Interdisciplinary Research on the Impact of Summer Break from School on Children with Severe Autism and their Parents

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Abstract: This paper defines interdisciplinary by first exploring disciplinarity, then exploring interdisciplinarity, and finally by contrasting the two. Types of, reasons for, the history of, and the process of interdisciplinarity are examined. The research on the impact of summer break from school on children with severe autism and their parents is summarized, and its status as interdisciplinary research is discussed by looking at the various disciplines involved, discussing how the various subjects, methods, tools, theories, concepts, and assumptions will contribute to the research, and looking at the interdisciplinary process used.

Key words: interdisciplinarity, disciplinarity, autism, summer, school, stress, parent

Résumé : Cet article définit l'interdisciplinarité en explorant d'abord la disciplinarité, ensuite l'interdisciplinarité pour finir avec une comparaison des deux. Seront examinés les types d'interdisciplinarité de même que les raisons qui y président, son histoire et sa procédure. Synthèse de la recherche sur l'impact des vacances scolaires d'été sur les enfants atteints d'autisme aigu et sur leurs parents et discussion de son statut de recherche interdisciplinaire en examinant diverses disciplines impliquées, en discutant de la manière dont les divers sujets, méthodes, outils, théories, concepts et hypothèses contribueront à la recherche et en examinant les différents procédures utilisées.

Mots-clés : interdisciplinarité, disciplinarité, autisme, été, école, stress, parent

The purpose of this paper is to define interdisciplinarity and demonstrate why the research on the impact of summer break from school on children with severe autism and their parents is interdisciplinary. This paper defines interdisciplinarity by first exploring disciplinarity, then exploring interdisciplinarity, and finally by contrasting the two. Disciplinarity is explored by looking at ways disciplinarity is defined in the literature, types of disciplinarity, and reasons for disciplinarity. Interdisciplinarity is also explored in much the same way, by looking at how it is defined in the literature, types of interdisciplinarity, reasons for interdisiplinarity, the history of interdisciplinarity, and the process of interdisciplinarity. Disciplinarity and interdisciplinarity are compared and contrasted because interdisciplinarity exists in relation to disciplinarity. The research on the impact of summer break from school on children with severe autism and their parents is then summarized, and its status as interdisciplinary research is discussed by examining the issue from three directions. First, the various disciplines involved, including psychology, education, and disability studies, are considered. Next, how the various subjects, methods, tools, theories, concepts, and assumptions will contribute to the research is examined. Lastly, the interdisciplinary process used is looked at. These three areas demonstrate that the research on the impact of summer break from school on children with severe autism and their parents is interdisciplinary. Both why the research is interdisciplinary as well as why the research must be interdisciplinary are looked at in various sections.

Disciplinarity

A paper on interdisciplinarity would be well introduced with a definition of disciplinarity. Salter and Hearn (1997) claim that disciplines have five attributes: their own topics, methods, and perspectives; a dominating approach; a community; status as a discipline; and adherence to a register.

A register is the collective language and ways of understanding and organizing data (Salter & Hearn, 1997). Disciplines must also be called a discipline to be a discipline; people must be trained in the discipline and employed in the discipline (Turner, 2000). A discipline is, simply put, a community of scholars (Repko, 2008).

Chettiparamb (2007) gives three approaches to understanding the distinguishing characteristics of disciplines. One is the scientific approach, which defines disciplines by the concepts, methods, and ways of knowing they use. The second is the social approach, which defines disciplines by how they are socially embedded in society. The third is the organizational approach, which defines disciplines by how knowledge is institutionally organized in universities.

The ways disciplines are seen by the public, universities, and interdisciplinarians is also useful to a definition of disciplines. Disciplines are known as static, rigid, conservative, averse to innovation, and resistant to change (Chettiparamb, 2007; Weingart & Stehr, 2000). They are seen as defensive and guarding of their metaphorical "private property" (Weingart & Stehr, 2000). A discipline is a set of practices or imposed ordering (Chandler, 2009). In this way, academic discipline can be linked to the term "discipline".

On a positive note, at the same time disciplines are hard, tough-minded, ordered, controlled, and use methodological rigor (Weingart, 2000). "Disciplines are ways of keeping distinct the origins not just of ideas and materials, but of work practices, lines of authentication, and accountability" (Strathern, 2004, 45). Disciplines promote depth of knowledge in one subject areas using their own approaches (Shailer, 2005). Disciplinary teaching creates a community of students, teachers, and professionals who can understand what is said in the discipline – the language, the way things are said, and the ideas that are discussed (Turner, 2000).

