working together for the same purpose, outside agencies collaborating with schools, parents and teachers collaborating and even the learners collaborating with staff to achieve a common goal.

In this study, working with two teachers, their shared educational assistant and the 118 students across their classrooms, collaboration was fostered to build knowledge and awareness of AT. Collaborating with external agencies, to deepen knowledge of the appropriate selection and use of AT, build capacity, competence and confidence for both staff and students, further enhanced wellness dimensions in students and promoted UDL in these classrooms. In order to enhance inclusion in the classroom, there has to be shared work undertaken at various levels which calls on the strengths

and participation of a diverse range of professionals. Dyson and Milward (2000) state that an inclusive setting means:

- bringing together a wide range of needs in an inclusive locality;
- bringing together learners in a community with an inclusive curriculum, accessible to all learners regardless of ability, inclusive learning experiences
- opportunities for co-operative learning so that all students can have enhanced life experiences and participate fully in society (p15-16).

Howes and Davies (2007) underscore this idea in their research 'Engaged Teachers, Engaged Learners: Learning from a cross case analysis of secondary school action research on inclusion.' Their analysis of meaningful inclusion in secondary schools raises the idea that "teachers' active engagement is seen to be central to achieving greater inclusion; without such participation the dominance of standards-oriented approaches mitigates against the possibilities of inclusive schooling at every turn" (p. 1). Thus, as one of the aims of this study was to develop a framework for the use of Assistive Technologies for the support of all learners, professional collaboration was an element to be considered.

The terms of the Individuals with Disabilities Education Act (IDEA, 2004) require that schools must help students with special needs to access, participate, and progress in the general curriculum. Technology can help schools fulfill these requirements, as well as entrench wellness theory through the use of AT, and promote the involvement and success of students, regardless of ability or disability. Assistive Technology can assist

teachers and support staff to personalize instruction for students with special needs whilst having the benefit of improving learning in the general student population as well.

3.4.1.8 AT development

AT is being developed at an increasing pace and what is available today can support all students, making education more inclusive than ever before as well as infusing the dimensions of the wellness theory into the general classroom routines and pedagogy.

Long-standing adaptations of textbooks which include Braille, audio and large print versions of textbooks or novels have been in use for many years to support students with vision, hearing and cognitive disabilities, and promote intellectual, emotional and physical wellness. Today, however, multimedia technologies can incorporate these and other solutions into accessible, digital textbooks that feature high-quality audio, images and video and interactivity that support students with pronunciations, definitions, comprehension prompts and translations for English language learners, for example.

Another simple though somewhat costly introduction has been the use of laptops in the class provided not just to students with physical, cognitive, and emotional disabilities, but all students. This has been shown to be very successful in numerous studies like the state of Maine's Laptop Technology Initiative. The laptops were shown to improve the engagement and motivation (thus promoting emotional wellness), the ability to work independently, increase output and increase interaction with others in the class for all students, especially for those with disabilities. The motor co-ordination aspect (writing) was minimized thus allowing students to produce work that was "easily edited and looked as good as the work of their non-disabled peers" (Harris & Smith, 2004, p. 8).

In the abundance of existing technology available for mainstream use, much of which was produced for medical disability (thereby supporting the physical wellness dimension), is the sound field amplification system. This wireless, infrared technology enhances and distributes the teacher's voice above background noise in the classroom, making the sound more audible to students. The enhanced quality of the teacher's voice, not the "loudness," makes a difference in student learning. Originally developed for students with mild hearing losses, this technology enabled these students to stay in regular classrooms, rather than be moved to more expensive special education classes. Research shows that all students, especially those with attention deficit problems and those for whom listening is an effective learning style, also benefit from this technology, (Evans, 2001; Gertel & Schoff, 2004, "Hot Technologies for K–12 Schools," 2005). Once again, this brief example of AT in the classroom serves to illustrate how inclusion for all students can be facilitated and thus enhance not only achievement in the classroom, but attainment of personal wellness, as dimensions such as physical, intellectual, emotional and occupational wellness, are seamlessly fused into the general classroom delivery methods.

My guiding question of how the use AT in a classroom can enhance inclusion and support for all, seems to be straightforward then – AT promotes inclusion and enhances the experience of all students, not just students with learning disabilities, in a mainstream classroom to support learning for all.

3.5 SUMMARY

This chapter addressed the theoretical frameworks which are Cultural Historical Theory, Wellness Theory and Universal Design for Learning with regard to the implementation and use of Assistive Technology to increase inclusion in the mainstream setting. The focus on how AT can increase wellness and inclusion was explored using both local and international research and literature.

Being aware of theory such as CHAT, as developed by Engeström (1999), Vygotsky (1978) and Leon'tev (1974), and the wellness theory of Hettler (1979) and Goleman (1995), coupled with the extensive work of Edyburn (2006a), is a starting point for the empirical study.

My research aims to provide evidence based research, in the form of a case study, of what can be achieved through the use of AT and the manner in which it can be implemented without causing already over-taxed educators to spend their limited time and resources wasting time looking for information. The research will be a very limited exploration of both the advantages and the disadvantages of the implementation of AT, as well as the challenges to both the school environment, staff and their professional collaboration within the setting of a Junior High School in Canada and will hopefully add to the existing body of research in a constructive manner.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

The current chapter focuses on the research design of the study which is embedded in the constructivist paradigm and followed a qualitative, case study research method. The role of the researcher, the research site, data interpretation and analysis as well as the trustworthiness of the study are explored in this chapter.

4.2 THE RESEARCH PARADIGM

The current study followed a constructivist paradigm, with the intention of understanding the human experience in a particular real life setting (Cohen & Manion, 1994), suggesting that "reality is socially constructed" (Mertens, 2005, p. 12). The constructivist researcher tends to rely upon the participants' views and understanding of the unique situation being investigated (Creswell, 2003) and recognizes the impact on the research of their own background and experiences. Constructivism, as developed by Dewey (1933) and expanded by Kolb (1984), is a theory based on the observation and scientific study of how people learn, with its premise being that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. This theory is in keeping with the CHAT theory and the understandings underpinning this research which posit that learners' attempt to reconcile new knowledge with their previous ideas and experience, maybe by changing what they believe, or by discarding the new information as irrelevant. The constructivist paradigm supports the idea that people are active creators of their own knowledge and to do this they must ask questions, explore, and assess what they know.

This paradigm is eminently suited to this research which focuses on questions regarding the use of AT to support students in the mainstream setting and to foster inclusion and wellness. These are paramount to constructing new knowledge informed by research to add to the existing body of research in this area, and hopefully support teachers in similar settings.

4.3 Philosophical Framework

4.3.1 Epistemology

Epistemology focuses on how best to understand, or gain knowledge and know more about the object being studied. In this case, the use of AT to enhance inclusion in a mainstream school. Epistemology establishes how we know, what we know about an issue. Guba and Lincoln (1994) suggest that different research orientations result in differing perspectives on how to best understand this object of study (epistemology). By selecting the ethnographic case study as method for gathering data and information, to gain knowledge, the research is considered from the real life, or actual context. Fieldwork furthers the process of discovery, finding knowledge and making meaning of the data.

4.3.2 Ontology

Ontology refers to the how to best understand the nature of what is being studied and again, influences the choice of methods used to investigate or research the topic. Guba and Lincoln (1994) again suggest that different research orientations bring about diverse perspectives on the nature of what is being studied (ontology).

4.3.3 Axiology

Axiology refers to the values and judgements attached to the information gathered in the research. This can be seen through the use of language and of course the actions taken, or not taken, during the course of the fieldwork or research. This is also applicable to dealing ethically with the use of learner records, such as the Individualized Program Plans (IPP) documents which were consulted for use in profiling leaner needs and determining most appropriate selections of AT to best support the student. The ethics adhered to I in this study included seeking permission for the University's ethics board and then adhering to the ethical standards therein. Research can have various moral and social values, including such items as social responsibility, human rights, compliance with the law, and health and safety, so it is essential that this research be subject to a strong code of ethical conduct, in keeping with those of the research institution and with law of the land (Harcourt & Sargeant 2012; Ransome, 2013).

4.4 RESEARCH METHOD

This study used a qualitative approach which articulated with the nature of the research, dealing with the how and why of the use of AT in the mainstream settings to support all learners, which meant that simple yes or no answers could not be generated for the questions. Qualitative research aims to address questions concerned with developing an understanding of the meaning and experience dimensions of humans' lives and social worlds, investigating the why and how questions inherent in the study. Using the more flexible design of qualitative methods, meant that opinions, feelings and experiences could be gathered for analysis. This requires that social beings and phenomena must be viewed in the social contexts in which they occur and in which the

meaning of that context was constructed, again underscoring the constructivist paradigm. Qualitative research has been described as a systematic investigation (Burns, 1997) or inquiry whereby data is collected, analyzed and interpreted in some way in an effort to describe and understand the individual experience of their unique situation (Mertens, 2005). Qualitative research has the ability to provide value when investigating complex and sensitive issues. A questionnaire with open-ended questions completed by two Language Arts teachers involved in the pilot project at the school site, along with an extensive literature review on existing research to articulate with my own experience, various documents were analysed and a general self-completed staff questionnaire were used to gather data.

4.4.1 An Ethnographic Case Study Approach

The study followed an ethnographic, case study approach, first defined by Yin (1984, p. 23) and in his later works (2013), as an “empirical method used to investigate a phenomenon in its real life setting”.

4.4.1.1 Strengths of ethnography

The research, being based in a Junior High school in Canada, is a real life context. Thi context benefited from the choice of ethnography as a method due to the holistic approach to the study of cultural systems which ethnography employs. Ethnographic research allows for the review of both an emic (insider view) and etic (outsider view) perspective. The use of fieldwork to inform the process of discovery, making inferences, and continuing inquiries allows for the open-ended, emergent learning process, and is thus flexible, interpretive, reflexive, and forms part of the constructivist process

(Whitehead, 2004). The overarching strength in this method is that it delivers a view of the phenomenon being researched in its actual setting and provides thick, rich data for investigation.

4.6.1.2 Case Study

A valuable working definition of the case study, compiled from a number of sources such as Yin (2006) and Gerring (2009) is that the case study examines a phenomenon in its natural setting, employing multiple methods of data collection, to gather information from one or more sources. Merriam (1998) states, in her seminal work on case study, that the most defining characteristic of case studies lies in the ability to delimit the object of study. This means the boundaries of the study are clearly stated. According to Merriam (1998), the case study does not associate best with any one data collection method but rather looks at the big picture and the holistic description and explanation of the situation being studied. This allows for a comprehensive, qualitative description of the case as well as presentation of information from a wide variety of sources in support of the case.

The key strength of the case study method involves using multiple sources and techniques in the data gathering process to answer “how” and “why” questions.

Critics of the case study method, such as Campbell and Stanley (1966), claim that a small number cannot be generalised to the whole population, thus findings may not be reliable. They state that ‘one shot’ case studies “have such a total absence of control as to be of almost no scientific value” (p. 6). Nevertheless, Kelley (2006, n. p.) states that a one-shot case study is “a study design where a single group of individuals (or another

interesting unit of analysis) is selected for observation over a single, limited time period, usually because they have experienced some factor taken as important in shaping some outcome", and can expose the inner workings of an organization such as a school implementing AT practices. According to Schrank (2006), a number of case study situations exist, of which two are applicable to the current study and make a one-shot case study appropriate:

- "When it promises to yield fundamental insight into a rare but important process or event that offers no obvious point of comparison" (Shrank, 2006, p. 173). The rare but important process in this study is the implementation of AT technology in mainstream school classrooms which is a very new and largely untried phenomenon; and
- "When it can be evaluated against an established body of theory that offers multiple observable implications" (*ibid*.), such as the theories of CHAT, wellness and UDL.

4.6.1.3 Case: Junior High School based in Canada

This research study seeks to answer the research question of how the use of Assistive Technology (AT), for the support of all learners, can be implemented in a mainstream classroom environment.

Being true to ethnographic research and the case study, as defined by Yin (2006), the use of AT in a Junior High setting was examined in its "real life" setting within the school. As the Learning Support coordinator in the school, the researcher was provided a unique opportunity to interact with staff and gather information via multiple methods

(conversations, written feedback on student IPPs, requests for support and advice) as part of the daily routines and natural setting inherent in the school and the role of learning support in the school.

4.7 Population and sampling

4.7.1 Population

The population for this study was all the teachers at the Junior High school where I work. The total number of teachers was 53.

Sampling refers to choosing a particular population to represent the wider population which is related to the field of study or research being conducted (Polit & Beck, 2010). Choosing a sample allows the researcher to attain information from a smaller group/sample that is most relevant to the study. Of the 53 teachers, two teachers and one educational assistant were involved in the pilot program for implementation of AT for all learners. These three staff members were selected for the qualitative research aspect, making this a purposive sample. These staff were selected as they both had similar profiles in terms of course loads, both taught Grade seven classes and shared a common educational assistant. No other staff in the school site shared such unique similarities. The remaining teachers were invited to complete the self-completed questionnaire, making this a census sample as detailed below.

Two sampling methods were used in this study, namely purposive sampling and census sampling.

4.7.1 Purposive Sampling

Purposive sampling is defined by Patton (2002) as the choice a researcher makes when selecting a very specific portion of the population to engage in their study. Purposive sampling is popular in qualitative research as it serves a very specific need or purpose. A researcher chooses a sample based on specific characteristics or knowledge the sample population may have in relation to the purpose of the study.

The participants in this study were purposively selected; each of them was suitable in that they were part of the Assistive Technology pilot project in the school and thus had access to very particular knowledge and skills related to the study. The two teachers selected for face-to-face interviews had been charged with implementing the AT devices in their relevant classes (with the help of the educational assistant assigned to these classes) in Grade Seven to determine the effectiveness in supporting students with a mild to moderate learning disability, severe and complex (medical and/or cognitive needs) students who required enrichment and extension, and students in general in their classroom settings. They were thus fully able to participate in this research project. These two teachers and the educational assistant had been privy to the consultation process and each step included in the pilot project and their feedback was deemed valid and trustworthy. Furthermore, the entire staff (53 teachers) were asked to complete open-ended questionnaires to ascertain the use of AT for all learners in a mainstream school. This larger sample added another layer of data to the rich in-depth qualitative information gleaned from the face-to-face interviews, regarding general use and opinions from staff who were not involved in the pilot project work.

4.8 INSTRUMENTS

4.8.1 Semi Structured Interviews

The use of the interview in research is seen by Kvale (1996) as a move away from viewing humans as being able to be manipulated and seeing data as somehow "external to individuals, and towards regarding knowledge as generated between humans, often through conversations" (p. 11). As such, the interview can be seen as neither subjective nor objective, but rather as "intersubjective"' (Gillespie & Cornish, 2010, p. 20). This means that knowledge can be constructed and clarified in conversation with another and the social context of the research being undertaken is accounted for. However, in contrast to an everyday conversation, the interview has a focus or specific purpose. The purpose is highlighted through the use of structured questions asked by the interviewer, and the onus is on the interviewee to provide detailed responses which provide the rich data for analysis. This idea articulates with the work of Greiff, Wüstenberg, Molnár, Fischer, Funke and Csapó (2013), which supports the interaction between all the micro-systems involved in and impacting on the learner's situation, so that free flow of information and information exchange can be realized.

Semi-structured interviews were used in this study as they allow for a more open, flexible approach. This allows for the exploration of any new ideas that may become apparent in the course of the interview with the participant. Having a framework in keeping with the topic of the study, allows the interviewer to guide the interview, but not be confined by the rigidity of a formal interview in which only the selected questions are asked or answered. The semi-structured interview is flexible enough to allow new ideas

to be considered during the interview as a result of what the interviewee says. This approach provided a guiding framework for both participant and researcher, as well as allowing for essential open-ended questions to encourage the participants to engage in an open dialogue about their experiences (Polit & Beck 2010). Face-to-face interviews are beneficial when the researcher is interested in obtaining more personal information from the respondent and can promote the gathering of richer and more complex data (Kinchin, Streatfield & Hay, 2010). For the aim of this study to be reached, the interview questions (Appendix C) focused on such areas as planning and profiling, training for staff, feedback on challenges and difficulties, implementation and use of AT and suggestions, as well as recommendations regarding overcoming any challenges or difficulties that may have been faced.

4.8.2 Self-Completed, Open-ended Questionnaires

The benefit of using a self-completed, open-ended questionnaire, as explained by Constantinos, Phellas, Bloch and Seale (2011), is that it is practical and allow for large amounts of information to be gathered in a relatively short period of time.

Further to this, providing an extended return time was necessary to ensure that staff had ample response time. Teaching staff are very busy in their daily activities of teaching, as well as in their after-school departmental commitments and extra-curricular activities. I did not want staff to feel rushed or simply choose not to return the questionnaire because they felt they had no time to complete it. Thus no cut off time was set, and it was left open until the end of the school year ending on 30 June 2014.

This provided an opportunity for staff to be reflective in their responses and to look back over the year in determining their responses.

The questionnaire provided the participant with space to explain their choice, thus providing his/ her personal understanding or experience of the question being asked. This allowed for the how and why, which is inherent in qualitative research (Bernard, 2002). The questions (Appendix A) focused on teachers' awareness of technology that existed, their own technology skill and comfort levels, and the regularity with which they might use AT in general. The advantage of this method was that every participant received the same questions and the response effect was minimized in allowing for self-administration. The use of this data collection tool may give rise to disadvantages which were considered in the use and administration thereof. Two disadvantages are the uncertainty of who actually completed the self-administered questionnaire and a generally low response rate (Bernard, 2002). Qualitative research being that which seeks to understand the 'why' of a circumstance, attempts to highlight or gain insight into people's attitudes, behaviors, value systems, concerns and motivations. All of these have an impact on the collection and interpretation of the data (Cohen, *et al.,* 2009). The allowance for self-administration assisted in this.

4.8.3 Document Analysis

Document analysis is a method often used in qualitative research (Bowen, 2009) and incorporates the interpretation of documents by the researcher. Document analysis is a form of qualitative research in which documents are analyzed and interpreted by the researcher to give voice and meaning around a particular research question or topic. A

document is something that can be read and which relates to an aspect of the social world. Examples of such documents include vision and mission statements, staff handbooks, parent handbooks and organization handbooks, parent information booklets, assessment procedures and protocols, individual program plans and report cards to name a few. Official documents are intended to be read as objective statements of fact, but they are themselves socially produced, revealing, albeit veiled, the nature of the organization, its vision and mission (Heffernan, 2001). Engaging in this form of data collection involves the intense scrutiny of documents collected to allow for the coding of content into themes pertinent to the research issue. The recurrence of themes and the discourse explored contributes to the body of data collected to form part of the research project. As is stated by Jorgensen (1989), about documentation, “the researcher sorts and sifts them, searching for types, classes, sequences, processes, patterns or wholes. The aim of this process is to assemble or reconstruct the data in a meaningful or comprehensible fashion” (p. 107). For the purposes of this study, the document analysis focused on the Individual Program Plan (IPP) which learners with diagnosed exceptionalities would have (Appendix F).

4.9 DATA COLLECTION – PHASE 1

4.9.1 Pilot Project

A proposal was made to the school division to research the benefits of using Assistive Technology in classrooms to support all learners in the mainstream setting. This was done at a time when staff in specialized services were diminishing and not being replaced, hence the need for further supports within the mainstream school setting, to

continue a high quality system of support, whilst promoting student self-esteem and independence.

The planning team for this project included the researcher as the primary lead, supported by three external support agencies: Student Support Services, a Speech and Language Therapist and an Occupational Therapist. In addition, a technical advisor was also provided to support the selected teachers in ensuring AT used was functioning and in good repair at all times. This technical expert was also given a second SMART response system to use and become confident and competent in so as to train the teachers who opted to use this new piece of AT in their classrooms and provide ongoing training and assistance as needed.

Participants to the initial planning phase met (1st meeting) to discuss the project and requirements. This initial meeting served as a planning meeting to structure and determine the duration and scope of the pilot project. This meeting was a daylong event in which all participants viewed supports and AT currently available in the school site and also discussed possible new AT which could be purchased and used in the trial.

The scope of the pilot project was delimited to two grade seven teachers, who shared a common educational assistant, based on the number of grade seven classes they each taught. This allowed for four classes (total of 118 students) to be included in the pilot and provided greater scope for trialing the AT and feedback. These teachers were not obligated to take part and it was made clear that they could, in fact, decline to participate at any time.

Phase One outline:

1. A class profiling date was set with the staff involved to review a class list for each of the four classes (2nd meeting) and which indicated each student's special needs coding if applicable and the current supports they received in the selected teachers' classes. Each class had between four to eight students with various mild to moderate special needs coding including: Specific Learning Disorder: Reading, Specific Learning Disorder: Written Expression, Learning Disorder Not Otherwise Specified (LD-NOS), Attention Deficit Disorder (ADD), Attention Deficit Hyper Activity Disorder (ADHD), Low Vision, Dyslexia and Dysgraphia. Medical conditions such as limited bowel function and spina bifida were also included in the analysis. This profile was conducted with the researcher in her capacity as the Learning Support Coordinator with full reference to student Individual Program Plans and Psycho-Educational Reports.

2. Once the profile was complete, staff met again (3rd meeting and discussion) with the researcher to review and select various readily available AT within the school site. New AT was also selected which could be trialed in their classes, such as the SMART response system, as well as the suggested supports from the researcher, such as Hokki stools, fidgets, text to speech or Read Out Loud 6 programs. The WATI assessment package (Appendix B) was used as a starting point for discussion on AT selection and appropriateness of selection.

3. In conversation with the researcher, teachers involved were asked to select strategies as discussed – one no tech, one low tech, and one high tech – to use in their classrooms and to provide feedback on. These strategies included:

   - “NO” tech: fidgets (each teacher was provided with two baskets of fidgets and pencil grips).
   - “LOW” tech: environmental changes which included the use of Hokki Chairs (recommended for ADHD/ ADD and sensory impairments), rise and fall desks.
   - “HIGH” tech – Read Out Loud 6 program software, as well as the speech-to-text and text-to-speech accessibility options readily available on the five laptops purchased for each classroom for permanent use in these classrooms.

   One classroom teacher also chose to trial the newly purchased SMART response system for use with her Social Studies and Language Arts grade seven classes.

4. A 4th meeting with all the original stakeholders, chaired and directed by the researcher, and now including the selected teachers, was held as part of the consultative process. This was done to provide the grade seven teachers involved the chance to ask questions and consult on their AT selections with other staff who had specific and specialized expertise in this area as a further support for their involvement in the pilot project. This helped to set the scene for the conversations teachers would have in their classrooms with students (this included, among other things, the tool versus toy conversation and providing supports for access.).

5. The pilot project teachers had access to the researcher on a daily basis for the duration of the study for questions, advice, guidance and mentoring and simply to have informal conversations about how they felt the trial was going, what they felt they needed to ensure greater success, the challenges they were facing and general feedback they wanted to pass along.

6. The final stage was a formal interview with each of the two teachers and their educational assistant. These interviews lasted approximately an hour to an hour and a half in duration. Using the interview sheet Appendix C, as guide to the discussion and interview, teachers provided their responses and shared their experiences.

7. After the interview with the researcher, the researcher was able to feedback to the initial planning team. This team consisted of the researcher the external agency staff (speech and language therapist and occupational therapist) and the technical support person.

The subsequent section describes the manner in which I collected the data using the various instruments detailed above.

4.9.2 Semi Structured Interviews – Phase 2

Interviews were set up at the school site and were conducted at a time of the participant's choosing. The two teachers who were directly involved in the delivery of the program, along with the educational assistant who supported these teachers, were interviewed in face-to-face semi-structured interviews. Kvale and Brinkman (2008) described the interview process as a social production of knowledge which eminently suits the constructivist paradigm.

Davies (2007) suggested that interviews be recorded to allow the researcher to focus on the participant and note any non-verbal behaviors. Also, the audio-recording can act as a safeguard in that it creates a detailed account of the participant's responses and a verbatim transcript for analysis (Meadows, 2003). A recording prevents the researcher from missing important information by means of poor note-taking skills or relying on memory.

A date, venue and time were selected by the interviewees to suit their schedule and needs. I obtained consent prior to the interviews. I used the interview tool included as Appendix C to direct the interview and steer conversation. Notes were made during the interview and a recording was made with the permission of the interviewee to ensure I had not missed anything said. Participants were encouraged to expand on the questions if needed and share any insights they felt were relevant. Ensuring participant convenience was important to allowing the participants to feel involved and also allow them choice and control to enhance their comfort and feelings of collaboration.

4.9.3 Self-Completed Questionnaire

The questionnaire with open-ended questions created by the researcher was distributed as both a hard / printed copy to every member of the teaching staff (53) at the research site, as well as in the format of an email document to all staff at the research site. This allowed for a twofold approach to ensure maximum exposure, coverage and returns on the questionnaire. The returned copies could be returned to a sealed box, labeled 'Returns', which was left in the front office beside the staff mailboxes. This further

allowed for an anonymous return and helped to maintain the confidentiality and anonymity of participants.

The questionnaires were self-administered to allow participants time to think about their responses and complete the questionnaire in private. The intention was to encourage staff to be more open and honest in their responses to the self-completed, open-ended questionnaire which would promote more reliable data. However, not being present did mean that, should participants not be sure of a statement or what to do, the researcher was not on hand to assist. I felt, however, that sincerity of answers and honesty were more valuable which might be jeopardized if I administered the questionnaire.

4.9.4 Document Analysis

There are three primary types of documents which can be used in document analysis: public records, personal documents and physical evidence.

Public records are the official documents which track an organization's activities. In a school, these can include items such as student transcripts, mission statements, reports, policy documents, parent and student handbooks, school planning and even the curriculum. In the course of this study, personal documents used included first-person accounts of an individual's actions and experiences which could include the use of e-mails, scrapbooks, duty logs, incident reports, and personal reflections/journals. Physical evidence is that which is found within the study setting (called artefacts) and these encompass such items as posters, weekly agendas, and various professional training materials at the research site.

The school board/division produces text and documents as related to its mission and vision statement and these serve as a guide for staff, parents and students. Statements with regard to the divisional inclusion policy, various in-school supports (such as protocols for seeking external agency supports and applications for such) and implementation of Individual Program Plans (IPPs) were all studied with particular attention to the issues of inclusion, wellness and utilization of Assistive Technology in supporting all learners in a mainstream school.

The IPPs were of particular importance when engaging in the pilot project as they provided detailed information on student special needs coding, current supports, dates of testing and current academic goals. Using these documents served as a platform for class profiling and AT selections as needed for the support of students. Many of these documents are freely available on the school division's website, as well as on each individual school, within the division's website. Included are such items as parent handbooks, and information packs given to parents at orientation evenings, and thus are not subject to freedom of information constraints, nor do they require special permission to obtain and analyze. A review of the school division's publicly broadcast mission statement, with regard to support for all learners, as well as the Student Services manual, with regard to identification and assessment of students who may require additional supports within the mainstream classroom, provided rich data for the study. Knowing how students are identified, and then how the IPP is created to regulate support for identified learners to remain in the mainstream classroom setting, provided qualitative data which could then be compared with the themes which emerged from the interviews and self-completed questionnaires. In addition to the freely available

documents pertaining to the school and the division, this research project also focused on documents such as the minutes of meetings and planning discussions held by senior stakeholders in the pilot project for the study, advertising materials and internet sites for the products purchased, and teacher records for the Assistive Technology pilot project classrooms with particular reference to what items / strategies were chosen, why and if they were successful or not.

4.10 DATA ANALYSIS

The paragraphs that follow describe how I analyzed the data for the current study.

4.10.1.1 PHASE 1: Pilot Study

The data gathered here, from an anecdotal perspective (through discussion and using the minutes of the meetings as a reference), indicated some overarching considerations:

- Time: ample time was needed to ensure that meetings could be held to engage with external professionals and time to complete class profiles, read IPPs and make AT selections.
- Access to information and training: having the technology support was important as staff were hesitant to use something if it was not first explained, demonstrated and then used to develop a comfort level with the tools – this was true for the low tech Fidgets and the high tech Read Out Loud software.

4.10.1.2 PHASE 2: Interviews

In order to begin analysis, a researcher must have a conceptual resource to guide the processes of representation or interpretation, otherwise no sense at all could be made of any data. Since researchers move back and forth between concepts and data, all research involves processes of induction and deduction (Minns, 2003) especially thematic analysis, whereby “induction creates themes and deduction authenticates them” (p.1). Drawing on the guide offered by Braun and Clarke (2006), clearly delineating the interview responses into the research categories, allowed for coding of the participant responses linked to the selected themes. I used coding techniques for finding and marking the underlying ideas in the data include the following strategies: grouping similar kinds of information together in categories and then relating different ideas and themes to one another (Rubin & Rubin, 1995). Braun and Clark (2006) described phases of coding which include the researcher familiarizing himself with the data by multiple readings of the collected data before generating the codes to be used. Once the initial code categorization has taken place, actively reading and highlighting these categories so that themes can be sought out and data gathered, is required. Following this, the codes are then refined prior to producing a report documenting the analysis. This coding process was applied to the data collected in this study. Each of the identified response categories has one or more associated themes that give a deeper meaning and value to the collected data. Different categories can be collapsed under one main over-arching theme, in this case, the use of Assistive Technology to support inclusion in the mainstream classroom setting. The researcher use Thematic Content Analysis (TCA) which is a means of presenting qualitative data collected during

the research study (Anderson, 2007). Using the transcription of interviews, TCA illustrates the thematic content of the collected data by identifying common themes and allowing the researcher to group and disseminate the common themes which recur in the interview transcripts. This gives “voice” to the common ideas or themes which emerge from across the interviews. While sorting and identifying themes requires some level of interpretation, this interpretation is initially kept to a minimum. The researcher’s own feelings and thoughts about the themes or what the TCA themes may mean are not included in order to prevent data from becoming skewed.

Thematic analysis is the most common form of analysis in qualitative research and emphasizes pinpointing, examining, and recording patterns (or "themes") within data which has been collected. Themes are patterns across data sets (Braun & Clarke, 2006) that are important to the description of the phenomena studied and associated to my specific research question. These themes become the categories for data analysis (Fereday & Muir-Cochrane, 2006) which is undertaken through the process of coding in six phases to create established, meaningful patterns. These phases include familiarization with data, searching for themes among codes, reviewing themes, defining and naming themes, and producing the final report. This method emphasizes organization and rich description of the data which has been collected during the research project. Thematic analysis goes beyond simply counting phrases or words in a text and moves on to identifying implicit and explicit ideas within the data by searching through data to identify recurrent issues (Creswell, 1994; Miles & Huberman, 1994). A theme (or construct) is a group of linked categories conveying similar meanings (Minns, 2003).

4.10.1.2.1 Self-completed, open-ended questionnaires

A total of fourteen questionnaires, excluding the three from the pilot project staff were returned for a total of seventeen responses in all.

The coding procedure described above was applied to the comments returned on the questionnaire sent out to staff. In analyzing the returns through the coding lens, the free flow of commentary to identify specific issues with regard the use of AT was noted, and again, highlighting for themes/coding categories was applied. The themes were coded to compare the overlaps, similarities and differences to those found in the interview data thereby adding to the validity of the data collected. These comments provided rich data in relation to the questions asked and contributed to the analysis, as data was used to measure the incidence of various views and opinions which could impact the use of AT to support all students in the mainstream setting (Appendix I).

4.10.1.2.2 Document analysis

For the purposes of my research, I used information gleaned from all three sources of documents (public records, personal documents, and physical evidence), to add to the rich data collected in the interviews and questionnaires. Essential questions for the researcher of this study to bear in mind were:

- What was the identified need?
- What AT had been selected to support the identified need?
- Had this selection been supported by both divisional (student services documentation) and school based documents (such as the IPP)?

Using the questions above as guidelines, the data collected from analyzing documents could also be separated into themes and “big ideas”.

4.11 TRIANGULATION

The term triangulation in social science research refers to a process by which a researcher wants to verify a finding by showing that independent measures of it agree with or, at least, do not contradict each other (Miles & Huberman, 1994). Studies in the social sciences often use triangulation sources that have different strengths and foci so that they can complement each other.

The use of multiple methods of data collection seeks to enhance the validity of the results and limit researcher bias. The term internal validity, as explained by Miles and Huberman (1994), relates to issues of the study making sense and being credible, and answering the question of authenticity of the study. Gliner, Morgan and Leech (2000) described triangulation as a method of highest priority in determining the internal validity in a qualitative research project. The systematic combination of various types of data is a crucial aspect of ensuring triangulation in research (Cohen & Manion, 1994).

The type of triangulation chosen depends on the purpose of a study. For the purpose of this study, the focus on triangulation by data source (questionnaires, face to face interviews and document analysis) was the primary source of creating internal validity.

This multi-modal approach articulates with Yeasmin and Rahman’s (2012) definition of multi-method triangulation which is the use of more than one method to determine if there is a convergence of results and thus increased validity in the findings of the

research. They indicated that the use of more instruments would provide for more detailed and multi-layered information about the phenomenon under study.

4.11.1 Trustworthiness

Lincoln & Guba (1985) suggested that trustworthiness in research is vital as it enables the researcher, and the consumer of the research, to evaluate the worth or value of the information presented. They suggest four constructs which can act as guides in aiding the determination of trustworthiness in research undertaken, as discussed below.

4.11.1.1 Credibility

Prolonged engagement (Guba and Lincoln, 1985) in the field to develop an understanding the setting and the surrounding culture of that setting is important. Building relationships and rapport with the staff in the setting, helps the researcher to facilitate trust which assists in authentic information sharing and rapport. This trust building articulates with offering participants the right to refuse to participate. This helps to ensure that the data collection sessions involve only those who are genuinely willing to take part and prepared to offer data freely.

Other elements necessary to enhance credibility in a study include the researcher's own reflection on the study as it evolves and develops. This reflection process articulates with Shenton's (2004) idea of "the researcher's 'reflective commentary'" (p. 68), which refers to the researcher's self-regulation and monitoring, thus adding integrity to the research process.

A vital element in research is that of internal validity. This is the degree to which a study measures what you intended to measure or test. Shenton (2004) stated that this construct is essential to establishing trustworthiness in a research project or study. In order to gain credibility, a study should adopt well-established research methods to gather data. Thus, the specific procedures employed, should follow where possible, those that have been used successfully in similar studies in the past. The use of different tools, such as individual interviews and questionnaires with open-ended questions, which form the major data collection strategies for much qualitative research, is supported as means of measuring what the researcher actually sets out to measure. In this study, the interview transcripts from two teachers involved in the implementation of a pilot AT project, and the questionnaires from fifty-three teachers who were not involved, were compared with one another as a means of triangulating the results. The examination of previous research findings in similar cases as undertaken in the literature review, to help ascertain the degree to which the study aligns with past studies can also deepen the credibility of the new study.

4.11.1.2 Dependability

The use of overlapping methods accompanied by a thorough methodological description which can allow the study to be repeated in similar circumstances increases the degree to which the research findings and the study itself can be termed dependable. Guba and Lincoln (1985) make a clear statement that dependability means findings are consistent and can be repeated. This idea is echoed by Shenton (2004) who stated that “in order to address the dependability issue …, the processes within the

study should be reported in detail, thereby enabling a future researcher to repeat the work, if not necessarily to gain the same results" (p. 71).

4.11.1.3 Confirmability

In order to minimize researcher bias, I created a reliable audit trail by ensuring that the steps taken express the experiences and views of participants and not mine. Triangulation is used to minimize the effect which the researcher brings to bear on the study and helps to minimize researcher bias (Salkind, 2010; Johnson & Christensen, 2010). By recognizing the shortfalls of the study and documenting these clearly, being transparent in the steps taken, and in identifying any weaknesses in the methods and their potential effects on the study, the researcher can ingrain deeper integrity in the study.

4.11.1.4 Transferability

Ponteretto (2006) used the term "thick description" (p. 547) to highlight the essence of building the context, filling in all the details to provide a rich context allowing findings to be transferred to a similar situation. Guba and Lincoln (1985) refer to transferability as the demonstration that findings would be applicable to similar situations. This is not always crucial in studies with small samples such as this one, but the research design could be replicated in other similar studies. The research findings of this study may not readily be transferred but I provided a thick rich description of findings to show how AT may be used to support all learners in a mainstream school

4.12 ETHICAL CONSIDERATIONS

Denzin and Lincoln (2005) described ethics in research as applying a system or set of moral principles to any research to prevent participants from being harmed and to ensure their human rights are upheld. This system of moral principles requires that researches be aware of potential ethical concerns throughout the duration of the study and to actively take steps to ensure protection of participants at all times.

4.12.1 Permissions

The approval of the University Research and Ethics Committee was sought prior to data collection (Appendix E). Ethical considerations included obtaining permission from the school board to conduct the research, permission from the school principal to issue the questionnaires to staff and permission from the participants (teachers in the pilot project and educational assistants) themselves using informed consent forms. All of these steps are documented along with the permission sought from the University's Ethics Committee to ensure that all protocols and procedures followed the steps required and ensured participant safety and confidentiality.

Teaching staff, selected using the census sampling strategy mentioned earlier, were invited to participate in the self-completed, open-ended questionnaire and their return of the questionnaire was considered as consent.

Some concerns needed to be acknowledged in the use of the questionnaire: the ethics of asking respondents to share their thoughts or opinions needed to be considered and as such, the fact that return was voluntary and would serve as consent, was made clear on the document itself.

4.12.2 Voluntary Participation

As part of the ethical considerations, as well as the tenets of research credibility, all staff were informed of their right to withdraw without prejudice. The two teachers directly involved in the research, along with the educational assistant who worked closely with students experiencing learning disabilities in their classes, were invited to participate in face-to-face interviews and were provided with an informed consent document to sign at the time of setting the date and time for the interview. Ethical considerations required that all information be treated in a confidential manner and the participants needed to be assured that their responses would be coded in such a way that they could not be recognized by the readers of the thesis. This was explained and made clear prior to participants' signing the informed consent form. Their right to withdraw was also made clear to avoid the pressure of obligation. Furthermore, as Minter (2003) stated, the purpose of the interview should be clearly stated at the outset and the conduct of the interview explained so that at all times, the researcher is seen to be transparent and honest about the research and interview.

Respondents needed to understand that they were free not to complete the questionnaire and that involvement was completely voluntary and any information provided would be done as an anonymous contributor (Cohen et al., 2009). Thus no names or identifying marks would be placed on any documentation.

4.12.3 Confidentiality

Confidentiality (Mertens & Ginsberg, 2008) is described as the guarantee of the researcher to a participant that any information provided cannot be identified or traced

back to that respondent. This assurance of confidentiality extends to ensure that readers of the research are unable to determine the respondent's identity. Confidentiality is an active attempt to protect participants and their identities. The researcher provides verbal or written specification of the respondent's level of confidentiality. In this study, the researcher allowed for anonymity by not collecting names of identifying data on the questionnaire, and not providing any identifying markers on the interview sheets. Explicitly providing an assurance of confidentiality, can mean the respondent is more likely to participate and provide honest and valid responses rather than providing publicly acceptable answers due to a fear of identification. Confidentiality can be seen to minimize associated risks for participants and thus protects the respondent and enhances validity of responses.

4.12.4 Harm

The concept of harm is quite subjective (Mertens & Ginsberg, 2008) as this term may include such issues as distress, embarrassment or anxiety. These are things that you cannot predict as each participant is unique and experiences a situation such as an interview differently. Another understanding of the idea of “harm” can be linked to such concerns as inconvenience, time lost, intrusion or being made to feel uncomfortable or awkward. A participant may feel harmed if they are treated as an object, deceived or humiliated, or if they feel that their morals and values, actions or opinions have been ignored or judged. By engaging in the ethical review process and obtaining permission from the University, these concerns have been considered and every effort made to negate or minimize these impacts on the participants.

4.12.5 Human Rights

In protecting confidentiality, and reducing harm to participants, I protected the rights and welfare of the participants by asking them to volunteer to participate. This is an essential ethical responsibility and it is incumbent on the researcher to systematically and rigorously protect participants (APA, 2010). Research involving human beings has significantly increased our knowledge base as a human race, but research must not be undertaken at the expense of human rights or human dignity.