Disciplines are not mirrors of society. Repko (2008) compares them to lenses through which we view the world and interpret it. As Frodeman (2010) states, "They are economic devices and psychological supports as much as reflections of the way things are" (xxxv). Disciplines have an impact on the way we see the world. This is not always negative, but this effect should be recognized by scholars.

Chandler (2009) makes the clear distinction between discipline and subject, by defining the subject as a topic to be studied, but the discipline as the way the topic is studied and the way the topic is viewed. He is careful not to make his reader think that discipline is just method either, by pointing out that method is a way to research, but a discipline includes how the research topic is viewed. Chattiparamb (2007) compares discipline to wisdom and subject to mere skill or knowledge. Newell (1992) agrees that "members of a discipline are not so much characterized by the conclusions they arrive at, but by the way they approach the topic – the questions they ask, the concepts that come to mind, and the theories behind them" (219). "Disciplines seek to be complete worlds unto themselves; they aspire to explain everything, albeit in their own way." (Chandler, 2009, 740). Repko also points out that disciplines are evolving, so even though at any one time we can define a certain discipline, over time it will slowly take on other methods or theories, ether created or adapted from other disciplines.

Types of disciplinarity.

Disciplines today are traditionally categorized into natural sciences, social sciences, humanities, and applied professions (Repko, 2008). The natural sciences include mathematics, physics, biology, chemistry, and computer programming. The social sciences include psychology, sociology, anthropology, political science, and economics. The humanities include literature, philosophy, religious studies, and art, music, and

theatre. The professions include education, medicine, social work, and law. Disciplines can also be divided into tightly or loosely bounded or driven by theory or research (Salter & Hearn, 1997). Tightly bound disciplines are strict in their process and defend their borders, like psychology, because its process is more rigid and traditional. Loosely bound disciplines allow for more freedom of process, like sociology, because new ways of doing research are easier to introduce. Disciplines driven by theory would include sociology, because theories are applied to situations to study them, and the sciences are research driven, because they use proofs and the scientific method to perform research. Both tightly or loosely bounded and theory or research driven disciplines sit on a continuum (Salter & Hearn, 1997). Few are at the extremes. Repko (2008) also defines subdisciplines as subdivisions of traditional disciplines.

Finally, disciplines are distinguished from one another by questions, perspectives, assumptions, methods, and subjects (Repko, 2008). Each discipline asks different types of questions about different subjects. They have different perspectives on and different assumptions about these subjects, and they use different methods in their research. There may be overlap in some of these areas. For example, religious studies, literature, and even history may all study the bible, but from different perspectives. Religious studies may study biblical hermeneutics, literature may study aesthetics, and historians may look at how the bible sheds light on important historical events.

Reasons for disciplinarity.

Chettiparamb (2007) gave man's need to classify and to use all knowledge as two reasons for disciplinarity. “Philosophers from Plato onward have sought to categorize human knowledge” (Weingart, 2010). Specialization became necessary when our collective knowledge began to increase

beyond our ability to keep up. Klein (2010) quoted a recent IBM commercial that claimed that each day we create eight times the knowledge in the world's libraries. Whether this is a correct citation or not, it is clear that in order to deal with all this knowledge, some academic roles were required. Disciplinarity is the way this knowledge has been classified.

Interdisciplinarity

Klein (2005) tells us that although interdisciplinarity had a "philosophical grounding" in ancient times, it came about in the last century because of a new need for it due to our complex society and specialization (p. 33). Interdisciplinarity literally means "between fields of study" or "derived from two or more" (Repko, 2008, 5). Definitions of interdisciplinarity include Repko (2008):

> "Interdisciplinary studies is a process of answering a question, solving a problem, or addressing a topic that is too broad or complex to be dealt with adequately by a single discipline and draws on disciplinary perspectives and integrates their insights to produce a more comprehensive understanding or cognitive advancement" (p. 12).

Aboelela (2007) gives a similar definition:

> "Interdisciplinary research is any study... undertaken by scholars from two or more... disciplines. The research is based upon a conceptual model that links or integrates theoretical frameworks from those disciplines, uses study design and methodology that is not limited to any one field, and requires the use of perspectives and skills of the involved disciplines throughout multiple phases" (p. 341).