4.12.6 Risks and Benefits of the Study

The principles of maleficence and beneficence are considered when thinking about risk and benefit. With direct regard to ethnography, Atkinson, Delamont, Coffey, and Lofland (2014) explored these issues. They contend that the ethical approach requires that the benefits of research outweigh the potential for harm when deciding to pursue research. Ethnography, they argue has more potential to do “indirect” rather than “direct” harm (p. 340) and this is a factor that researches must stake into account and be aware of. I informed the participants that the study will benefit them in improving the way they use AT in supporting learners.

4.13 SUMMARY

The chapter focused on the qualitative research paradigm followed in this study and illustrated the inherently interpretive nature of this design. Furthermore, the focus also included issues of methodology and reviewed the data collection tools, the analysis applied and ethical considerations implicit in the study. The themes generated serve as

the basis for the findings and interpretation of collected data which follows this in the next chapter.

CHAPTER 5

FINDINGS AND INTERPRETATION OF DATA

5.1 INTRODUCTION

This chapter focuses on the presentation of the data collected and the interpretation of themes which attempt to answer the research questions set out in chapter 1. The themes which emerged from the interviews, self-completed questionnaires and documents analyzed are discussed in subsequent sections.

5.1.1. Emergence of Themes

The themes arising from the three data collection tools are summarized in Table 5.1 below. This shows the overarching code with how the theme was derived from the three tools.

Table 5.1: Themes from interviews, self-completed questionnaires and document analysis

Code	Themes from Interviews	Themes from self-completed questionnaires	Themes from document analysis
Time	Enough time is needed (for planning, for collaboration, and for research)	Time for research and sharing of awareness of AT which exists to support classrooms	Time to engage in professional development, training and collaboration with

			other staff who teach identified students to discuss challenges and success in using AT to support students in a mainstream setting.
Training	Teachers need training (In-service and professional development as ongoing relating to high tech, low tech and no tech awareness and options)	Training to enhance the ability to use AT to enhance support for mainstream classrooms.	Training to meet identified needs and support at both school and divisional level for training
Teacher perceptions on the use of AT		Availability and competence in use has an impact on whether the AT is used by the teacher.	Limited reference to AT devices in the IPP documents.
Access and awareness	Teachers should allow students to access tools and equipment such as IPads,	Access to more technology (IPads, computers)	Awareness of AT equipment to best support identified needs

	computers		
Support	The ideas of collaboration and drawing on expertise were highlighted with regard the planning for the pilot project as being a support for staff involved.	Teachers indicated that Educational Assistants are used to provide the one to one support they see as necessary for students with an additional need within the mainstream setting	The IPP document is to acts as a guide and support the classroom teacher as is the profiling tool – helping to identify needs and strategies.
Wellness	Inclusion; Control/autonomy related to buy-in; Peer similarity /“fitting in”; Emotional state reference (see Appendix J)	Students being supported in terms of academic wellness ad use of technology to meet some learning needs. (See Appendix I)	
Student needs and selection of AT	Completion of the profiling tool in pilot phase, in collaboration with other involved staff to use AT to trial	Staff used AT which they felt comfortable/ confident with – not what was best suited for students.	Student needs identified in the IPP document drawing on various assessments and testing as included

	in support of learner needs.		in each child's unique IPP document.

5.2 THEMES FROM SEMI-STRUCTURED INTERVIEWS

It was apparent from the interviews that the two staff who had engaged in the pilot study had become more aware of what AT is and how it could be used to support the education of all students in the mainstream setting. Findings suggest that the participants' thoughts are in line with thinking about how becoming more aware and realizing the elements needed for ensuring successful AT use in the regular classroom setting. The big ideas, reflected in Figure 5.1, which emerged from the interviews were:

- Time (for planning, for collaboration, for staff to research AT and various options available);
- Training (in-service and professional development as ongoing relating to high tech, low tech and no tech awareness and availability); and
- Awareness and access to tools and equipment (such as IPads, computers, software and hardware items that can be used as AT to support all learners in the mainstream setting).
- Support and collaboration
- Wellness dimensions with particular emphasis on inclusion and emotional wellness
- AT selection to meet student needs in collaboration with other stakeholders through the use of profiling.

Figure 5.1: Themes identified from the interviews

5.2.1 Theme 1: Enough time needed for planning

Direct responses from the interviews highlighting this theme are recorded below. It should be noted that these are direct transcripts and have not been edited for grammatical correctness, in order to retain the authenticity of the findings and reflect the finer nuances of the responses.

Question 1: How useful was it to do a class learning profile, noting the diagnosed needs of students as well as undiagnosed students, consider their various wellness needs, before meeting with the consultants to brainstorm possible Assistive Technology solutions for establishing an inclusive classroom environment?

- RESPONSE 1: This was a great exercise. I actually want to do this exercise with all my classes because I think it works really well in helping me get to know my students and helps to plan for their learning. It was good to be able to think about each student and plan for them more specifically but it took time.

- RESPONSE 2: I missed some of this initial meeting but caught up on a one-to-one basis later so then it was useful and I felt I was able to ask questions and clarify the purpose of the pilot, what was expected from me and the kind of things I would get to support me. I had time to ask questions and go over the information with the researcher.

Question 2: How useful did you find the brainstorming sessions with the Learning Support department and consultants in selecting, discussing and ultimately choosing or discarding the Assistive Technology strategies for use in creating the inclusive learning to enhance learning and support wellness? Explain.

- RESPONSE 1: This was great support, sharing the ideas made me feel like I didn't have to choose everything myself and only rely on my own information. Having people around to ask questions and get advice was super helpful and kept me calm and not panicked. Knowing I had time, and the researcher made time to meet and go over all the information was great.

- RESPONSE 2: I took a class list with me to all the meetings and then shared what I knew and the Learning Support teacher shared what she knew and we were able to try and select options to suit the students as well as the class so that everyone might benefit, not just the students who had a code or an IPP. It was nice to have advice

and guidance from someone who had tried out some of the options and it wasn't all down to me. Having time to talk and share so that we could plan together was great.

Question 6: What do you think could be done to circumnavigate these challenges to improve the efficacy of the UDL classroom environment?

- RESPONSE 2: Have a supply of earphones ready for when you use the Read Out Loud 6 program, the students often lost or broke earphones. Also, making sure computers were up to date and also newer for all of them would be better so you don't spend half the lesson getting them to work and then lose time to teach. I think time is the biggest issue – time for me to figure it out and then time to use it and help the kids figure it out. Getting used to the new software and time to try it out so that when I used the SMART response**,** I could use it competently and also be able to quickly support a student who was struggling with their response remote and QWERTY keyboard.

Question 7: Do you have any suggestions for low or high tech strategies that could be used – and to meet which specific learning goal – in a classroom setting to maintain and enhance inclusion of all students with a learning disability?

- RESPONSE 2: I think time is the biggest problem we face – time to try things out and figure out who it could help and why. I have a lot of ideas, but I don't often have time to practice or try them out and then decide what is best for my students. I also don't get a chance to look up stuff on the internet and then figure out how to use it in my class to help students, so I guess I just always use the computers or the SMART response you gave me to pilot and try out this year.

The aspect of time (or lack thereof) proved most prevalent across the collected data sets. Staff felt they needed time to plan, time to trial AT, time to research AT, time to seek guidance, time to implement and pilot and time to review and engage in collaboration with other staff. Guidance and support from someone knowledgeable was a key factor in cutting back on time constraints.

The suggestion that one could "plan specifically" for students and thus enhance their learning experience was shared in the interviews, specifically in relation to knowing "what to use, when, how and with what student" if provided with enough time to do so. This has also been an important aspect of the pilot project process with numerous meetings with the selected teachers and researcher to ensure class profiling and AT selection was appropriate and suitable for each student.

The indication that with provision of time, the pursuit of greater knowledge and understanding of AT could be achieved was empowering – staff in the interviews indicating that without time, "*I guess I just always use….what you gave me to try out".*

5.2.2. Theme 2: Teachers need ongoing professional development, collaboration and training

Findings from the interviews suggest that staff would be more amenable and eager to use AT if they had the training to do so confidently and competently (words used directly in response to the question asked) and thus enhance the educational support on offer for all students in the mainstream setting. The interview generated information relating to the theme of training and staff development.

Question 3: The initial set up of the inclusive learning environment involved some training, delivered by consultants, and included both teaching staff and classroom support staff. Do you think this training was valuable? Motivate your response.

- RESPONSE 1: Very valuable. I know I have been teaching for a long time but there was a lot in the training that I didn't know and so it was good to ask questions and have the selections explained so I knew what to use, when, how and with which student.

- RESPONSE 2: Yes, this was valuable – I need to be comfortable with technology if I am going to be using it and teaching people with it. I want to feel confident and competent. It was interesting to see what kind of questions were being asked when we looked at each option we had and what the potential for it was.

The staff involved in the pilot project, which made use of low tech options such as fidget toys (Appendix D2), and environmental changes such as the use of Hokki stools (Appendix D1), considered these in their responses to the use of Assistive Technology. Having external consultants support the two classroom teachers in the pilot project, was shown to be useful (as noted in the interviews) and helped build knowledge and capacity. This articulates with the research conducted by various teachers (Reiser, 2001; Floyd, Smith, Canter, Jeffs & Judge, 2008) which indicated that in order for teachers to be aware of and actually use AT in a manner that brings forth a strong, positive impact, they must be confident and well trained to do so. This requires knowledge and access to training in order to be well prepared. The responses received from the research site, suggest that teachers simply are not well-informed and need to

be “taught” or prepared in terms of knowing what Assistive Technology is all about. Lack of knowledge regarding technology was evident, for example, a few training programs were incorporated into initial teacher training programs although that is not enough (Todis, 1996). For teachers, as noted in the interviews, finding out about Assistive Technology is a personal choice and often undertaken in their own time and at their own expense. This lack of professional development and teacher training in this area lead to another obstacle, that being the lack of ongoing support for the training. Providing updates on what new technologies or strategies exist and supporting new developments with training are lacking.

The following questions revealed a common desire to learn more through sharing and feedback as staff encountered challenges and worked through these.

Question 6: What do you think could be done to circumnavigate these challenges to improve the efficacy of the UDL classroom environment?

- RESPONSE 1: Maybe have it as part of initial teacher training, or use the transition meetings we have every year to share the class profile with the next teacher so they don’t have to keep making one and selecting stuff. If you have already got the profile and you can track what works and what doesn’t work, then you streamline the process and make it so much easier – then you can also benefit ‘cause you get the same information from other teachers and then pretty soon it’s the way things are done for every class and every year group in the school.

- RESPONSE 2: Have a supply of earphones ready for when you use the Read Out Loud 6 program, the students often lost or broke earphones. Also, making sure

computers were up to date and also newer for all of them would be better so you don't spend half the lesson getting them to work and then lose time to teach. I think time is the biggest issue – time for me to figure it out and then time to use it and help the kids figure it out. Getting used to the new software and time to try it out so that when I used the SMART response, I could use it competently and also be able to quickly support a student who was struggling with their response remote and QWERTY keyboard.

5.2.3 Theme 3: Students should have access to AT Equipment to meet and support their needs

The face-to-face interviews raised the following responses highlighting the theme of access to tools and equipment. The responses emanated from questions 4, 5, 6, 7 and 8. The fact that reference was made to the need to access AT across a number of questions further highlighted how important this issue appeared to be to the participants.

Question 4: Once the project was set up, and the equipment / items being used were in place and actively being used by students, what was your initial feeling for the interactions you had observed in your class with students?

- RESPONSE 1: At first the fidgets took getting used to because I was worried they would be seen as a toy and thrown around the class or something. After the first week though, the fidgets and even the Hokki chairs were just being used the way they were supposed to. Initially, all the students wanted to use the fidgets and the chairs because they looked like fun. But after I implemented a seating plan and

strategic choices, then it was better and the students who really needed the tools, were using them.

- RESPONSE 2: I didn't use the fidgets as I also had an older group – mainly Grade 9's so I didn't want them out, but I did pilot the SMART response system and at first the kids thought it was a game and fun, kind of like texting, but after a few lessons they really enjoyed using the tools – it was a great way to engage everyone as each child has to submit a selection when using the SMART response, this was especially great to use in Math and Science reviews and lessons. I didn't have to use exit cards anymore because I could just do a quick 5 minute exit session, using the SMART system, with three or four questions and then when I looked over the data later, see what area most students had struggled with and then use that for the start of the next lesson and build from there.

Question 5: In the creation of the Universal Design for Learning classroom environment, did you experience any difficulties or challenges?

- RESPONSE 1: It's quite difficult to set up like in the beginning you have to do the profiles, get the training, order any equipment and then set it up. You also have to use the software like Read Out Loud 6 so that you can teach the students as you don't always have an educational assistant in the class to help so it's better if you just know what to do then there aren't any surprises. This all takes a long time to do and sometimes you don't have the time because you teach a lot of classes. All this work went into just one or two classes, the pilot classes, but I can definitely see that once it is set up, it's really useful.

- RESPONSE 2: Sometimes the computers were older and took more time to start up. We did get new laptops but then the new software had to be updated as well. Also, the desk and chair combinations were not great, they are joined and I think separate chair and desk would be better to allow for the use of Hokki chairs with regular desks rather than getting in different desks to suit the chair. I also had to spend time practicing with the software and getting to know the SMART response – I did visit another school which the researcher set up for me to see another classroom that was using this technology but again, this took time away from the school day and meant a lot of preparation for a substitute and then trying to find time to use the SMART system and get used to it before using it in my classroom.

Question 6: What do you think could be done to circumnavigate these challenges to improve the efficacy of the UDL classroom environment?

- RESPONSE 2: Have a supply of earphones ready for when you use the Read Out Loud 6 program, the students often lost or broke earphones. Also, making sure computers were up-to-date and also newer for all of them would be better so you don't spend half the lesson getting them to work and then lose time to teach.

Question 7: Do you have any suggestions for low or high tech strategies that could be used – and to meet which specific learning goal – in a classroom setting to maintain and enhance inclusion of all students with a learning disability?

- RESPONSE 1: I think having more laptops in the class so that every child can use them and not just the students who need Read Out Loud 6, or scribing or accommodations. Having the computers just for some students can make them feel

like they stand out but if you have them for everyone then that will mean everyone is the same.

5.2.4 Theme 4: Inclusion and Wellness

Question 8: Overall, do you think this Assistive Technology pilot project was a success at fostering greater inclusion for all students? Please explain fully and include reasons for your comments.

- RESPONSE 1: Yes, I think that I was able to keep my students in class more and not send them out with an Educational Assistant but it did take some getting used to. The computers were a big help and I did actually use them with other classes too, not just the pilot classes. The software was great because students could plug in their earphones and then listen to tests instead of having to leave the class and go out to get a reader as they feel quite embarrassed when this happens. The only thing I didn't really try was the use of the smart phones, I think they are unsafe as students can take videos or photos and that's a freedom of information issue. Quite a few other kids liked the things we tried too, not just the kids who I thought needed it.

- RESPONSE 2: This was a success – any time you can keep your highest needs students in a class with a teacher leading their learning, rather than sending them out, is a great thing and a success. It also takes away the "mystery" of what is happening to the students who leave a class for those students who are left behind. I used the SMART system with mainly the Grade sevens and also my Grade 9 Math and Science classes (not part of the study) and found it was very successful at

whole class engagement and also to help me quickly and easily identify areas where students were struggling – using visuals, manipulatives and the software all together allowed me to include students that I may have asked to work with an educational assistant before. I think this made my students feel better about the class and made them feel like they were adding to what was happening and part of that.

5.2.5 Theme 5: Support for student learning through support for staff

Question 1: How useful was it to do a class learning profile, noting the diagnosed needs of students as well as undiagnosed students, consider their various wellness needs, before meeting with the consultants to brainstorm possible Assistive Technology solutions for establishing an inclusive classroom environment?

- RESPONSE 1: This was a great exercise. I actually want to do this exercise with all my classes because I think it works really well in helping me get to know my students and helps to plan for their learning. It was good to be able to think about each student and plan for them more specifically but it took time.

- RESPONSE 2: I missed some of this initial meeting but caught up on a one-to-one basis later so then it was useful and I felt I was able to ask questions and clarify the purpose of the pilot, what was expected from me and the kind of things I would get to support me. I had time to ask questions and go over the information with the researcher.

Question 2: How useful did you find the brainstorming sessions with the Learning Support department and consultants in selecting, discussing and ultimately choosing or

discarding the Assistive Technology strategies for use in creating the inclusive learning to enhance learning and support wellness? Explain.

- RESPONSE 1: This was great support, sharing the ideas made me feel like I didn't have to choose everything myself and only rely on my own information. Having people around to ask questions and get advice was super helpful and kept me calm and not panicked. Knowing I had time, and the researcher made time to meet and go over all the information was great.

RESPONSE 2: I took a class list with me to all the meetings and then shared what I knew and the Learning Support teacher shared what she knew and we were able to try and select options to suit the students as well as the class so that everyone might benefit, not just the students who had a code or an IPP. It was nice to have advice and guidance from someone who had tried out some of the options and it wasn't all down to me. Having time to talk and share so that we could plan together was great.

5.2.6 Theme 6: Access and awareness of existing AT

Question 3: The initial set up of the inclusive learning environment involved some training, delivered by consultants, and included both teaching staff and classroom support staff. Do you think this training was valuable? Motivate your response.

- RESPONSE 1: Very valuable. I know I have been teaching for a long time but there was a lot in the training that I didn't know and so it was good to ask questions and have the selections explained so I knew what to use, when, how and with which student.

- RESPONSE 2: Yes, this was valuable – I need to be comfortable with technology if I am going to be using it and teaching people with it. I want to feel confident and competent. It was interesting to see what kind of questions were being asked when we looked at each option we had and what the potential for it was.

5.3 THEMES FROM SELF-COMPLETED QUESTIONNAIRES

There were fourteen returned questionnaires from fifty three staff.

Themes which emerged from the self-completed, open-ended questionnaires were:

- Access to more technology (IPads, computers);
- Use of Educational Assistants to provide support with the mainstream setting;
- Time for research and sharing of awareness of AT which exists to support classrooms;
- Training to enhance the ability to use AT to enhance support for mainstream classrooms;
- The improvement in the wellness of students across all dimensions of the construct.
- Teacher perceptions on the use of AT

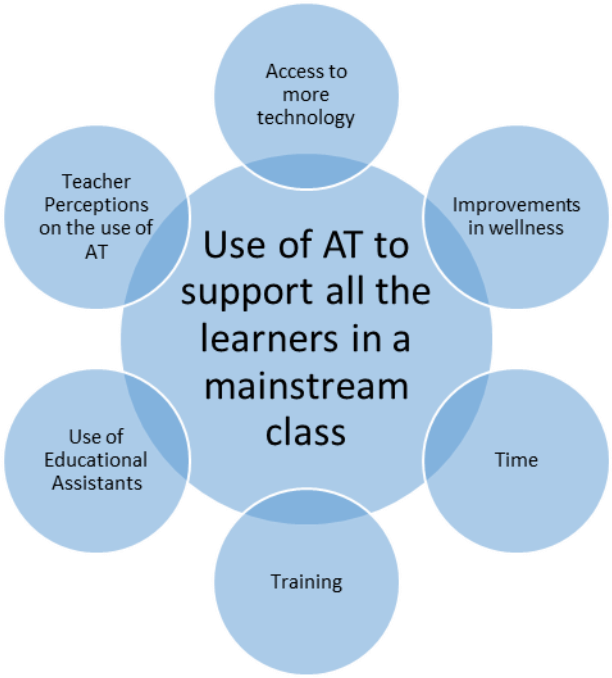


Figure 5.2: Themes identified from self-completed staff questionnaires

5.3.1 Theme 1: Access to More Technology (IPads, computers)

The self-completed questionnaire sent out to staff, elicited the following responses articulating with the theme of provision of tools and access to such.

The first of these questions asked was: *"If you had an unlimited budget, what kinds of Assistive Technology would YOU purchase for use in your class to make it more inclusive?* The following two examples of responses were received:

1.

8. If you had an unlimited budget – what kinds of assistive technology would YOU purchase for use in your class to make it more inclusive?

Ipads, laptops, with newer technology

2.

8. If you had an unlimited budget – what kinds of assistive technology would YOU purchase for use in your class to make it more inclusive?

Ipads for kids w/ great apps

A tracking table was used, helping to track data and add to developing themes, to indicate the prevalence of such suggestions as shown in Table 5.2 below :

Table 5.2: Kinds of Assistive Technology staff would choose with an unlimited budget

	IPads	**Classroom set of computers**	**Tablets or notebooks / SMART Tablets**	**Classroom printer**
Manual	7	2	2	1
Online	2	3	1	

The responses made it clear that all the respondents thought that having technology and hardware was important – iPads and printers, laptops/ notebooks and computers. Every respondent indicated the need for some form of electronic technology. This was an overwhelming response highlighting not only the notion that having the AT would help; however this may also highlight a very narrow and limited view of what AT is. When considering the definition of AT in chapter 2, AT includes software and hardware, but this is only one narrow aspect of AT. There are many examples of AT such as fidgets, prosthetics, pencil grips, colored overlays in which have been described in Chapter 2. This lack of knowledge indicates a need or desire for knowledge and training in the realm of AT.

5.3.2 Theme 2: Use of Educational Assistants to provide Support within the Mainstream Setting

Almost every returned self-completed questionnaire indicated the need for Educational Assistants to be present to work with students who experienced challenges to learning. The question: *"When you have an educational assistant in class – how often do you have students who are coded with a learning disability or who may be struggling, leave the room to work with an Educational Assistant?"*

The responses received and transcribed are illustrated in the data below each respondent receiving a different colour code to coincide with their other responses shown in Appendix I:

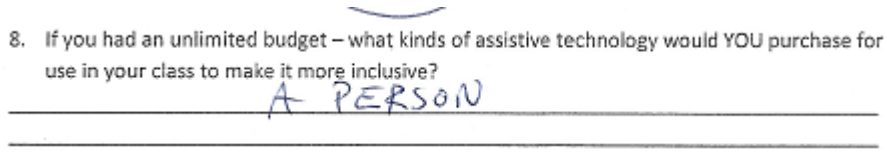
Table 5.3: Use of Educational Assistants

1. When you have an educational assistant in class – think of the frequency with which you use them to work with students who are coded with a learning disability or who may be struggling, and leave the room to work with an educational assistant and explain why you choose this option.
_**They can get the one on one help they need and also work at their own pace this way. I use this option frequently to help the student.** **I like that an EA gives more individual help and can take the time needed to go over the work and explain things as many times as needed without holding up the rest of the class. I would say I use this quite often.**

_I can work with some kids and she can work with some kids and that way we get to everyone

_If I need them then I do use them but I also like to be the one to answer questions and explain so things happen the way I want in the lesson and class. So I would say that I use the EA infrequently simply because I like to be the one helping and explaining.

One participant, in response to the question on the unlimited budget had responded “a person” as shown below:


8. If you had an unlimited budget – what kinds of assistive technology would YOU purchase for use in your class to make it more inclusive?

A PERSON

This was a clear indication of an idea that a “person” was better at providing support than technology could be in a school (articulating with theme six – teacher perceptions of the use of AT). While this is only one response, it revealed a lack of understanding that AT, if appropriate, can provide support for a lifetime, while a person is only there for a short period.

There was a fairly even division across responses for the use of support staff as a means of providing the intervention and support for students, rather than the teacher or the appropriate piece of AT to meet a need, overcome a barrier and allow students’ educational experience to be enhanced and supported in the mainstream classroom

setting. The fact that most of the responses fell into the often and sometimes categories shows that this is regarded as important by the respondents.

5.3.3 Theme 3: Time for research and sharing of awareness of AT which exists to support classrooms

Appendix A included responses to determine how prevalent current information and use of technology was among staff. From the responses, there was a clear knowledge of how to use common technology such as a digital camera, or their own cellular phones as every respondent indicated they were “proficient” with this use. However, when such items as the use of Read and Write Gold, or Inspiration (software to support specific learning needs) was introduced, only one respondent indicated knowledge or use of this. This lack of knowledge articulates with training needs as well as time to conduct training needs. Of the 20 returned responses, 15 participants responded to question 9 – which asked for feedback on the use of AT – that they would like to learn more, but felt there was limited time. One participant stated “I have a full timetable and then with marking, I just don’t have time to find out what to use.”

There appears to be a willingness to learn as seen from responses, but limited time and resources to do so.

5.3.4 Theme 4: Training to enhance the use of AT to support all learners for mainstream classrooms

The questionnaire responses produced comments in support of the theme of training. The last question sought comments and feedback on the use of Assistive Technology in the classroom. A snapshot of responses received is indicated below:

- Participant response: “More in-service training on using technology and training on a more regular basis”.
- Participant response: “I’d like to learn more about existing websites and Smart Board programs that would appeal to visual learners.”
- Participant response: “Formal instruction needed for kids to use the technology”.

These ideas highlight staff awareness of their training needs in the area of AT and how best to select and use AT to enhance educational support for all students in their classrooms.

Staff were asked how often they used AT devices and to explain why. The visual representation of the fourteen staff responses (not inlcuing the three from the pilot group) provided in Figure 5.3 below indicates a low rate of use, yet this in contrast to the expressed desire for more training in AT. As one participant stated, “I use what’s there”. This articulates with the theme of access to AT, and the training to build more capacity and confidence, to be more effective in using the AT. This figure again provided a means to visualise the data and develop the emergent themes.

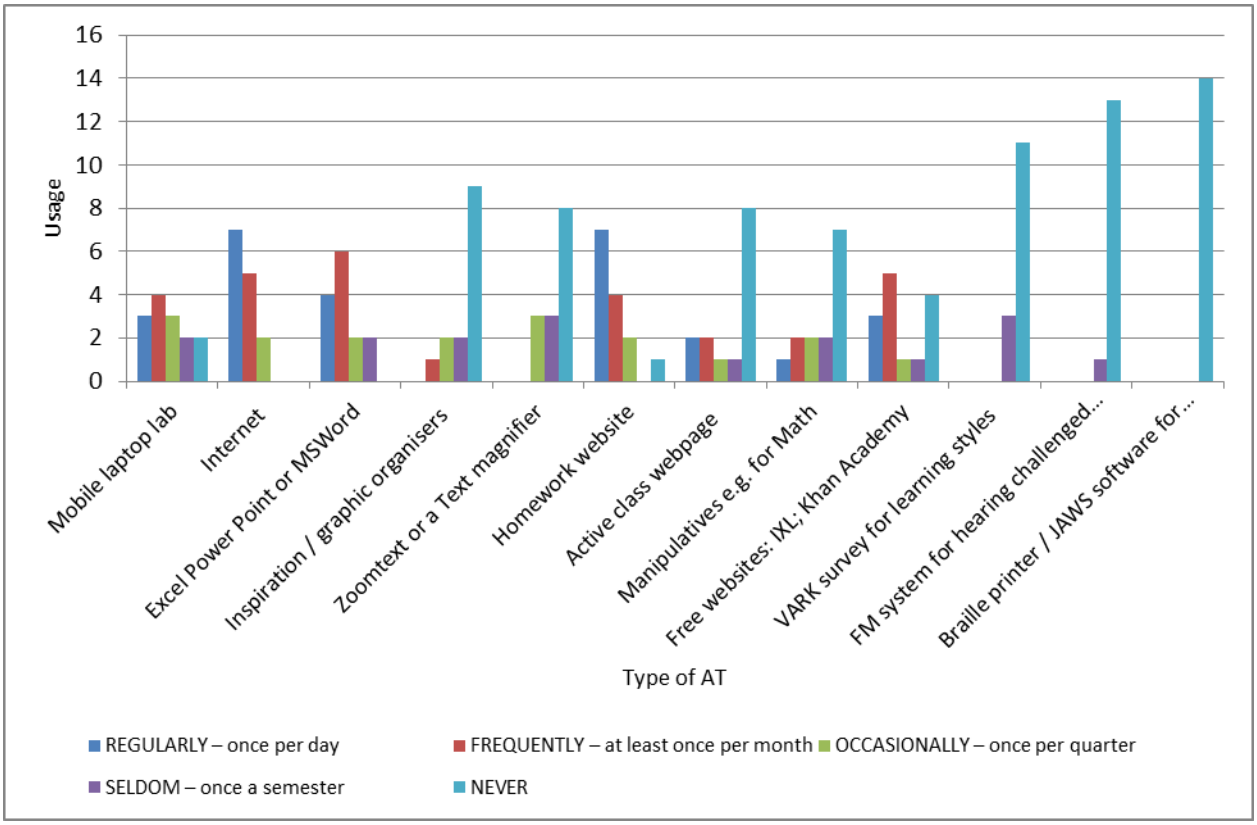


Figure 5.3: Regularity of AT use

5.3.5 Theme 5: Improved Wellness

To explore wellness during the initial phases, Appendix C, questions 1 and 2 were included as follows:

1. How useful was it to do a class learning profile, noting the diagnosed needs of students as well as undiagnosed students, consider their various wellness needs, before meeting with the consultants to "brainstorm" possible Assistive Technology solutions to establishing an inclusive classroom environment?

- RESPONSE 1: This was a great exercise. I actually want to do this exercise with all my classes because I think it works really well in helping me get to know my students and helps to plan for their learning. It was good to be able to think about each student and plan for them more specifically but it took time.

- RESPONSE 2: I missed some of this initial meeting but caught up on a one-to-one basis later so then it was useful and I felt I was able to ask questions and clarify the purpose of the pilot, what was expected from me and the kind of things I would get to support me. I had time to ask questions and go over the information with the researcher.

2. *How useful did you find the "brainstorming "sessions with the Learning support department and consultants in selecting, discussing and ultimately choosing or discarding the Assistive Technology strategies for use in creating the inclusive learning environment to enhance learning and support wellness? Explain*

- RESPONSE 1: This was great support, sharing the ideas made me feel like I didn't have to choose everything myself and only rely on my own information. Having people around to ask questions and get advice was super helpful and kept me calm and not panicked. Knowing I had time, and the researcher made time to meet and go over all the information was great.

- RESPONSE 2: I took a class list with me to all the meetings and then shared what I knew and the Learning Support teacher shared what she knew and we were able to try and select options to suit the students as well as the class so that everyone might benefit, not just the students who had a code or an IPP. It was nice to have advice

and guidance from someone who had tried out some of the options and it wasn't all down to me. Having time to talk and share so that we could plan together was great.

These initial responses did not generate a large amount of information pertaining to wellness and as such, a follow-up questionnaire was sent to the two teachers and one educational assistant who had worked with the pilot class, the following wellness focus was included (and is shown as Appendix J):

Question 1: Please elaborate on any area/s of wellness you believe you noticed the most growth/ development. Why do you think there was growth in this area or areas?

- RESPONDENT 1: Socially it was awesome, kids didn't leave the class with Mrs……. But stayed and got to be in control of what they were doing. Like they could use the Read Aloud with their headphones, their own headphones too, so they looked like the other kids who might have been listening to music. So, they got the email with my notes and then using read aloud, the notes were read, text was highlighted etc and so they worked in class just like everyone else.

- RESPONDENT 2: I found that having my students in class lessened the anxiety they might feel. They were not worried about being asked to leave the class and go work with the educational assistant, they knew they would get discreet help in class and no one would be staring at them or looking at them. I think this made some of the students feel calmer. I think of one girl and she was always really stressed about getting help in class and didn't even want to look at me when it came time to work on the assignment, but since we used the Read Aloud, and the laptops in class, she is able to work in class now. Another little guy also seems happier and that's because

he has a “cool chair” – he doesn’t actually need the chair as he doesn’t have an IPP or anything but he loves sitting in the chair, he says it makes him think better so I just leave him there ‘cause he’s happier.

- RESPONDENT 3: I think emotionally the students benefitted. Some of the guys I work with are pretty strung out and they are super conscious of being singled out. When I can leave them be and they can just be in class and be like everyone else, they are so much happier. I don’t know if their work was any better ‘cause some of them still wanted help, they were just happy to be in class though. I think at fourteen, you don’t want to stand out or have anyone notice you.

Highlighting such ideas as “happiness”, “being in class like everyone else” (and thus not excluded) added to the overall wellness students were experiencing in these environments. Further follow up questions included:

Question 2: Do you think the use of AT promotes wellness in your students?

All three respondents answered YES to this question. The follow up to this was:

Question 3: Please explain your answer above and share your thoughts / feelings on why/ why not AT can promote wellness dimensions in the students you worked with.

- RESPONDENT 1: Like I said earlier I think that being able to keep your kids with you, to make sure they get the teaching you as the teacher deliver rather than being taken out which makes them feel like they are different, so it’s embarrassing for them as teenagers, and then they also miss what goes in the class, like when someone asks a question and then they don’t get to be part of that. Before, I would

send kids out who needed a reader or a scribe, but now I use the software. It was hard at first because the kids had never seen this stuff before so it was like getting used to it first, but then, when they figured it out, they liked it and got way more done. I had kids who could only get a few sentences or answers done in a lesson, but now they get so much more done, and feel good about it. So that's what is the best part, they feel good about it which means they want to do the work and get on with things.

- RESPONDENT 2: My students were much more functional and included when I used the technology to help them. I feel that they outputted more and achieved more in a class so their time was used wisely rather than sending home a lot of incomplete assignments and adding to their homework load. This made them feel good about themselves, I think, well I hope so because they did so much more and should be proud of this.

- RESPONDENT 3: The best part about this whole exercise was that students used different tools to figure out what worked best for them, and then they stuck to this. They know themselves well and they know what works for them so this meant they controlled their learning and they felt good about that. I know I already said this but I think when a child can choose their own tools and how to engage with the work, it makes it more meaningful to them so they do it.

The findings support the wellness theory of Hettler (Chapter 2, S2.4.3) in terms of the emotional, intellectual, social and occupational dimensions. Feeling good (emotional),

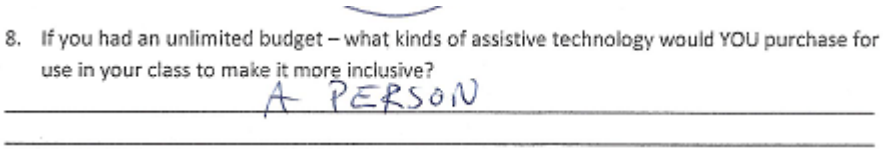
self-management (social), achieving more (intellectual) and using self-selected tools (occupational) were results that arose out of these comments.

In reviewing the responses using a TCA lens, again some broad themes or ideas are revealed. These include the ideas of inclusion, fitting in with one's peers, emotional state (anxiety/happiness) and the idea of student control/buy in to the use of AT.

These thoughts, which were shared by the staff involved in the pilot project, articulate with the work of Lickona and Davidson (2007) (discussed in Chapter 2, S 2.3.1) in their project: "Smart and Good Schools". The responses highlighted the positive impacts that AT had across all the wellness dimensions, barring the dimension of physical wellness. This was expected as the students in the original study were not physically impaired (such as using wheelchairs, prosthetics) and as such the responses were in keeping with the research reviewed in Chapter 2. Having completed the initial profiling procedure prior to the start of the study, AT was selected for the identified needs which did not include physical barriers to learning. The responses tabulated above indicate that staff who used the AT in their classes, perceived it to have made a positive contribution to the wellness of the students, most particularly to their emotional and social wellness. As explored in Chapter 2, the emotional wellness element highlighted the need for individuals to feel confident and in control, while social wellness relies on a strong sense of belonging and feelings of self-worth. AT contributed to both of these wellness aspects in the classroom. This was encouraging to note as the pilot project had been a small scale study in the Junior High School setting.

5.3.6 Theme 6: Teacher perceptions on the use of AT

One participant, in response to the question on the unlimited budget had responded “a person” as shown below:


8. If you had an unlimited budget – what kinds of assistive technology would YOU purchase for use in your class to make it more inclusive?

A PERSON

This indicated that the use of AT was seen as inferior to the support offered by a person (educational assistant/teacher). Unfortunately, the idea of support for a lifetime is overlooked in favor of support while in class – rather than seeing the end outcome as being a lifelong learner and effective contributor to society, support is limited to what can be provided in class. In fairness, across all the responses received, there was an even division across ideas on the use of support staff (such as educational assistants) as a means of providing the intervention and support for students, as well as support for the use of AT (in the form of laptops and IPads) to meet student needs.

5.4 THEMES FROM DOCUMENT ANALYSIS

In reviewing the publicly available documentation from the school division (such as the student services hand book) along with available internal school documentation (Appendix F) due to my role as Learning Support Coordinator in the research site, and in reviewing the minutes of the meetings held with the pilot study staff, themes emerged as shown in Figure 5.4 below ad the following brief discussion.

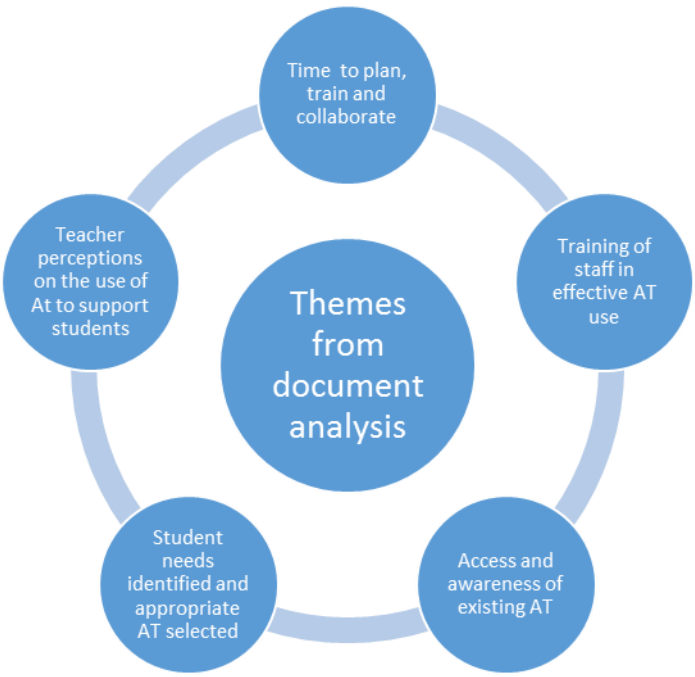


Figure 5.4: Themes identified from document analysis

- Training to meet identified needs and use AT effectively (referred to as a commitment to ongoing professional development supported at both school and school division level);
- Teacher perceptions on the use of AT to support students;
- Time to engage in professional development, training and collaboration with other staff who teach identified students to discuss challenges and success – in essence holding case meetings to support students in a mainstream setting.
- Awareness of what supports provide the least restriction for students to best meet and support identified needs and access to such;
- Student needs identified and AT selected to best meet such needs;

Training, time, along with access to and awareness of AT, were also identified in the interviews as themes and the documentary findings confirm this.

5.4.1 Theme 1: Training to Identify Needs

Document analysis of the Individual Program Plan (IPP) again revealed that AT is needed in teacher training if the information contained therein is to be effectively used. Being able to understand what assessment and diagnostic information means, and interpret this to make wise choices for the use of AT in the classroom to enhance inclusion, are all fundamental to the IPP document (Appendix F). There are two pages in the Individual Program Plan (IPP) devoted to this information, underscoring the importance of understanding the assessments and diagnoses (Appendix F). In the pilot project, the time spent on class profiling made significant use of the IPP and it was clear from the discussions, the time and depth devoted to these, that the teachers were uncertain of how to use the information contained in the IPP to most effectively support the students. Ongoing conversations were held throughout the year in my role as Learning Support Coordinator around the IPP with the pilot project teachers, adding to the notion that time for IPP review was essential for staff to effectively profile and then select the AT most suitable for their students to enhance inclusion and learning. Using the IPP along with the WATI assessment package (Appendix B) in the conversations was a platform from which to begin exploring the relevant AT and making choices and decisions which could then be shared with the learner.