Interdisciplinarity is problem-focused, and in that way directed to ends (Turner, 2000). It is a means to greater insight and greater problem solving success (Frodeman, 2010). Interdisciplinarity utilizes hybridization, borrowing, and problem solving to work on problems not found in disciplines (Klein, 2000). "Interdisciplinary learners integrate information,

data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines to craft products, explain phenomena, or solve problems, in ways that would have been unlikely through single-disciplinary means" (Mansilla, 2010, 289).

Interdisciplinary is seen as creativity, progress, reform, and modernization, as well as dynamic, flexible, liberal, and innovative (Weingart, 2000). It is also seen as boundary crossing, bridge building, mapping, bilingualism (Repko, 2008), as well as the new frontier (Weingart, 2000). Interdisciplines are more interested in breadth over depth of knowledge. The other side of this is that interdisciplines are seen as softer (Weingart, 2000). Interdisciplinarity creates career risks for students who want to continue in the academy (Shailer, 2005).

Types of interdisciplinarity.

Klein (2010) divides interdisciplinarity into multidisciplinarity, interdisciplinarity, and transdisiplinarity.

Multidisciplinarity occurs when disciplines are juxtaposed in sequence or at the same time with no integration or interaction between them (Klein, 2010). It is this lack of integration that draws the line between interdisciplinarity and multidisciplinarity (Repko, 2008). Klein (2005) considers multidisciplinarity "adding breadth" to a research project. She claims that, in multidiscipinarity, "the status quo is not interrogated, and disciplinary elements retain their original identity" (p. 55).

Interdisciplinarity occurs when both integration of and interaction between disciplines become proactive and intentional (Klein, 2010, 18). Interdisciplinarity can be subdivided into many different types, such as narrow or broad; shared, cooperative, or solo; methodological or theoretical; bridge building or restructuring; instrumental, critical, or conceptual; and finally endogenous or exogenous.

Narrow interdisciplinarity is interdisciplinarity between disciplines that are close to each other on the spectrum of disciplines, such as two sciences or two humanities disciplines, where the disciplines have similar subjects, methods, and views. Broad or wide interdisciplinarity is between disciplines that are far from each other and have little compatibility, such as a discipline from the sciences and a discipline from the humanities (Klein, 2010, 18).

Shared interdisciplinarity occurs when a team researches in smaller groups and then shares their findings. Cooperative interdisciplinarity occurs when the groups in the team cooperate immediately, feeding off each other's findings as they research (Klein, 2010). It is also possible to do solo interdisciplinarity as an individual without a team (Klein, 2005). Salter and Hearn (1997) reinforce the idea that interdisciplinary research does not mean team research when they list this as a myth that needs to be dispelled about interdisciplinarity. Mackey believes that "the systems that most scholars study are complex, but that the particular issues addressed by an individual scholar are fairly simple" (2001, p. 65). He goes on to say that:

> Interdisciplinary scholarship does not usually involve the construction of some grand, complex-system model. It is rather an incremental addition and extension of an existing knowledge base. The interdisciplinary scholar may extend his or her knowledge base beyond a single discipline, but that extension is also incremental. (2001, p. 65).

Methodological interdisciplinarity occurs when methods are borrowed from other disciplines, and theoretical interdisciplinarity occurs when there is a emphasis on synthesis and a comprehensive overarching view of the problem (Salter & Hearn, 1997; Klein, 2010).

Interdisciplinarity can be based on the metaphor of bridge building or restructuring. Bridge building involves making links between two or more disciplines, while restructuring takes parts of several disciplines

to make a new whole (Klein, 2010). Types of restructured interdisciplines include interdisciplines based on topics, such as Canadian studies; life experience, such as disability studies; hybrids, such as educational psychology; and professional preparation, such as education. (Klein, 2010).

Instrumental interdisciplines serve a need in real-world research finding practical solutions to real-world problems (Klein, 2010; Repko, 2008; Salter & Hearn, 1997). Critical interdisciplinarity questions knowledge formation and tries to change the way we organize knowledge through research (Klein, 2010; Repko, 2008; Salter & Hearn, 1997). Also, conceptual interdisciplinarity poses questions without a disciplinary basis, while viewing the disciplines as important (Repko, 2008; Salter & Hearn, 1997).

Finally, endogenous interdisciplinarity is concerned with the production of knowledge, while exogenous interdisciplinarity questions the disciplines through its research (Shailer, 2005). These are similar to instrumental and critical interdisciplinarity.

Transdisciplinarity "transcends the narrow scope of disciplinary worldviews through an overarching synthesis" (Klein, 2010, 24), filling in the gaps between disciplines or surpassing disciplines (Chettiparamb, 2007). It may also include knowledge from individuals or the public or private sectors (Repko, 2008).