In order for teachers to use AT effectively to enhance support for all learners in the mainstream classroom, they must be confident and well-trained to do so. Many students

do not enjoy using a computer nor does it suit their needs. For example, a student with a motor impairment may not be able to type very quickly; a student with a visual impairment may not be able to see the screen or keyboard; and a student with attention deficit disorder (ADD) may be over-stimulated or distracted by the laptop or computer. Perhaps the simple provision of a chair or stool (environmental changes) would be better suited to a whole class, or changing the ambient lighting rather than simply providing a whole set of computers, and hoping that support would be provided.

5.4.2 Theme 2: Awareness of Assistive Technology to best support Identified Needs

Appendix F includes a copy of the classroom accommodations page required for intervention. The category of Assistive Technology is included as a choice for support. Staff completing this document require a working knowledge of what AT exists and how to best use it to enhance educational support for students in their classrooms, if they are selecting this option of support.

In analyzing the self-completed questionnaire responses, it was noted how seldom AT is used. Perhaps this could be attributed to teachers' limited understanding of its use. The answers to Question 9 of the questionnaire, in asking for feedback on the use of AT, highlighted that staff are seeking more information as they do not feel equipped to select, implement, and evaluate the efficacy of AT in their classrooms. One respondent wrote "I don't even know where to start or how to respond 'cause I don't know what exists". This articulates with the experience of the two pilot project teachers who were guided through the profiling and selection phases, having access to expertise to help

broaden their understanding and awareness of AT. Staff who did not have this access felt they did not know where to start and may even have felt overwhelmed and intimidated had they been asked to profile and make AT selections on their own.

- **5.4.3 Theme 3: Awareness of supports which provide the least restriction for students to best meet identified needs**

As the Learning Support Coordinator for the research site, I was in a unique situation to note every IPP used in the school. I was also in the unique position of working with staff in setting up interventions and supports for students in classrooms. To do this more effectively, I completed a six month certificate course in Assistive Technology (Appendix G) to equip myself with the skills needed to make recommendations for AT, and to confidently use the selected AT in a classroom setting and to model for staff. Engaging in this course not only deepened my learning but made it abundantly clear that staff training and development to effectively implement AT in mainstream classrooms was essential to the successful utilization of an AT device.

The school division, according to documents analyzed and autobiographical experiences, makes funds and time available for teacher training, and staff are encouraged to use this to support their learning. However, no mandate in terms of AT learning and development has been set and as such, building awareness of AT into the culture of the school as a community of practice, is needed to enhance the understanding and use of AT as means to benefit the inclusion, wellness and overall academic goals of a school.

5.4.4 Theme 4: Time, Professional Development, Training and Collaboration

The Individual Program Plans revealed an emphasis on the use of assessment to inform choices about the tools and strategies that could or should be used as part of the planning process to ensure success for every student (Appendix F). Coupled with the class profiling exercise engaged in as part of the pilot project, using Appendix B as an additional guide to AT selection, it was clear that good collaboration, sharing of expertise and knowledge and training, were an essential part of the process to ensure that AT was used to enhance the creation of an inclusive classroom which supported all dimensions of learner development, and provided access to learning in a variety of ways, as UDL suggests.

When considering the IPP document, clearly the element of time is crucial in being able to provide assessments at class level, and then determine the supports needed to create the least restrictive environment to support and enable students to access the curriculum and achieve learning outcomes and goals. Time to familiarize oneself with the document, and then actively plan to use learning support strategies, or provide modified notes (such as cloze notes) requires preparation and active planning. This requires forethought in preparing lessons and materials, drawing on the Universal Design for Learning (UDL) principles and relevant Assistive Technology to support the needs of all learners in the mainstream class.

Having fulfilled the role of Learning Support Coordinator, and being the person responsible for the implementation of IPPs together for each student who required them, was a time-consuming job. In viewing the IPP documents, I noted that goals were

being set for students, but the tools to aid growth and development were not always being provided as regularly as required to sustain growth, support and wellness in students. This was the observation I made when I compared the numerous IPPs for students with identified learning needs, the class lists for the pilot project and the responses from the interviews.

5.4.5 Student needs identified

Having fulfilled the role of Learning Support Coordinator, and being the person responsible for the implementation of IPPs together with their classroom teachers, for each student who required them, highlighted the importance of noting and planning for unique needs. In viewing the IPP documents, I noted that goals were being set for students, but the tools to aid growth and development were not always being provided as regularly as required to sustain growth, support inclusion and wellness in students. This was the observation I made when I compared the numerous IPPs for students with identified learning needs, the class lists for the pilot project and the responses from the interviews.

5.5 SUMMARY

Responses received from the participants in the interviews, the follow up questions (conducted a year later at the request of the examiners of the thesis) and self-completed questionnaires, along with document analysis, provided insight into the use of AT in the regular classroom setting to support all students. Needs arising, in the form of themes, were explored and provided a depth to recommendations that are made in

Chapter 7 to improve AT use in the mainstream setting for the educational support of all students.

CHAPTER 6

DISCUSSION OF FINDINGS

6.1 INTRODUCTION

In the preceding chapter, findings related to the use of AT in the school to provide educational support for all students in the mainstream setting, were discussed. Based on these findings, the current chapter synthesizes the research findings pertaining to the themes raised in the previous chapter, along with the strengths and limitations of this study.

Hettler's (1979) Wellness Theory, Universal Design for Learning and the Cultural Historical Activity Theory (Engeström, 1991) featured significantly in this study. The research in these areas, spurred the need to pursue how best to support inclusion of all students in a safe environment, that was least restrictive for their needs and which empowered students to learn and participate in an inclusive setting.

In order to address the themes which emerged from the data collection process, each theme is broken down for deeper exploration to illustrate how it impacts the use of Assistive Technology in the classroom to support inclusion of all students.

Visually, these themes can be illustrated as follows in Figure 6.1:

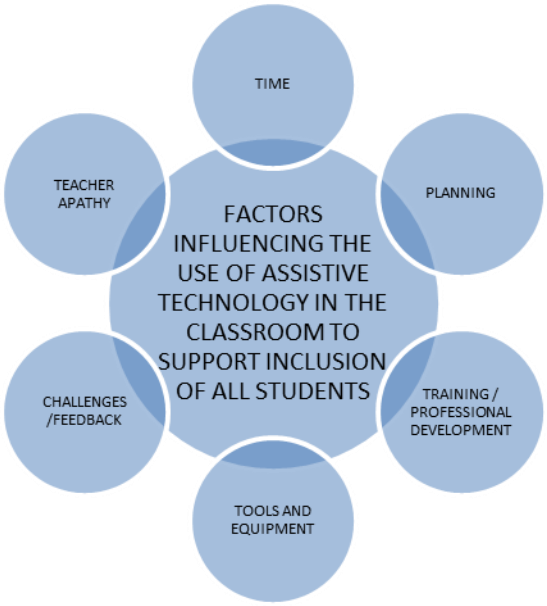


Figure 6.1: Themes from interviews, self-completed questionnaires and document analysis.

6.2 THEMES COMBINED

It became clear from the findings of this research, that staff had a limited awareness of AT (which was one of the questions raised in Chapter one: What are teacher perceptions of AT?) and indicated they felt a desire to learn more, so as to be more effective in supporting their students. Further to this need for training and understanding what AT is and how it can be used, the time to do so and to share/ collaborate with peers, was raised as a problem. In addition to training, the theme of access to AT to build on training and allow staff to become more proficient in the use and evaluation of AT, and thus help to change their perceptions regarding AT, was explored.

6.2.1 Staff Training and Ongoing Professional Development

Teachers indicated that professional development and other learning opportunities equip teachers and educational staff with the tools and knowledge they need to help students reach their full potential. To maintain their standards of excellence, teachers need to be continually and actively engaged in their own learning throughout their career. The professional learning community model (Marzano, 2003) flows from the assumption that the core mission of formal education is not simply to ensure that students are taught but to ensure that they learn. This simple shift – from a focus on teaching to a focus on learning – has profound implications for schools.

For purposes of this study, it became clear from the data that teachers and educational stakeholders need to be aware, not only of AT, but also of certain contributory factors when choosing to implement AT in a classroom to promote educational support for all students.

These questions tie in with the work of both Edyburn (2006a), who suggested three steps for educators to be cognizant of, as well as the wellness theory of Hettler (1979):

- recognizing an academic performance restriction/problem/disability (physical or intellectual wellness dimensions);
- identifying a trigger event, or antecedent factors which influence the students' progress (environmental, social and emotional dimensions of wellness); and
- calculating the remediation vs. compensation equation to best support the needs of the student through the use of AT.

These articulate with the training and ongoing learning that teachers need to engage in. In preparation for this study, the six month Assistive Technology course (Appendix G) I engaged in with a post-secondary provider in Canada, revealed how little I knew, even as a practitioner working in this realm. An active search for information was needed, and making the time to do this was important.

The work of Edyburn (2002), Blackhurst (1965), and the research of Dell, Newton and Petroff (2012), Golden (1998) and Roblyer (2003) have been instrumental in shaping the understanding of AT both at a local level as well as internationally. The current research has drawn extensively from this earlier work, and highlights the need for educational stakeholders to be aware of AT as a tool. At the same time, they need to be confident to both manage and explore its practical implementation in a classroom setting to promote educational support for every learner in the mainstream setting.

For teachers, all the materials they make and create to allow their students access to learning, illustrate that they are utilizing and implementing AT at its most basic level. The complexity of what is created, bought or used, depends entirely on the unique needs of the student, and the manner in which the six wellness dimensions put forth by Hettler (1979) can be attained. This leads to a consideration of what is needed to overcome the learning disability and allow the student to use their inherent strengths to develop as a learner within the mainstream classroom where possible, and thus move towards greater emotional wellness. It also relies on the teacher to be well-trained and able to make relevant, well-informed choices to suit unique and individual needs to enhance support.

Findings of the study revealed that it is important to note that the use of Assistive Technology is not remediation or the use of remediation strategies such as re-teaching or chunking information. It is an entirely different realm, working to support remediation, which in many cases has not been successful on its own, and thus the need for something in addition to help overcome student barriers to learning. Professional development for staff can aid them in understanding this basic difference between remediation and the use of AT.

CHAT (Engeström, 1991) is based on the belief in a learning system which is composed of the individual interacting with a concept/learning and the practical tools of learning to create a unified ‘dynamic whole'. This model of “expansive learning” brings about change as these systems do not reside in a vacuum but are constantly influenced by the conditions in which they are situated. The nature of this model is inherently interventionist and thus aptly suited for professional development of staff and educational stakeholders.

6.2.1.1 Theme of professional development

Findings of this study reveal that staff identify a lack of knowledge and awareness which hampers their use of AT in the mainstream classroom. The planning element of using AT as an intervention to support learning among students who experience barriers to learning, is the most important step in using AT and is often commented on in various research studies (Murry & Murry, 2000). Planning requires teachers to be aware of the disability, its impact on and restriction of classroom activities and how best to support

this through knowledge of existing AT to allow staff to make an appropriate AT selection.

Schools and teachers routinely evaluate academic performance, since testing and assessment form part of the everyday happenings in a classroom, be it summative or formative in nature. Every teacher and classroom has a variety of systems in place to identify challenges. Effective training and professional development for teachers can provide the knowledge, skills and confidence to allow them to be sufficiently aware of the support options available, which include AT.

This does not mean giving up explicit teaching strategies to assist all students, with or without a barrier to their learning. It is instead about identifying additional supports like AT, and infusing the dimensions of wellness into the classroom, which may be crucial to enhance access and educational support required for students in the mainstream classroom setting.

From the study's findings, it appears teachers are faced with a critical decision. The choice to use AT, or not, to support their students, or as Assistive Technology theorists (King, 1999; Cook & Hussey, 2002) suggest: remediate or compensate. To make this decision, teachers must be well-trained and prepared to do so in an informed and coherent manner. Edyburn (2000) suggested that one way of addressing the remediation vs. compensation problem is to consider that these are not mutually exclusive options, but they can be complementary and work in tandem with each other. AT requires "buy in" from the user, effective matching with the user and effective utilization and implementation from the staff supporting the learning.

Other considerations for professional development when using AT include awareness of what exists in this realm, amongst the plethora of technology, and how teachers can be aware of what is available, and how to ensure they choose the correct interventions for their students. Knowing that resources such as speech recognition software (like Dragon Speak) are good for students who have trouble with grapho-motor skills (such as dysgraphia), or that text-to-speech software (like Word Q and Read and Write Gold) is available to support students with a written expression disability, as well as a reading disability, can be invaluable information for teachers. Webspiration, and other graphic organizer software, can be extremely effective for a student diagnosed with ADHD / ADD and the use of screen magnifiers, Zoom Text and JAWS software can be instrumental in allowing a visually impaired person to access curriculum. Whether the AT is in the form of Braille, an FM system (for hearing impaired students) or in the form of software such as Speak Q or the Dasher Keyboarding system, it exists to serve a unique purpose, and thus careful, intentional training is vital to ensure appropriate selection.

6.2.2 Time

The findings of the current study revealed that there is a need for time to plan, to research, trial and implement AT. The element of time was directly highlighted as an issue in the preceding chapter in that teachers often felt they did not have time to seek out new information, to explore AT and then be able to trial various devices or items in their mainstream setting.

6.2.2.1 Time for collaboration and sharing

From the findings it was clear that building a culture of collaboration means building a professional learning community which recognizes that they must work together to achieve a common goal or a collective purpose of learning for all. Building this culture takes time. Despite compelling evidence indicating that working collaboratively represents best practice (Marzano, 2003), teachers often continue to work in isolation. Even in schools that endorse the idea of collaboration, the staff's willingness to collaborate often stops at the classroom door as staff may not want to appear to lack knowledge or confidence in an area (this was indicated in question 1 of the interviews where staff stated they felt better when allowed to talk and ask questions prior to the study).

The power of collaboration in professional learning communities lies in a systematic process in which teachers work together to analyze and improve their classroom practice. The findings clearly suggest that when staff were able to draw on the expertise of colleagues (such as the profiling exercise) and have discussion and gather knowledge in a collaborative manner, they felt more empowered to deliver the chosen AT to support the students in their class. This power translates into collective wellness practices that support not only students but teachers too. This issue was raised by two staff involved in the research pilot project. The opportunity to collaborate with experts in the field prior to starting the pilot project was seen as highly useful. This co-operation and collaboration articulates with the thoughts expressed by Wenger (1998) who explored “communities of practice”’. He explains that these are groups of people with a mutual concern or interest in something which they do, and then learn how to improve

their interest through regular interaction with others. As Wenger (2011) stated, over a period of time this “collective learning” (p. 1) makes each member of the community a stronger individual in their own way. This in turn articulates with the extensive research (over one hundred schools) of Lickona and Davidson (2007), and the building of communities of practice, to support the whole child (academically and in building character).

What I found in this study, was the professional collaboration in the classroom includes teaching staff and support staff working together for the same purpose, outside agencies collaborating with schools, parents and teachers collaborating and even the learners collaborating with staff to achieve a common goal. In order to enhance educational support in the classroom, there has to be shared work undertaken at various levels which calls on the strengths and participation of a diverse range of professionals. Dyson and Milward (2000) stated that a “supportive setting means bringing together learners in a community, and providing access to curriculum and supported learning experiences, opportunities for co-operative learning and enhancing life experiences to participate fully in society” (p. 15-16). This articulates with Hettler (1979) and Howes and Davies (2007) whose analysis of meaningful educational support for all in secondary schools raises the idea that the active engagement of teachers, and their competency in delivering educational support, is central to achieving greater educational support for the mainstream setting.

In the pilot findings, I observed that building this community of practice in the school would result in an exchange of targeted knowledge and strategies, to better include all learners in the mainstream classroom. If all staff, not just those in the pilot, were to

engage in this type of collaboration, namely the building of a community of practice, the incidence of educational support through the use of AT and awareness of how best to use AT to support all learners would be increased.

The findings suggest that professional collaboration and time for this result in greater participation. Participation is defined by Booth (2002) as “going beyond access. It implies learning alongside others and collaborating with them in shared lessons. It involves active engagement with what is learnt and taught and having a say in how education is experienced. But participation also involves being recognised for oneself and being accepted for oneself. I participate with you, when you recognise me as a person like yourself, and accept me for who I am” (p. 2).

I realised through engaging in the study, that the areas highlighted reveal that participation and collaboration impacts all the members in a school environment which include staff, parents/carers, students and external agencies and is concerned with all areas of school life, so while teaching and learning are very important, so is school policy and the everyday interactions of the people in the environment. Collaboration also takes account of the diversity which exists within a learning community, so that it does not create or reinforce barriers to participation for some whilst increasing participation for others. Professional collaboration is a process focusing on the “enhancement of learning for all students through innovative thinking” (Hart, 1996, p.4).This means staff need to work together and with each other as well as with learners to effectively promote the aims of using AT to promote academic achievement and wellness in all students and thus enhance the inclusion of all students in the mainstream setting. For the purposes of inclusion, this statement has far-reaching social, emotional

and pedagogical consequences and the onus on making inclusion work shifts from being a senior management initiative, to being one which encompasses every member of the school community. Included in this are staff, parents, learners and external agencies. Ideology will also pose a significant problem, as can be seen from the literature thus far, a universally accepted understanding of the term inclusion has not yet been achieved. Many professionals work within their own paradigms and thinking and embracing a new system of thought can be very difficult.

“There is no room in a classroom dedicated to learning without limits for learning opportunities that only benefit some people,” (Hart et al, 2004, p. 203). This statement encapsulates the very heart of the use of AT in a mainstream setting to increase support, academic progress and wellness for all. Equity in learning means not that everyone is treated the same, but rather that we are given the same opportunity to access learning in various ways which meet our needs and enhance the learning environment for each learner.

6.2.2.2 Time for planning

Findings highlight the need to engage in professional development is inherently tied to the themes of time and planning which emerged in the data collection and analysis phases. Phase one, the pilot project, was time intensive with five meetings being held to allow for thorough planning, profiling, selection, discussion and evaluation of the pilot. This did not include the data collection process of Phase two which included further interviews held with the two participating staff (Appendix C and responses shown as

Appendix J), or the weekly tracking sheets compiled by the education assistant in the pilot classrooms as a means of noting if supports were being utilized.

Time is also needed to facilitate the inquiry process. Seeking out answers to questions and problem solving, requires both time to research and gather information, and time to plan, implement and then evaluate what actions are undertaken.

Articulating with the research of many theorists already mentioned (Edyburn, Cook & Hussey, King) time is needed to explore the various applications for AT. Application aslo requires time as in order to be effective, staff need to be trained, and staff need to collaborate with experienced partners to scaffold learning to be most effective. All these elements require time.

Findings suggest that reform in the use and application of AT is needed. Reform requires that teachers learn new roles, access new ways of thinking, delivering, and ways of teaching. This means long-term developmental processes are needed which require educational stakeholders to focus on changing their own practice. However, "the demands posed by daily teaching and other aspects of the reform continue to absorb a bulk of teachers' energy, thought, and attention" (McDiarmid, 1995, p. 2). The need to make time, opportunity, and other resources available to teachers is a vital concern if the vision of educational change to promote the educational support of all learners in mainstream settings where possible, is to be realized. This makes inclusion problematic as practical factors such as time are in short supply. When do all stakeholders meet to articulate ideas and agendas (as was required for the pilot project), to discuss and plan, to develop and review AT to support inclusion, wellness and academic progress?

Another factor is financial resources – funds for training and professional development will be needed to enhance staff skills to better meet the learner needs, as well as funds to provide relief/ substitute teaching to allow staff to meet with colleagues and undertake classroom observations, shadowing and mentoring and professional development as required.

It was clear form the findings that in order to effectively implement and use AT, a change needs to occur at the structural level of the school in order to promote learning, inclusion and wellness for all students. Education must respond to the changing needs of students and their teachers, just as the corporate world has reacted to its changing needs by implementing employee training. Shanker (1993) emphasized the critical importance of providing additional time for professional development and made a startling comparison when he pointed out, as an example, that the Saturn automobile company allowed employees to spend 5 percent (92 hours a year) of their work time learning, and that this had resulted in improved automobile building. In the essential service of education, how much more should time and training be devoted to improving teaching and learning? Shanker further stated, “if we're not willing to commit ourselves to that kind of effort, we are not going to get what we want" (p. 3).