In addition to the main categories of interdisciplinarity, multidiscipinarity, and transdisciplinarity, there is also Klein's (2005) reference to anti, post, non, and de-disciplinarity, which would want to see the end to disciplines, Shailer's (2005) pluridisciplinarity, which is similar to a narrow multidiscipinarity, and Kockelmans' (1998) crossciscipliarity, which he defines in contrast to his definition of interdisciplinarity. In Kockelmans, Interdisciplinarity creates new disciplines, while crossdisciplinarity integrates disciplines for research but does not create

new disciplines. According to Newell & Green (1998), one discipline is often the "subject matter" of the other in crossdisciplinarity, such as the history of technology.

Reasons for interdisciplinarity.

Interdisciplinarity is "needed to answer complex questions, solve complex problems, and gain coherent understanding of complex issues that are increasingly beyond the ability of any single discipline to address comprehensively or resolve adequately" (Repko, 2008, 3). The reason the disciplines cannot answer these questions is because of increased specialization and increased complexity in society (Klein, 2010). Krohn (2010) claims that the most complex problems are the real-world problems that have to be dealt with every day outside the academic community. Complexity is defined by Morin (2008) as not only the quantity of units and interactions of information, but also "uncertainty, indetermination, and random phenomena" (p. 20). Interdisciplinarity is required because the mismatch between "the world which our sciences describe and the world in which we would actually like to live must be overcome. This cannot be accomplished on the basis of scientific rationality alone; scientific rationality is to be complemented by a form of critical reflection that is of a typically philosophical nature" (Kockelmans, 1998, 95).

Other reasons for interdisciplinarity include problems that lie between disciplines (Repko, 2008), problems that involve more than one discipline (Klein, 2010), a desire to solve society's problems (Klein, 2010), the power of new technologies in research (Klein, 2010), the fact that specialization can blind researchers to other contexts or points of view (Repko, 2008), and the fact that breakthroughs often require interdisciplinarity (Repko, 2008).

History of disciplinarity and interdisciplinarity.

There is disagreement about the origin of interdisciplinarity.

> For some it is quite old, rooted in the ideas of Plato... and other historical figures who have been described as "interdisciplinary thinkers." For others it is entirely a phenomenon of the twentieth century, rooted in modern educational reforms, applied research, and movement across disciplinary boundaries (Klein, 1990, 19).

Plato was the first to argue for unified science, general knowledge, synthesis, and integration in philosophy (Klein, 1990), but then his student Aristotle created fields of study divided into the theoretical, the practical, and the productive. The theoretical, at the top of the hierarchy, consisted of theology, math, and physics. The practical, ethics and politics. The productive consisted of fine arts, poetics, and engineering. Philosophy was still a unified field (Moran, 2007). In the late middle ages in Rome the liberal arts of the trivium, including logic, grammar, and rhetoric, and the quadrivium, including arithmetic, geometry, astronomy, and music, were required before one could specialize in one of the disciplines of medicine, law, theology, or arts (Klein, 1990).

During the scientific revolution and the enlightenment, there was a movement from a more universal way of thinking of knowledge to more specialization, even though problems with specialization were recognized by a variety of writers such as Nietzsche and Jose Ortega y Gasset (Moran, 2007; Klein, 1990). New disciplines came about in the 19th and early 20th centuries, such as history, economics, political science, and sociology (Klein, 1990).

The term "interdisciplinarity" emerged in the 1920's. Although criticisms of disciplinarity had been happening as long as disciplinarity itself, it usually referred back to the original unified knowledge of Plato.

This new form of criticism, "interdisciplinary", was a reaction to 20th century problems in knowledge organization (Moran, 2007). Movements that brought interdisciplinarity forward in the 20th century included the 1930's "unity of science" movement and the support of grand theories, the 1960's student movement, and the Organization for Economic Co-Operation and Development's 1972 publication "Interdisciplinarity".

Klein (1990) lists four major ways that this modern interdisciplinarity has been shaped and created. She lists attempts to maintain historical unity and synthesis of knowledge, interdisciplinary programs in research and education, the broadening of disciplines, and the interdisciplinary movement.

How to do interdisciplinarity.

Repko (2008) lists 10 steps to doing interdisciplinary research:

1. Define the problem
2. Justify using Interdisciplinarity
3. Identify relevant Disciplines
4. Literature Search
5. Adequacy in Relevant Disciplines
6. Analyze the problem/Evaluate each Insight
7. Identify Conflicts between Insights
8. Create Common Ground
9. Integrate Insights
10. Produce an Interdisciplinary Understanding of the Problem

Step one is to define the problem or research question, which is the same for all research. Step two is to justify using interdisciplinary research instead of disciplinary research. Step three is to identify the relevant disciplines to the research question, and how they are relevant.

Also, narrow down to the most relevant disciplines if there are many. Step four, again another step in all research, is the review of the literature, with special attention to the disciplines the literature comes from. Step five is to gain adequacy in the relevant disciplines. An interdisciplinary researcher should have an overall feel for each discipline, and more in depth knowledge about the relevant theories, methods, and perspectives to the research question. Klein (2005) agrees that adequacy is required, but the intedisciplinarian does not require expertise in all disciplines. Step six is to analyze the problem from each discipline and to evaluate each disciplinary insight. Repko (2008) suggests looking at the strengths and weaknesses of each discipline and how the methods, evidence, and definitions of each discipline are skewed. Step seven is to identify conflicts between each disciplinary insight. Repko (2008) suggests recognizing and confronting differences at this step. Step eight is to create common ground. Bromme (2000) suggest developing a common language. Step nine, which may be the most important step, is to integrate insights. Repko (2008) defines integration as creating something new where the new whole is greater than its individual parts. Frodeman (2010) claims that "success at integrating different perspectives and types of knowledge – whether for increased insight, or for greater purchase on a societal problem – is a matter of manner rather than of method" (xxxi). Finally, step ten is to produce an interdisciplinary understanding of the problem.

Szostak also writes a twelve step process for doing interdisciplinary research. Step one is to start with an interdisciplinary question or problem, step two is to identify the main and secondary phenomena involved with the question or problem, and step three is to determine which theories and methods are relevant to the question or problem (2002). Step four is to perform an in-depth interdisciplinary literature review, step five is to identify relevant disciplines and perspectives,

and step six is to research relevant phonomena that have not received attention in the area. Step seven is to evaluate the results of previous research and step eight goes along with step seven because it asks to compare the results from previous interdisciplinary and disciplinary research. Steps nine through twelve are to develop a more integrative analysis and to reflect on, test, and communicate the results of integration.

The most important part of both Repko's and Szostak's interdisciplinary methods is integration. Without integration, these methods would not be interdisciplinary. The major difference between Repko's and Szostak's interdisciplinary methods is that Repko specifies that the researcher(s) must develop adequacy in relevant disciplines. There are differing opinions as to how much disciplinary knowledge an interdisciplinarian should have, but Repko believes that adequacy involves an overall understanding of the discipline and a more in depth understanding of the relevant topics.

Interdisciplinarians.

In addition to how to do interdisciplinarity, the literature lists attributes of successful interdisciplinarians. Bromme (2000) claims that a good interdisciplinary possesses reliability, flexibility, patience, resilience, sensitivity to others, risk-taking, thick skin, a preference for diversity, tolerance for ambiguity, a willingness to learn, divergent thinking, curiosity, courage, modesty, and the ability to subordinate one's own views. Although many of these are also required in a disciplinary researcher, some, such as the ability to subordinate one's own disciplinary views for the views of another discipline, must be more refined. In addition to these, Repko (2008) adds enterprise, love of learning, reflection, tolerance for ambiguity and paradox, receptiveness to others, willingness to achieve disciplinary “adequacy”, appreciation of diversity, a willingness to work with others, humility, competent

communication, abstract thinking, dialectic thinking, the ability to engage non-linear thinkers, creative thinking, and holistic thinking. Newell (1998) lists the qualities that employers are looking for when they hire interdisciplinarians: conceptual thinking, problem solving, understanding other value systems, evaluating alternatives, using facts to change opinions, good communication skills, group participation, ethical sensitivity and constructive response to criticism.

No general interdiscipliarity.

Salter and Hearn (1997) point out that there is very little in common between various manifestations of interdisciplinarity, even though they are all under the title "interdisciplinarity". Bioethics is grouped in with Canadian studies and the history of mathematics. These different "interdisciplinarities" have different subjects, methods, tools, theories, and concepts, but they all share the concept of integration, and using the best methods for solving a certain problem. Klein (2000) also points out that there is no universal interdisciplinary language. Even the term "subject" in one discipline might be "topic" in another and "phenomena" in another yet. Frodemann (2010) argues that even method is not universal when he says that "there never will be *the* interdisciplinary method any more than there exists *the* scientific method" (xxxi). Moran (2002) points out that "the value of the term "interdisciplinary" lies in its flexibility and indeterminacy, and that there are potentially as many forms of interdisciplinarity as there are disciplines"(p. 15).