The findings reveal an articulation with the Action on Inclusion (2010) document and the Alberta Teachers Association (2004) code of conduct which places an obligation on school divisions to ensure highly qualified teachers are placed in classrooms. This expectation is echoed internationally in the National Commission on Teaching and America's Future (1996) which draws a correlation between teacher knowledge, skills and student achievement. Based on the idea that teacher expertise has the most

significant impact on student achievement, the National Education Commission on Time and Learning (2005) recommended that a variety of means be used to ensure time for professional development. The National Staff Development Council (Sparks & Hirsh, 2000) recommended that at least 25 percent of an educator's time be devoted to professional learning so that what is learned is mastered and effectively used in classroom instruction. Darling-Hammond (1999) suggested it was unrealistic to expect teachers to learn how to master and then build difficult practices into their teaching after only a few hours of training. Canady and Rettig (1995) recommended at least five to ten days of workshops when instituting sweeping instructional changes.These issues highlight a wider issue in education which may be the focus for further study and future exploration.

Findings reveal a lack of knowledge and awareness in teachers as to what AT exists, where to find information to promote their AT understanding and how to effectively engage with information to more effectively support all learners in the mainstream classroom. In many ways, this inquiry-based planning model simulates Vygotsky's (1978) Zone of Proximal Development (ZPD) in that a bridge is needed from what is known and what is not known (the problem that needs to be resolved → the solution that needs to be found). The ZPD is the area on which the guided planning will operate as new information is needed. Interactions with more knowledgeable peers or professionals are sought to allow scaffolding of learning and then allowances are made to evaluate the new information to make informed decisions about what is to be assimilated and what is to be discarded.

6.2.2.3 Articulation of collaboration, inclusion and professional development

Findings highlight that inclusion can be increased (Appedix J) through the effective use of AT and thus an inclusive culture can be initiated and maintained. The work of Thomas and Vaughn (2004) as well as that of Ainscow, Booth and Dyson (2006) describe inclusion as having three elements – an inclusive culture, inclusive policies and inclusive practices. A school needs to actively cultivate its inclusive culture, from the top down, to allow for the policies and practices to follow and enrich the learning and teaching environment. One way to incorporate this in the research site would be to put greater focus and emphasis on inquiry and investigation in department and faculty groupings, requiring active engagement and investigation with regard to the use of AT in classrooms to promote and sustain inclusion. These departmental meetings can further be minuted and could include, as a priority, discussions of whole school policies, like inclusion. In this way, all staff are conversant with, and using a common vocabulary, when it pertains to inclusion, how it will take shape in the school and the role they will need to play to facilitate this.

Fostering the need to stay current was highlighted in the findings of this study. In education, it is essential to remain current as information changes, grows and diverges so quickly in the world. Wheatley (1992) stated: "Information informs us, forms us" (p. 97). Inherent in any organization, especially a school seeking to improve, is the need for all stakeholders to have access to and dialogue around the information. This means using current information and not that which has already been debunked and disproved.

Findings in this study, as related to professional development to establish professorial learning communities to enhance the culture of collaboration are echoed in the work of Paul (2012). Paul (2015) conducted research on teacher motivation and found that teacher apathy and decreasing commitment often stem from a lack of investment by school principals in staff development. Lack of structured feedback and guidance were also cited as a contributing factor to teacher apathy and demotivation. This would make sense in terms of this study: staff development in this area, using AT to promote inclusion for all students in the mainstream classroom, had not been initiated before. The data revealed this to be a factor in this study, articulating with the need for professional staff development and establishment of professional learning communities to promote a culture of sharing and feedback.

6.3 LIMITATIONS OF THE STUDY

Without exception, all research is limited in various ways, be it in the form of internal or formal limitations, such as the materials and procedures used, coupled with the scope of the problem explored and the applicability of the results. Furthermore, external limitations can exist in the form of resources such as availability of time, finances (if applicable), human resources, location and travel and any existing socio-economic or political factors.

In acknowledging these limitations, it can assist in focusing the researcher more clearly on their research area and help in the design of a study that adequately tests and supports the research but is also cognizant of the limits.

This study, grounded in the qualitative paradigm which seeks to examine particular social processes in depth, can pose limitations in that analysis of the collected data can be time-consuming and thus stretch resources.

The following are considered limitations of the study:

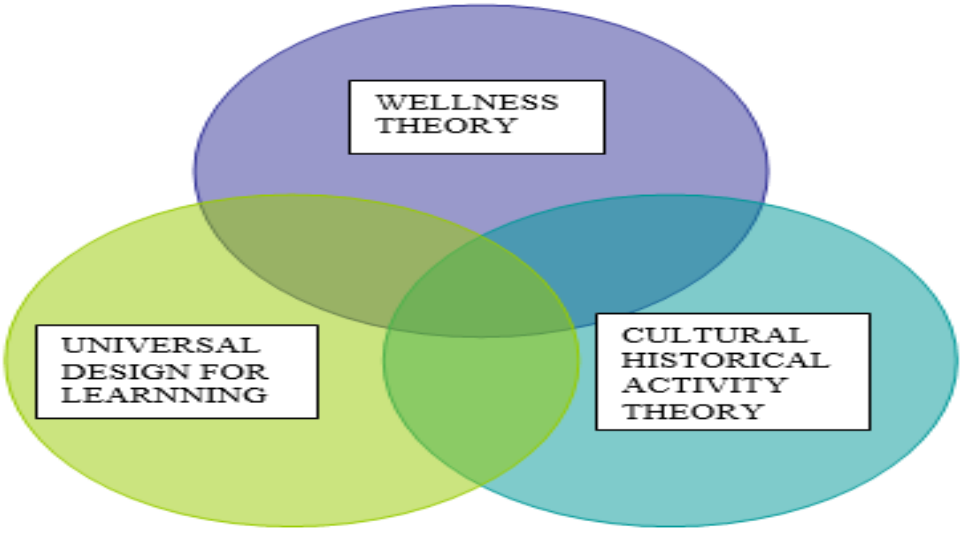
- Qualitative data is often subjected to critique in that it lacks the statistics or numbers to support a hypothesis and can be seen as being less credible or valuable and also subject to the researcher's own bias or subjectivity.
- The low respondent return rate of the survey.
- Another limitation of this particular study was that it had a limited time span – longitudinal research in this area would be highly beneficial. Mapping a group of students over the entire span of the schooling years would lend itself to generating rich data on the use of AT to promote educational support and wellness.
- This research, dealing with human beings, is also very sensitive as research should do no harm or infringe on any rights, freedoms and safety to participants' physical, emotional, psychological and academic well-being. This can pose yet another limitation to the research project. In collecting personal opinions on the use of AT in mainstream classes, a barrier to validity was identified in that opinions cannot be validated against measurable data, in keeping with Smith and Osborn (2003) who state that "qualitative analysis is inevitably a personal process and the analysis itself is the interpretive work which the investigator does at each of the stages" (p. 66).
- The study was conducted over a year at the research site. This allocated time included the initialization of the project as well as the six months of the direct teacher delivery in the classroom. While a year is a reasonable amount of time for the

purposes of this study, with the professional development and teacher training needed prior to the delivery of the project, extending the project into a longitudinal research project over two or three years may have resulted in more detailed information and deeper findings. This raises the potential for further research – implementing a full year, whole staff training project and then doing a year of practical implementation may have produced different results with regards the use of AT in the mainstream environment to enhance inclusion.

- Sample size was another considered limitation. However, as this project relied largely on qualitative information, this smaller sample size was not as much of a disadvantage as initially anticipated. If a future study was conducted, enlarging the sample size may be useful in generating more quantitative data and thus add to the validity of the data collected and conclusions drawn.

6.4 STRENGTHS OF THE STUDY

* Use of a tri-theoretical approach to the study undertaken which lead to the development of the Framework as shown in Figure 7.1. This can be shown as follows:



* Development of a Framework for implementing AT effectively to support all learners in the mainstream setting. Krueger and Sutton (2001) state that, "To ensure student success, an educational system must focus on student outcomes and provide the support necessary for students to achieve those outcomes. […] The greatest student success occurs with different instructional strategies addressing the learning needs of all students" (p. 2).

* Developing a process, as outlined in Figure 7.1, to allow for engaging in planned collaboration with staff, external agencies and other professionals to deepen and expand their knowledge of AT and how AT can effectively support students and enhance their learning experiences.

- Highlighting systemic issues in the site was a strength that was exposed. In addition to highlighting the need for AT in mainstream classes to enhance inclusion for students who may otherwise be placed in remedial or “pull out” programs, this

research also exposed a number of greater systemic issues which may otherwise have gone undetected. There is a need for professional development, to build a culture of inquiry and learning, to facilitate change and reform to meet the changing needs of our world and build on such theories such Hettler's Wellness Theory in a bid to create truly supportive learning environments. All these require a well-structured, coherent plan to enhance implementation. Bringing this to light may help schools become more aware of the use of AT in classrooms to bring about greater inclusion for all students.

- Support for students in the research classes was achieved and these students were able to explore and use, to their advantage, various tools which they may otherwise not have been exposed to or allowed in other circumstances. This allowed knowledge of what can be achieved to be revealed and will hopefully benefit other classes which are taught by the teachers involved.
- Training for teachers was provided and at the conclusion of the study, two teachers at the research site had acquired new knowledge and learning. It is hoped that their new knowledge can be shared in their professional learning community to build an even greater understanding of the use of AT in classrooms to support inclusion or all students, regardless of ability or disability.
- Using various data collection tools, and not relying solely on one source, was a means of enriching and verifying results.
- The school was very supportive of the study which indicates a willingness to pursue AT as a support for students in the future and a willingness from the school to explore ways to support all learners in the mainstream classroom setting.

Fortunately, for this research project, access to information and participants, access to expert guidance from a university supervisor, along with access to and support from various professional consultants (Speech and Language Pathologists, Occupational Therapists, Physiotherapists and expert teachers) as per the project planning phase was readily available. This helped to increase the viability of the research.

6.5 CONTRIBUTION TO THE BODY OF KNOWLEDGE

This study sought to explore how Assistive Technology could be utilized to enhance the educational support of all learners in a mainstream school. Benefiting from the study were the various educational stakeholders that could be impacted such as students, teachers and professional staff and curriculum planners as discussed below.

6.5.1 Theory

This research hoped to add to, and extend the theories which already exist in the realm of AT use, to enhance inclusion and equity, wellness in students as well as those impacting staff collaboration and developing professional learning communities, to achieve inclusion, equity and wellness. The research highlights the work of Dufour and Eaker (1998) and Levine and Shapiro (2004) who state the attributes of a professional learning community include developing a shared vision and values that lead to the collective commitment of school staff, which is expressed in day-to-day practices (pedagogy), actively seeking solutions to learning challenges, and having an openness to new ideas, working in teams with cooperation to achieve common goals. Through this work, it is hoped that the encouragement of experimentation as an opportunity to learn

will lead to an ongoing quest for improvement and professional learning in which to improved outcomes for all students in the mainstream setting.

6.5.2 Policy

Using the existing research to underpin the development of policy for technology use to support learners in a school, is imperative to create a vision in the school and establishing a culture to support equity and inclusion through the use of technology. Policy (such as the existing Alberta Education Learning and Technology Policy Framework, 2013). This policy actively supports the innovative use of technology to broaden and enrich the learning experience for all students. Furthermore, it aims to increase the capacity of the education system to support improved student learning by realizing data, management and administrative efficiencies.

6.5.3 Practice

Training and development for teachers and staff to ensure innovative approaches to teaching and learning can be supported and as such improve the quality of students' learning experiences while increasing student choice. In addition, it enhances professional learning opportunities and experiences thus adding to the traingin of teachers.

6.6 SUMMARY

This chapter focused on discussing the findings gathered from the data.

Educational support for all students in the mainstream classroom environment is a possibility but, like any change, needs to be planned for. Resources such as time and training, manpower and access to information, expertise, and funding of various AT need to be in place.

Simply making a change and expecting it to work, as indicated in the above exploration, will not work. Change needs to be scaffolded and supported in order to empower not only the teachers, but the students, the wider school and even community. As Dewey (1933) stated, “Education is a social process; … education is growth; … education is not a preparation for life but is life itself" (p. 37).

CHAPTER 7

A FRAMEWORK FOR THE USE OF AT IN SUPPORTING LEARNERS IN MAINSTREAM SCHOOLS, CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

Throughout the research project, the findings drawn in the previous chapter, along with the focus of AT use in the classroom, with the aim of support and enhancement of educational support for all students in the least restrictive environment, have been explored. Major themes discussed highlighted the needs expressed by staff to ensure that this support process (for time, training, collaboration of staff to support wellness and inclusion for students) can be initiated, supported and maintained.

As part of this study, an overarching aim was to provide a framework/guiding questions for schools and teachers to use as a guide for implementing AT effectively to support all learners in the mainstream setting. This stemmed from the question asked in Chapter 1: How can a framework be developed for the use of assistive technologies to support all learners?

This chapter focuses on the development of a framework to guide AT use in mainstream schools as well as a framework to support the vision and policy development required to ensure AT use can be effectively implemented in the school culture.

A framework is a real or conceptual structure intended to serve as a support, or guide, for the building of something that expands the structure into something which teachers

can use to effectively implement the use of AT in their schools and classrooms to enhance the learning inclusion and wellness of their students as explored in this study.

7.2 FRAMEWORK FOR THE USE OF AT IN SUPPORTING LEARNERS IN MAINSTREAM SCHOOLS

From the findings in the previous chapters, the researcher was able to determine a framework for the use of AT in supporting learners. The framework depicts the insight into the study on how the effective implementation of AT incorporates the theories of wellness, Cultural Historical Activity Theory and the principles of Universal Design for Learning and inclusion and is visually represented as follows:

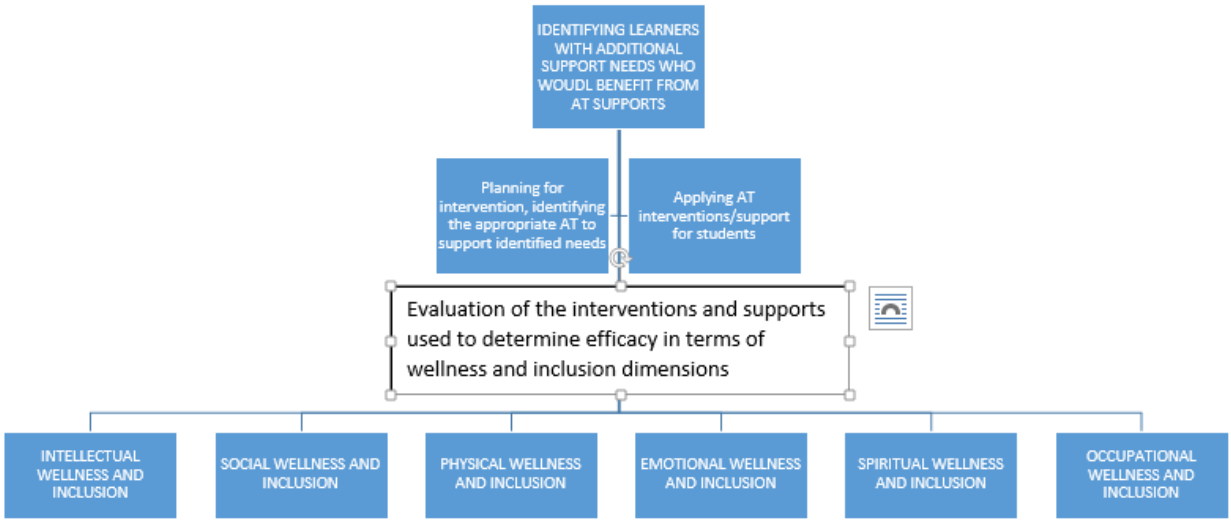


Figure 7.1: A Framework for the Use of Assistive Technology in supporting leaners

The work of Harris and Hofer (2009) articulate with this framework in that they identified five essential decisions needed to provide the platform from which to plan for the use of AT in the classroom. These areas include:

- Clear learning outcomes and objectives set;
- Practical and well informed pedagogical choices are made regarding the learning experience;
- Appropriate scope and sequence of learning activities to promote learning linked to the appropriate interventions selected;
- Selecting suitable formative and summative assessment strategies to focus on the selected learning outcomes and determine how well students are learning; and
- Appropriate choice and selection of AT and learning tools for students to use to enable them to benefit from the planned learning experience.

The emphasis of this framework (Figure 7.1) is on the choice of tools and resources, which should flow seamlessly from the preceding instructional planning decisions which a teacher makes when lesson planning. To harness the power of AT, the teacher's ability to use it for customizing instruction as needed for identified students' needs, is pivotal. In Alberta, the Learning and Technology Policy Framework (2013) states:

If we are to shape the future of education and not have it shaped for us, we must become more purposeful in our approach to technology. We need to understand what may be emerging, its implications, and how it can be used for education. Ultimately, the power of technology should be harnessed to support innovation and discovery, not simply to aid teaching. We need to engage learners to use these new technologies as designers and creators of knowledge (p.14).

Each of these dimensions depicted in Figure 7.1 will be explored in the following sections as they relate to the use of AT to support wellness and inclusion for all students in the mainstream class and the findings of this study.

7.2.1 Collaboration and Professional Learning to support identification of learner needs and planning for intervention

To initiate a successful professional learning community, and build a culture of collaboration in a school environment to enhance the exchange of information to support the use of AT to support all learners, the school culture must change. Falk and Drayton (2001) and Fullan (1991) made recommendations to highlight why a systemic and cultural change is needed to allow for collaborative sharing and learning to occur in support of professional growth and development. This includes such stipulations as learning being linked to real life problems or situations (such as a student's need to access curriculum to be effectively supported in the mainstream setting), and that data generated is used actively, engaged with and investigated. When considering the six dimensions of wellness, and their articulation with building a culture of enhanced educational support in schools to promote inclusion, these can be seen as mutually supportive.

The first step, springing from the data analysis, is the idea of true enabling of the schooling structure to accommodate the use of AT to more fully enhance the learning support structures available to all learners. These can promote wellness, enhance participation and inclusion. As reflected in Figure 7.1 above, the inquiry process needs to involve such steps as processing, planning, evaluating, sharing and creating – all of

which form an integral part of a learning community. For AT to be incorporated and implemented to enhance learning for all students and promote the ideas of enhanced participation and inclusion, there needs to be an institutional change – from the top down. There needs to be an emphasis on staff development in all faculties to better meet the needs of learners who may require support, either for enrichment or because of learning barriers. Greater communication is needed across all faculties and departments within the school, not just those involved in the pilot project or those who have an interest in AT use. An administrative directive should be implemented to support increased opportunity to learn from colleagues, and as an encouragement for development as professional beings. In addition, the senior management team in conjunction with faculty heads and their relevant faculties need to be engage in sincere reflection on current practice, noting areas of weakness and strength and acting on these to bring about changes which are suggested by such reflection. Collaboration and learning together needs to be actively included by all staff across the whole school to allow both staff and students to create the social, emotional and physical connections needed to be part of the whole school, to develop an ethos and culture of active support and awareness for the use of AT in enhancing educational participation and fostering inclusion. As Sultana (1997) contends, “schooling cannot be divorced from the wider social order, and schools and educators are not and cannot be ‘neutral’ and ‘apolitical’ channels for equally ‘neutral’ and ‘apolitical’ knowledge. Whatever we make happen in schools – constantly and inevitably – gives messages for defining what it means to be ‘human’ , ‘good’ and ‘normal’ in particular contexts”, (pp. 26-27). Thus education is not just about the academic, the technical and the resources, as investigated by Rowlands

(2010) – it must include wellness dimensions, interacting with UDL principles to ensure enhanced support and promote such ideas as social justice, equity in the classroom and citizenship.

In order to make full use of AT to enhance the support of all learners in the regular classroom situation, certain criteria need to be considered and built into the culture of the school or establishment. These can include thinking about the process of change within organizations, a willingness to tackle the complex and challenging issues around the use of AT to promote support for all leaners and thus enhance inclusion and an organizational belief and tangible ethos that every student's wellness and academic progress matters. All stakeholders are needed to ensure this culture/ethos is developed and that it filters down to every level of the school or establishment, from senior administration to educational assistants.

Using the above guide to focus the collaborative approach to professional learning in a real life context, the engagement with professionals resulted in choices of various AT tools to support wellness dimensions in the mainstream classroom.

7.2.2 The Use of AT in Intellectual Wellness

Using Figure 7.1 as a framework, the process of identifying the unique needs of the learner, determining clear learning objectives and making practical and well informed pedagogical choices to ensure that appropriate AT was selected was engaged in. This mean that selections such as the use of Read Out Loud 6 software for students with reading challenges, or the Hokki chairs (shown as Appendix D1) was initiated after a process, as outline in Figure 7.1 was used. These choices came after discussion with

professionals assisting in the pilot project, a full review of the student files and any relevant testing a student had (shown in the Individual Program Plan, Appendix F) as well as anecdotal information from the class teachers involved in the project and teaching the students. This high level of discussion, debate and collaboration resulted in choices made to enhance support for the student through implementing AT. Exploring various options and weighing up choices to ensure appropriate AT selection for the unique needs of the student were enabled through the discussion and exploration of literature and research. This AT could enhance the students' ability to participate in the classroom and to increase the opportunities to learn and grow.

7.2.3 The use of AT in Supporting Learners in Physical Wellness

Again, using the Framework featured in Figure 7.1, teachers and staff were able to engage in a process of identification, discussion, selection and evaluation to best meet the needs of the learners identified. Teachers need to be familiar with a student's medical or health needs, which can include use of wheelchairs, eye glasses, hearing aids, walking aides and even prosthetic limbs. This is important in decision-making which may impact participation in class, and in physical education programs to promote health. Being aware of students' needs (such as illustrated in Appendix F and the Individual student plan) in terms of physical wellness, can help teachers plan relevant learning activities which may involve physical activities or awareness of and participation in health promoting programs like healthy eating, relaxation and mental wellness. Through this planning and evaluation process, which is part of the Framework illustrated in Figure 7.1, knowledge of AT to assist in meeting the objectives is important. Teachers are part of this process, they get to explore and learn in a

collaborative manner and thus make better informed choices for their students. Ensuring physical wellness helps support a healthier student and thus promote learning and development through regular attendance and general health.

7.2.4 The Use of AT in supporting Learners in Emotional Wellness

Being able to understand ourselves and deal with the challenges we face in a way that is resilient, forms part of emotional wellness. As a teacher, engaging in discussion with students to appropriately match AT to the student, forms part of this self-knowledge and is inherent in the Framework suggested in Figure 7.1 above. Goleman (1995) described the importance of actively listening to students to ensure their opinions and thoughts are validated and they feel acknowledged. When a student knows what works for him/her as a student, and articulates this in discussion with teachers and other professionals, this can help in the selection of optimal and appropriate AT. In the framework, this forms part of the evaluation process whereby selections are monitored for efficacy and suitability, and teachers need to be partnering with their students to establish this efficacy and suitability.

One illustration of this was offering students access to the Read Out Loud 6 software in the classroom after discussion with them and at their choice, allowing for self-determination. This allowed students who would normally be removed from the class to work with an educational assistant, to remain in class and work at their desks, using their laptops to access the information, textbook materials and teacher-made materials. This offer was made after consultation with the students to ascertain if they would in fact be comfortable using this AT in class. Students could express concerns or even share

ideas in using this and also had the right to refuse. This helped to build students' esteem and confidence, as their voice was heard. In using this AT, students were working more independently and were not being singled out for the whole class to notice by being removed to work in a different location with a reader or scribe. Respecting the students' self-knowledge, validating their own opinions and choices, allowed greater control over the learning for the student and enhanced the emotional wellness they felt in the classroom. This would enhance the frequency of use and effectiveness of the AT. This validation helps to build the student's sense of dignity and self-worth and as such, contributes to emotional wellness in the student.

7.2.5 The Use of AT in supporting Learners in Social Wellness

The basis of socio-cultural theory which is inherent in CHAT, is that a person's individual development is intertwined with his or her social environment. The interaction between personal growth, learning and the environment, allows participants to make meaning through their participation in activities and with those around them. This participation can promote inclusion and learning in the participants and their knowledge of their environment, culture and beliefs. In order to promote this active participation in learning, teachers, using the Framework set forth in Figure 7.1 can engage in planned, well informed learning experiences. Using AT to support students, as identified, and thus include all students so as to ensure active participation and social wellness, teachers can enhance participation and inclusion. Providing the tools, such as the Read out Loud 6 Software or the Hokki stools, allowed students to access the classroom environment, interact with their peers and thus develop their own knowledge. Social wellness refers to the interaction between self and community. In a classroom situation, the community is

everyone in that classroom, both teacher and students. Being able to interact in a manner that is fluid and natural, helps to enhance social wellness and the building of that classroom community. A simple example of this, in terms of this study, could be the group work, or pair/share work that is often undertaken in classes at the direction of the teacher. Providing access to software for students who may have a diagnosed difficulty such as Dyslexia or Dysgraphia, allows that interaction to occur. Allowing the student to access information, read, type and present, contributes to the student being part of the classroom activities and community, and it is the teacher who facilitates this access through provision of appropriate supports to enhance student learning.

7.2.6 The use of AT in supporting Learners in Occupational Wellness

Occupational wellness explores the desire for personal growth, and sense of purpose can be achieved through engaging in an occupation, or further studies, and pursuing career aspirations. Introducing AT early on in the education and learning process, using the Framework shown in Figure 7,1 to ensure choices are well informed, meet learning objectives and support learning, and are evaluated often to note ongoing efficacy, allows a learner to become familiar with the supports they can use to allow full participation in a future workplace. In the current study, the use of environmental changes such as the Hokki stools, allowed students to be more focused and attentive, thus allowing them to perform better and be more productive. In a work situation, such an adjustment could ensure sustained employment and sustain a good work rate. This sensory integration, developed by Ayres (2005), is a form of therapy and supports the learning and development of the student through the interaction between the students and their physical environment. Allowing these changes made in the physical

environment to be carried over to the work place, will support successful work placement and promote well-being and feelings of purpose and contribution to society.

7.2.7 The Use of AT in Supporting Learners in Spiritual Wellness

The work of Goleman (2005) highlighted the need for personal balance and awareness of a student/person's unique purpose and direction. Through the inclusionary process which was made possible by providing AT for students to use, improvements in participation, along with the promotion of feelings of self-worth and purpose were supported. Spiritual wellness can be seen as seeking purpose and meaning, and in this light, all the aforementioned wellness dimensions impact on the ability to find balance in one's life. Teachers who provide relevant AT to meet unique and individual needs, help students realize they are able to engage, learn and develop their intellectual wellness. This, in turn, builds self-esteem and confidence allowing students to develop future plans and goals, as well as develop social relationships and promote wellness in this area.

Wellbeing as explored by Prilleltensky and Prilleltensky (2006), in terms of personal, organizational and community settings, indicates there is no single need that outweighs others when it comes to well-being. All needs are equally important in promoting wellness in students and thus, in classrooms committed to enhancing educational support for all children, it is essential to include discussion and consideration of all wellness dimensions when selecting AT.

7.3 RECOMMENDATIONS

Universal Design for Learning, as a model, includes methods and products to enhance the educational experience of diverse learners (whether or not they have learning disabilities) and promote inclusion. In this approach, AT is often built into educational materials and can be customized to help all students be successful with the general curriculum. This is done when the guiding questions of UDL – the “what”, “how” and “why”– are followed. When this is coupled with the ideas of wellness theory already explored, the dimensions of wellness and inclusion can be increased through the use of AT to promote all-round wellness in students and facilitate greater inclusion.

Effective use of AT compensates for a student's skill deficits or area(s) of disability and can increase a child's self-reliance and sense of independence within their learning environment. This study has produced data which, after analysis, allows the researcher to make the following recommendations:

- Promote effective professional development of all staff in the school environment to deepen knowledge and confidence when selecting and initiating AT to support all learners in the mainstream setting. The AT which is least effective is that which teachers least understand as they are unable to support the student using it effectively.
- Promote professional learning communities which actively follow a guided inquiry process. This process will enhance learning, collaboration and sharing to build capacity and confidence in staff to effectively use AT to support learners in the mainstream setting.

- Value sharing and exchange of knowledge in each learning site/school through provision of time to collaborate and train.
- Promote professional reading and an emphasis on staff remaining current (updating their knowledge through professional inquiry and reflection) and include time as a resource for staff.

The above recommendations will require senior administrative staff at the school site to provide a clearly stipulated mandate for the use of professional collaboration time (as shown in Figure 7.4). As mentioned in Chapter 1, time is provided at the research site each Friday afternoon for the sole purpose of professional collaboration. As this takes place every Friday, setting aside one Friday afternoon each month for the specific task of exploring AT, noting appropriate use and selection techniques and even trialing various AT to ensure that all staff are competent in the use of such, will be beneficial to increasing staff confidence in using these times. This will allow for two and half hours a month, resulting in thirty hours over the course of the ten month academic session for targeted focus on AT. Specifying the use of time from a senior level, will ensure that all staff are aware of the top-down support for AT to enhance and support inclusion and learner support, as well as the commitment to ensuring staff are provided with time to train in the use of AT and thus implement AT to support the inclusion of students. In doing this, administrator support for the needs identified by teachers of this study, can be met along with ensuring greater awareness of and support for AT use in classrooms to enhance the support and inclusion of all learners.

In review, the use of AT with specific regard to the ideas of inclusion, equity and support, Wellness Theory, Cultural Historical Activity Theory and Universal Design for Learning, is not a locale specific notion. This study has made reference to three diverse countries, although the pilot was conducted in Canada, and in each country, the role of AT use as a planned, informed intervention tool to support and enhance learning for all learners, across wellness dimensions, can be effectively implemented.

7.4 RECOMMENDATIONS FOR FURTHER RESEARCH

It is recommended that a longitudinal study be undertaken of the benefits of teacher training programs and the ability to use AT to enhance support for all learners in the mainstream classroom setting.

For future studies, broadening this study to include more classroom teachers and their students, could allow for greater support for learning, and enhanced educational impact through the introduction and use of AT.

7.5 PERSONAL REFLECTIONS

Having completed my M.Ed in Inclusion Policy and Practice with the University of Glasgow (2010), I hold dear the ideals of inclusion and support for all students, to enhance their engagement and development as a whole person. My passion for inclusion, developing knowledge and practical supports led to my interest in the use of AT to support students, and hence the establishment of the pilot project and research. I hope to continue to develop the culture of AT use in my current school placement and be a continued support to my students, their families and the colleagues in my community of practice. I want to further rebuild my skills to be more effective, as a

practitioner and mentor, to support my students and the wider school base, so that this culture of inclusion and commitment to the enhancement of support for all students in our classrooms, can be maintained and grown.

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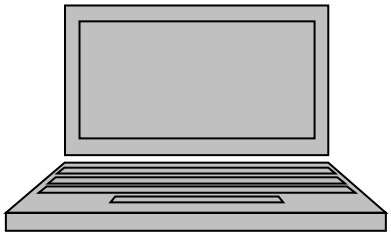
APPENDIX A: STAFF SELF-COMPLETED QUESTIONNAIRE AND FEEDBACK SHEET ON THE USE OF ASSISTIVE TECHNOLOGY IN THE CLASSROOM

Please complete the following to the best of your knowledge

DO NOT PUT YOUR NAME ON THIS SHEET.

1. **Grades taught :_____**
2. **Years in teaching:_____**
3. Have you ever used any of the following devices for students in your classroom *during* class time / instructional time - please circle the device.



READ OUT LOUD 6 or similar software.

Calculator **laptop** **Software**

Any other forms of "tech" that you have used and wish to mention / highlight?

_____

_____

Why did you choose to use these devices / or not use these devices – please explain as fully as you can?

_____

_____

_____

4. Based on the above response to how often you integrate AT in your class, explain why you choose or do not choose to use AT. Explain fully your choices.

_____

_____

_____

5. When you have an educational assistant in class – think of the frequency with which you use them to work with students who are coded with a learning disability or who may be struggling, and leave the room to work with an educational assistant and Explain fully your choice.

_____

_____

_____

6. If you had an unlimited budget – what kinds of Assistive Technology would YOU purchase for use in your class to make it more inclusive? Why? (explain fully your choices)

_____

_____

_____

7. Comments / feedback you wish to share on the use of Assistive Technology to promote and sustain Inclusion in the mainstream class.

_____

_____

_____

_____

Something to consider – all the items listed below are considered to be **ASSISTIVE TECHNOLOGY:**

- wheelchairs
- hearing aids / FM systems
- talking watches
- large print material
- alternative keyboards and mice
- voice recognition software
- adaptive toys
- laptops, Ipads, Iphones
- communication devices
- assistive listening devices
- electronic aids to daily living
- text-to-speech screen readers
- head pointing devices
- screen magnification software – Zoom text
- adaptive learning tools: e.g. talking calculators
- software to support visual learners – INSPIRATION
- Speech to text and text to speech programs like Dragon Naturally speaking
- Braille printers

Thank you for taking the time to complete this questionnaire – your input is appreciated.

APPENDIX B: WATI ASSESSMENT PACKAGE

WATI Assistive Technology Assessment Technology Checklist

- ☐ **COMPUTER ACCESS**
- ☐ Keyboard using accessibility options
- ☐ Word prediction, abbreviation/expansion to reduce keystrokes
- ☐ Keyguard
- ☐ Arm support
- ☐ Track ball/track pad/joystick with on-screen keyboard
- ☐ Alternate keyboard
- ☐ Mouth stick/head mouse with on-screen keyboard
- ☐ Switch with Morse code
- ☐ Switch with scanning
- ☐ Voice recognition software
- ☐ Other: _____
- ☐ **COMMUNICATION**
- ☐ Communication board/book with pictures/objects/letters/words
- ☐ Eye gaze board/frame communication system
- ☐ Simple voice output device
- ☐ Voice output device w/levels
- ☐ Voice output device w/icon sequencing
- ☐ Voice output device w/dynamic display
- ☐ Device w/speech synthesis for typing
- ☐ Other: _____
- ☐ **READING, STUDYING, AND MATH**
- ☐ **Reading**
- ☐ Standard text
- ☐ Predictable books
- ☐ Changes in text size, spacing, color, background color
- ☐ Book adapted for page turning (e.g. page fluffers, 3-ring binder)
- ☐ Use of pictures/symbols with text
- ☐ Talking electronic device/software to pronounce challenging words
- ☐ Single word scanners
- ☐ Scanner w/OCR and text to speech software
- ☐ Software to read websites and

- ☐ **WRITING**
- ☐ **Motor Aspects of Writing**
- ☐ Regular pencil/pen
- ☐ Pencil/pen with adaptive grip
- ☐ Adapted paper (e.g. raised line, highlighted lines)
- ☐ Slantboard
- ☐ Use of prewritten words/phrases
- ☐ Portable word processor to keyboard instead of write
- ☐ Computer with word processing software
- ☐ Portable scanner with word processing software
- ☐ Voice recognition software to word process
- ☐ Other: _____
- ☐ **Composing Written Material**
- ☐ Word cards/word book/word wall
- ☐ Pocket dictionary/thesaurus
- ☐ Writing templates
- ☐ Electronic/talking electronic dictionary/thesaurus/spell checker
- ☐ Word processing with spell checker/grammar checker
- ☐ Talking word processing
- ☐ Abbreviation/expansion
- ☐ Word processing with writing supports
- ☐ Multimedia software
- ☐ Voice recognition software
- ☐ Other: _____
- ☐ **Learning/Studying**
- ☐ Print or picture schedule
- ☐ Low tech aids to find materials (e.g. index tabs, color
- ☐ coded folders)
- ☐ Highlight text (e.g. markers, highlight tape, ruler, etc.)
- ☐ Recorded material (books on tape, taped lectures with number coded index, etc.)
- ☐ Voice output reminders for assignments, steps of task, etc.
- ☐ Electronic organizers

emails

- ☐ Other: _____
- ☐ **Math**
- ☐ Abacus/Math Line
- ☐ Enlarged math worksheets
- ☐ Low tech alternatives for answering
- ☐ Math "Smart Chart"
- ☐ Money calculator and Coinulator
- ☐ Tactile/voice output measuring devices
- ☐ Talking watches/clocks
- ☐ Calculator/calculator with printout
- ☐ Calculator with large keys and/or large display
- ☐ Talking calculator
- ☐ Calculator with special features (e.g. fraction translation)
- ☐ On-screen/scanning calculator
- ☐ Alternative keyboard
- ☐ Software with cueing for math computation (may use adapted input methods)
- ☐ Voice recognition software
- ☐ Pagers/electronic reminders
- ☐ Single word scanners
- ☐ Hand-held scanners
- ☐ Software for concept development/manipulation of objects – may use alternate input device, e.g. switch,
- ☐ Touch Window
- ☐ Software for organization of ideas and studying
- ☐ Palm computers
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐
- ☐

APPENDIX C: FACE-TO-FACE INTERVIEW SHEET FOR EDUCATORS IN THE ASSISTIVE TECHNOLOGY PILOT PROJECT.

INTERVIEW RESPONSE SHEET – STAFF INVOLVED IN THE ASSISTIVE TECHNOLOGY PILOT PROJECT

Please be aware that the interview will be recorded to allow for accurate transcription after the interview.

1. How useful was it to do a class learning profile, noting the diagnosed needs of students as well as undiagnosed students, consider their various wellness needs, before meeting with the consultants to “brainstorm” possible Assistive Technology solutions to establishing an inclusive classroom environment?

_____

_____

2. How useful did you find the “brainstorming “sessions with the Learning support department and consultants in selecting, discussing and ultimately choosing or discarding the Assistive Technology strategies for use in creating the inclusive learning environment to enhance learning and support wellness? Explain

_____

_____

3. The initial set up of the inclusive learning environment involved some training, delivered by consultants, and included both teaching staff and classroom support staff. Do you think this training was valuable – why or why not?

_____

_____

4. Once the project was set up, the equipment / items being used were in place and actively being used by students, what was your initial feeling for the interactions you had observed in your class with students?

_____

_____

5. In the creation of the Universal Design for learning Classroom environment, did you experience any difficulties or challenges?

_____

_____

6. What do you think could be done to circumnavigate these challenges to improve the efficacy of the UDL classroom environment?

_____

_____

7. Do you have any suggestions for low or high tech strategies that could be used – and to meet which specific learning goal – in a classroom setting to maintain and enhance inclusion of all students with a learning disability?

_____

8. Overall, do you think this Assistive Technology pilot project was a success at fostering greater inclusion for all students (academic and wellness)? Please explain fully and include reasons for your comments.

_____

_____

Thank you for sharing your time and your insights into the Assistive Technology project.

C.1 : FOLLOW UP QUESTIONNAIRE

Dear Participant,

It has now been a year since the initial pilot program started, and the technology put into place during the pilot program has been used as regular tool in classrooms out with the study. As a final follow up, please can you respond to the questions below based on the wellness dimensions supported by the technology used in your classroom.

To what extent do you think that Assistive Technology supports and enhances the six dimensions of wellness listed below:

Please check off the category you feel best describes your observations.

2 Six Dimensions of Wellness Model

Adapted from Hettler, 1976

Please elaborate on any area/s of wellness you believe you noticed the most growth/ development. Why do you think there was growth in this area or areas?

_____

_____

_____

_____

_____

Why do you think the use of AT made or did not make an impact on the students?

_____

_____

_____

_____

Do you think the use of AT promotes wellness in your students? _____

Please explain your answer above and share your thoughts / feelings on why/ why not AT can promote wellness dimensions in the students you worked with?

_____

_____

_____

_____

APPENDIX D: PHOTOGRAPHS OF THE ENVIRONMENTAL TECHNOLOGY USED IN THE ASSISTIVE TECHNOLOGY PROJECT

D1 HOKKI STOOLS

D2. HAND FIDGETS

APPENDIX E: RESEARCH ETHICS CLEARANCE CERTIFICATE

UNISA college of education

Research Ethics Clearance Certificate

This is to certify that the application for ethical clearance submitted by

T Rowlands [30785987]

for a D Ed study entitled

The utilisation of assistive technology to enhance educational support for all learners in mainstream schools

has met the ethical requirements as specified by the University of South Africa College of Education Research Ethics Committee. This certificate is valid for two years from the date of issue.

Prof KP Dzvimbo
Executive Dean : CEDU

Dr M Claassens
CEDU REC (Chairperson)
mcdtc@netactive.co.za

Reference number: 2014 MAY /30785987/MC

19 MAY 2014

APPENDIX F: IPP TEMPLATE:

ONLY RELEVANT PAGES SHARED FOR PURPOSES OF THIS STUDY (note the list of classrooms interventions and accommodations)

Name of Program	**Program Description**	**Amount of Time**
Eg. Communication Room		
Date:	Signature of Legal Guardian:	

Code: _____

Diagnosis / Relevant Medical Information / Additional Information

Medical Diagnosis or diagnosed Learning Disability and Date : _____

- ☐ Medical log on file
- ☐ Medical Emergency Plan on file
- ☐ Behavior Tracking Records
- ☐ Behavior Anecdotal Notes
- ☐ Behavior Plan

Other Concerns:

Placement/Plan of Action/Services/Amount of Time: Special Programming Placement

Current school year Support Services (additional school staff/support personnel/agencies) ***– Please check applicable boxes; delete and add other services:***

		Name of Service Provider (Current School Year)	**Amount of Service (If not doing a monitoring form)**
☐	Speech		
☐	OT		
☐	PT		
☐	FSLW		
☐	EA		

☐	Psychologist		
☐	Children's Services		
☐	Mental Health		
☐	REACH		
☐	Other (Describe)		

Areas of Strength	**Areas of Need**
•	•
•	•

Required Classroom Accommodations (changes to instructional and evaluative strategies, materials and resources, facilities or equipment)

1. Classroom Setting and Instruction

☐ Preferential seating arrangement
☐ Provide a copy of the notes (teacher/peer)
☐ Provide cloze notes
☐ Allow use of laptop or other technology for note-taking
☐ Required readings are read to student
☐ Read orally in a small group
☐ EA support
☐ Learning Support (i.e. Learning Strategies, Learning Center, etc.)
☐ Uses supportive resources: e.g. visual aids, web notes, computer programs, games, manipulatives, iPad App's
☐ Use student cueing
☐ Pair written instructions with oral instructions
☐ Other: _____

2. Assignments and Homework

☐ Fewer questions
☐ Calculator used to complete assignments
☐ Reduce writing demands
☐ Assignments recorded on a tape recorder
☐ More time to complete assignments
☐ Written assignments are scribed
☐ Partner work for support
☐ Required readings are read to student
☐ Modified assignments
☐ Pre-teaching vocabulary
☐ Highlight important concepts; information
☐ Use checklists or cueing devices
☐ Increase use of pictures, diagrams, concrete manipulatives
☐ Provide taped lessons for oral listening

- ☐ Increase print size in photocopying
- ☐ Other: _____

3. Organization

- ☐ Monitoring of agenda
- ☐ Support in organizing desk or locker
- ☐ Checklists or visual reminders are provided to the student
- ☐ Visual schedule
- ☐ Use advance organizers
- ☐ Allow student to have extra set of books at home
- ☐ Other: _____

4. Evaluation

- ☐ Calculator for exams
- ☐ Same exams and quizzes but exams are read to the student
- ☐ Same exams and quizzes but exams are scribed for the student
- ☐ Study guides and study questions are provided to the student
- ☐ Student uses a laptop or other technology to complete written components or tests and quizzes
- ☐ More time to complete exams or quizzes
- ☐ Exams and quizzes are broken into smaller chunks
- ☐ Exams and quizzes are written in a different location
- ☐ Opportunity for rewrite/make-up tests
- ☐ Allow use of spell check/edit options
- ☐ Adjust the test design (T/F, multiple choice, matching)
- ☐ Adjust to recall with cues, cloze, word lists
- ☐ Allow open book exams
- ☐ Adjust readability of test
- ☐ Allow oral exams
- ☐ Vary grading system (for Homework, Tests, Assignments, etc.)
- ☐ Other_____

APPENDIX G: CERTIFICATE OF COMPLETION – BOW VALLEY COLLEGE, CALGARY

BOW VALLEY COLLEGE

CERTIFICATE

awarded to

TRUDI ROWLANDS

In recognition of successful completion of

ASSISTIVE TECHNOLOGY

October 24, 2014

Calgary, Alberta, Canada

Dean, School of Health, Justice, and Human Services

APPENDIX H: LETTERS FROM CRITICAL READER AND PROFESSIONAL EDITOR.

Blue Diamonds Professional Services (Pty) Ltd
Enhancing your brilliance
Tel: 031 916 1420
Fax: 086 627 7756 Email: jaybee@telkomsa.net
Website: www.jaybe9.wix.com/bluediamondsed

30 October 2015

Declaration of professional edit

The Utilisation of Assistive Technology in Enhancing the Educational Support for all Learners in Mainstream Schools

by

Trudi Rowlands

I declare that I have edited and proofread this thesis. My involvement was restricted to language usage and spelling, completeness and consistency, referencing style and formatting of headings, captions and Tables of Contents. I did no structural re-writing of the content.

Sincerely,

Dr Jacqueline Baumgardt
Member, Professional Editors Guild

Professional EDITORS Guild

APPENDIX I: SAMPLE OF FOUR TEACHER QUESTIONNAIRES

The responses of four teachers to the questionnaire have been collated and coded below as an example of how information was gathered and constructed.

REPONDENT 1 – GREEN

RESPONDENT 2 – YELLOW

RESPONDENT 3 – AQUA

RESPONDENT 4 – PINK

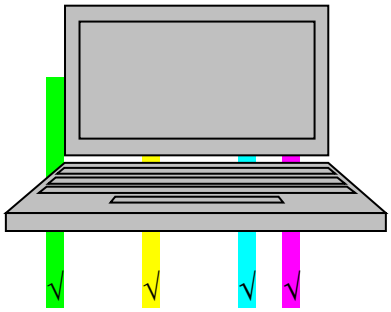
Research note:
All grades taught
Spread of experience form veteran to very new (recent graduate)

DO NOT PUT YOUR NAME ON THIS SHEET.

1. Grades taught :__7/8 __8____7/8/9___7/8/9_____

2. Years in teaching: 26 YRS___13_____5__ 1_____

3. Have you ever used any of the following devices for students in your classroom *during* class time / instructional time - please circle the device.



READ OUT LOUD 6 or similar software.

Calculator **laptop** **Software**

Any other forms of "tech" that you have used and wish to mention / highlight? __Smartboard Smartboard Smartboard Smartboard _____

Research note: common theme – all used the one thing that was in every classroom in the

4. **Why did you choose to use these devices / or not use these devices – please explain as fully as you can**?

__**Available and knew how to use them**, **They were in school already** **I know how to use this stuff,** _**I use them the most** _

Research note:
Themes emerging: 1) availability / in school already 2) Knowing how to use the technology

In following up results above, I engaged the teachers in conversations, the following information was obtained (October, 2015):

REPONDENT 1: I use my SMARTboard every day to display powerpoints and also allow student interactivity by getting them to come up and drag and drop information in front of the class. The students can also take pictures of the information on the SMART board with their phones so they don't have to write out all the notes – which I post to me class website if they want to download them later. I learn this trick with the phones at a conference I went to when I saw the people there using their IPhones to take pictures which I thought was quick and easy. I am very comfortable using a LCD projector but not so much with programs you suggested like Read and Write Gold or Kidspiration – I haven't actually heard of these – sorry.

RESPONDENT 2 – YELLOW Sometimes I use the SMART board and sometimes I don't. I like talking and teaching my class using the textbook, the notes I make and the powerpoints I use. I do use my projector for this or sometimes the SMART board if I have embedded a link in the notes. I don't let the kids use their phones cause they

might fool around, send texts or even start to record me or others in the class and so I like to control what they do or don't use. I know some staff doallow the kids to use phones, but this makes me nervous and so I just say no.

RESPONDENT 3 – AQUA I use the stuff that came with my class – so the SMART board, projector and stuff like that. I don't really use anything else and since it's not in my class, I guess I don't really need it.

RESPONDENT 4 – PINK I use a lot of technology in my class. I let the kids use their phones to do the Poll anywhere exercise and recently I started using the SMART response system so I can hook the kids up with multiple choice quizzes in class, true/ false and short response very quickly and easily and this means I get to checks for understanding quickly. I like that technology makes my life simple- I can show videos on the SMART board, the students can email me their homework, or ask questions and I have a website for my homework and questions as well. I can probably vamp this up a bit as I only update once a month or so but I am getting better. I don't know anything about the programs like Read and Write Gold or the other one in the list. I like using the stuff I actually know how to use, I guess if I got to see it and figured it out, I might use it.

2. Based on the above response to how often you integrate AT in your class, explain why you choose or do not choose to use AT. Explain fully your choices.

If its there and I can use it then I will

If I know how to use the technology then I will but if I am not sure then I don't want to waste teaching time in class if things go wrong .

I feel good using technology and so use it a lot to make it easier for the kids.

_____No explanation given for selection _____

Research note: THEMES
1. Availability
2. Know how to use

3. When you have an educational assistant in class – think of the frequency with which you use them to work with students who are coded with a learning disability or who may be struggling, and leave the room to work with an educational assistant and explain why you choose this option.

_**They can get the one on one help they need and also work at their own pace this way. I use this option frequently to help the student.**

I like that an EA gives more individual help and can take the time needed to go over the work and explain things as many times as needed without holding up the rest of the class. I would say I use this quite often.

_I can work with some kids and she can work with some kids and that way we get to everyone

_If I need them then I do use them but I also like to be the one to answer questions and explain so things happen the way I want in the lesson and class. So I would say that I use the EA infrequently simply because I like to be the one helping and explaining.

4. If you had an unlimited budget – what kinds of Assistive Technology would YOU purchase for use in your class to make it more inclusive? Why? (explain fully your choices)

_A person Ipads, laptops with newer technology Ipads for kids and great apps classroom computers

5. Comments / feedback you wish to share on the use of Assistive Technology to promote and sustain Inclusion in the mainstream class.

____None____None ____ None __None

Something to consider – all the items listed below are considered to be **ASSISTIVE TECHNOLOGY:**

- wheelchairs
- hearing aids / FM systems
- talking watches
- large print material
- alternative keyboards and mice
- voice recognition software
- adaptive toys
- laptops, Ipads, Iphones
- communication devices
- assistive listening devices
- electronic aids to daily living
- text-to-speech screen readers
- head pointing devices
- screen magnification software – Zoom text
- adaptive learning tools: e.g. talking calculators
- software to support visual learners – INSPIRATION
- Speech to text and text to speech programs like Dragon Naturally speaking
- Braille printers

Thank you for taking the time to complete this questionnaire – your input is appreciated.

APPENDIX J: RESPONSES TO ADDITIONAL WELLNESS AND AT QUESTIONS

Question 1: Please elaborate on any area/s of wellness you believe you noticed the most growth/ development. Why do you think there was growth in this area or areas?

RESPONDENT 1: Socially it was awesome, kids didn't leave the class with Mrs……. But stayed and got be in control of what they were doing. Like they could use the Read Aloud with their headphones, their own headphones too, so they looked like the other kids who might have been listening to music. So, they got the email with my notes and then using read aloud, the noted were read, text was highlighted etc and so they worked in class just like everyone else

RESPONDENT 2: I found that having my students in class lessened the anxiety they might feel. They were not worried about being asked to leave the class and go work with the educational assistant, they knew they would get discreet help in class and no one would be staring at them or looking at them. I think this made some of the students feel calmer. I think of one girl and she was always really stressed about getting help in class and didn't even want to look at me when it came time to work on the assignment, but since we used the Read Aloud, and the laptops in class, she is able to work in class now. Another little guy also seems happier and that's because he has a "cool chair" – he doesn't actually need the chair as he doesn't have an IPP or anything but he loves sitting in the chair, he says it makes him think better so I just leave him there cause he's happier.

RESPONDENT 3: I think emotionally the students benefitted. Some of the guys I work with are pretty strung out and they are super conscious of being singled out. When I can leave them be and they can just be in class and be like everyone else, they are so much happier. I don't know if their work was any better cause some of them still wanted help, they were just happy to be in class though. I think at fourteen, you don't want to stand out or have anyone notice you.

Question 2: Why do you think the use of AT made or did not make an impact on the students?

RESPONDENT 1: I think it helped because kids got to stay in class and anytime you can have kids in class, with a teacher, that's got to be good

RESPONDENT 2: I think it helped because students were included and were like their peers.

RESPONDENT 3: Students felt more in control of their learning and got to make choices about what did or don't work for them so I think they were more invested in what we did. Plus. They got to stay with their friends.

Question 3: Do you think the use of AT promotes wellness in your students?

All three respondents said YES

Question 4: Please explain your answer above and share your thoughts / feelings on why/ why not AT can promote wellness dimensions in the students you worked with.

RESPONDENT 1: Like I said earlier I think that being able to keep your kids with you, to make sure they get the teaching you as the teacher deliver rather than being taken out which makes them feel like they are different, so it's embarrassing for them as teenagers, and then they also miss what goes in the class, like when someone asks a question and then they don't get to be part of that. Before, I would send kids out who needed a reader or a scribe, but now I use the software. It was hard at first because the kids had never seen this stuff before so it was like getting used to it first, but then, when they figured it out, they liked it and got way more done. I had kids who could only get a few sentences or answers done in a lesson, but now they get so much more done, and feel good about it. So that's what is the best part, they feel good about it which means they want to do the work and get on with things.

RESPONDENT 2: My students were much more functional and included when I used the technology to help them. I feel that they outputted more and achieved more in a class so their time was used wisely rather than sending home a lot of incomplete assignments and adding to their hoe work load. This made them feel good about themselves, I think, well I hope so because they did so much more and should be proud of this

RESPONDENT 3: The best part about this whole exercise was that students used different tools to figure out what worked best for them, and then they stuck to this. They know themselves well and they know what works for them so this meant they controlled their learning and they felt good about that. I know I already said this but I think when a child can choose their own tools and how to engage with the work, it makes it more meaningful to them so they do it.

Key

Yellow – inclusion

Green – control/ autonomy related to buy-in

Purple – peer similarity/ "fitting in"

Turquoise –emotional state reference

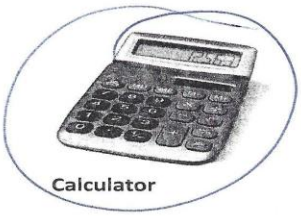
APPENDIX K: SAMPLE OF STAFF QUESTIONANNAIRES AS COMPLETED

Please return to the mailbox of TRUDI ROWLANDS

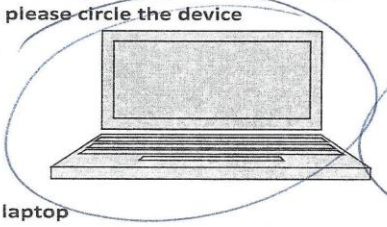
STAFF SURVEY AND FEEDBACK SHEET : USE OF ASSISTIVE TECHNOLOGY IN THE CLASSROOM

Please complete the following to the best of your knowledge DO NOT PUT YOUR NAME ON THIS SHEET

1. **Grades taught :** 7 & 8
2. **Years in teaching:** 26 yrs (who else but me,)
3. **Have you ever used any of the following devices for students in your classroom *during* classtime / instructional time - please circle the device**



Calculator



laptop

READ OUT LOUD 6 or similar software.

Software

4. **Please rate your own technology skills using the scale below :**

ACTIVITIES I DO	LEARNER – I am not sure	BASIC – I have done this before but might need some help	PROFICIENT – I can do this without any assistance	ADVANCED – I can teach someone else how to do this
1. Connect and use a SMART board				✓
2. Take digital pictures and download them to my computer from an Iphone, Ipad or camera			✓	
3. Use Read and Write Gold	✓			
4. Use Inspiration or Kidspiration			✓	
5. Connect and use a LCD projector in class				✓
6. Set up and maintain a webpage		✓		
7. Use a VISUAL schedule in class	✓			

80

5.How often do you integrate the technologies below into your ***DAILY INSTRUCTION***

ACTIVITIES USED IN CLASS TO ENHANCE / SUSTAIN INCLUSION	REGULARLY – once per day	FREQUENTLY – at least once per month	OCCASSIONALLY – once per quarter	SELDOM – once a semester	NEVER
1. Use the mobile laptop lab in class				✓	
2. Use the internet for instruction	✓				
3. Allow students to work using EXCEL, POWER POINT or WORD	✓				
4. Use Inspiration for students to create graphic organisers					✓
5. Use Zoomtext or a Text magnifier				✓	
6. Have a homework website and actively use it	✓				
7. Have an active class webpage					✓
8. Keep manipulatives (counters, blocks, base units) in class for areas like Math		✓			
9. Access FREE websites like : IXL - Math Khan Academy		✓			
10. Completed a VARK survey for learners learning styles					✓
11. Use an FM system for hearing challenged students					✓
12. Use a Braille printer or JAWS software for visual impairments					✓

81

7. When you have an educational assistant in class – how often do you have students who are coded with a learning disability or who may be struggling, leave the room to work with an educational assistant?

Please circle the **MOST** appropriate answer.

ALWAYS **OFTEN** **SOMETIMES** **SELDON** **NEVER**

8. If you had an unlimited budget – what kinds of assistive technology would YOU purchase for use in your class to make it more inclusive?

A PERSON

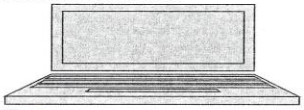
Please return to the mailbox of TRUDI ROWLANDS

STAFF SURVEY AND FEEDBACK SHEET : USE OF ASSISTIVE TECHNOLOGY IN THE CLASSROOM

Please complete the following to the best of your knowledge DO NOT PUT YOUR NAME ON THIS SHEET

1. Grades taught : 8
2. Years in teaching: 13
3. Have you ever used any of the following devices for students in your classroom *during* classtime / instructional time - please circle the device

Calculator



laptop

READ OUT LOUD 6 or similar software.

Software

4. Please rate your own technology skills using the scale below :

ACTIVITIES I DO	LEARNER – I am not sure	BASIC – I have done this before but might need some help	PROFICIENT – I can do this without any assistance	ADVANCED – I can teach someone else how to do this
1. Connect and use a SMART board			✓	
2. Take digital pictures and download them to my computer from an Iphone, Ipad or camera		✓		
3. Use Read and Write Gold	✓			
4. Use Inspiration or Kidspiration	✓			
5. Connect and use a LCD projector in class			✓	
6. Set up and maintain a webpage	✓			
7. Use a VISUAL schedule in class			✓	

80

7. When you have an educational assistant in class – how often do you have students who are coded with a learning disability or who may be struggling, leave the room to work with an educational assistant?

Please circle the **MOST** appropriate answer.

ALWAYS OFTEN SOMETIMES SELDON NEVER

8. If you had an unlimited budget – what kinds of assistive technology would YOU purchase for use in your class to make it more inclusive?

Ipads, laptops with newer technology

APPENDIX L: SAMPLE OF TRACKING SHEETS USED WEEKLY BY THE EDUCATIONAL ASSISTANT IN THE PILOT STUDY CLASSROOMS.

Identifying makes removed.

ASSISTIVE TECHNOLOGY : LOW TECH, HIGH TECH AND HARDWARE / SOFTWARE CHECK LIST								
Class : Grade 7 Language Arts			School:					
Low Tech options	Record of Use				Frequency			
	Tried	Successful	Independent	With support		Daily	Weekly	Monthly
1. Relaxation and breathing								
2. Fidgets						✓		
3. Hokki Stools						✓		
4. Panto Move Chairs						✓✓ ✓✓ ✓✓		
Total:								
High Tech Options								
1. Laptops		✓*						
2. Printer								
3. Scanner								
4. SMART response								
Total :								
Software								
1. Read Out Loud 6	✓✓✓	✓	✓					
2. Inspiration								
3. OTHER (anything else I tried??)						✓ Audio Book ✓ " ✓ "		
Totals:								

* book on line

Jan 31/14
Feb 5/14
Feb 6/14
Feb 25/14
MAR 5/14 ✓✓✓✓ + Audio bk, 2 fidgets.