Disciplinarity and interdisciplinarity.

Modern interdisciplinarity might have wanted to see the end of disciplines, but "postmodern interdisciplinarity" respects disciplines (Klein, 2005, 54). This feeling is repeated throughout the literature in interdisciplinarity.

Klein (2010) claims that "interdisciplinarity and specialization are parallel, mutually reinforcing strategies. The relationship between disciplinarity and interdisciplinarity is not a paradox but a productive tension characterized by complexity and hybridity" (p. 7). Weingart (2000) claims that disciplines in universities have the goal of understanding, not problem-solving, but that both disciplines and interdisciplinarity are important. He calls them "complementary rather than contradictory" (p. 29). Finally, Repko (2008) calls disciplines necessary, foundational, and symbiotic with interdisciplinarity. He claims that most interdisciplinarians do not want to see an end to the disciplines"(p. 31). Moran (2002) claims that disciplines are necessary to examine because interdisciplinarity is "always engaged with them"(p. 2).

What is the Difference between Disciplinary and Interdisciplinary Research?

From the sections on disciplinarity and interdisciplinarity above, it is clear that they have many similarities and even more differences. "All research – including interdisciplinary research – involves identifying problems, discovering source material, generating data, organizing and analyzing that information, and drawing conclusions" (Repko, 2008, 28).

Disciplines and interdisciplinarity both use topics, methods, theories, concepts, and perspectives, but disciplinarians have specific topics, methods, and perspectives that they use (Salter & hearn, 1997), while interdisciplinarians can combine these attributes from different disciplines (Repko, 2008). Disciplinarians follow a research method, and in addition to the methods used to research a topic, interdisciplinarians also have methods that they use for synthesis and integration (Repko, 2008).

Disciplines are seen as static and conservative, with strict rules and defended borders (Weingart & Stehr, 2000). Interdisciplines are seen as flexible, liberal, progressive (Weingart, 2000), and border crossing (Repko, 2008). The other side of this is that disciplines are seen as ordered, tough minded, using methodological rigor (Weingart, 2000), and accountable (Strathern, 2004), and therefore more likely to be taken seriously, while interdisciplines are seen as softer (Weingart, 2008). It may be more difficult for an interdisciplinarian to move onward and upward in academia (Shailer, 2005; Turner, 2000). Disciplines are concerned with depth of knowledge, while interdiciplines are concerned with breadth (Shailer, 2005).

Disciplines are required because specialization is needed because of the unmanagable amount of our collective knowledge. Interdisciplines are also required because of the increased complexity of our world (Klein, 2010). Disciplines deal with problems that can be researched in the context of one discipline. Interdisciplinarians deal with problems that either encompass many disciplines (Klein, 2010) or that lie between the disciplines (Repko, 2008). Disciplines are concerned with understanding (Weingart & Stehr, 2000); interdisciplines are concerned with solving problems (Turner, 2000).

Disciplines have a disciplinary bias, but interdiscipline has personal bias in the choices made about which disciplines to draw methods, theories, and assumptions from (Repko, 2008). Repko (2008) also adds that disciplines differ in their origins and levels of development. Disciplines are older and interdisciplines are newer and younger.

Disciplinarity	Interdisciplinarity
Specific topics, methods, and perspectives	Combination of topics, methods, and perspectives
Research method	Method for integration
Static, conservative, strict rules, defended borders	Flexible, liberal, progressive, border crossing
Ordered, tough minded, methodological rigour, accountable	Softer, a career risk
Depth of knowledge	Breadth of knowledge
Specialization because of too much collective knowledge	Increased complexity requires integration
Problems that fit in one discipline	Problems including many or between disciplines
Understanding	Problem solving
Disciplinary bias	Personal bias
Older	Newer and younger

The Impact of Summer Break from School on Children with Severe Autism and their Parents

Autism is defined in the Diagnostic and Statistical Manual (DSM-IV) by impairments in social interaction, communication, and stereotypic behavior (APA, 1994). Children with autism may also have difficulties in many other areas, such as behaviors, motor skills, self-care skills (National Research Council, 2001), and rate of educational development (Ministry of Education, 2001). Schools provide programs in these areas of difficulty based on the student's Individual Education Plan (IEP) (Ministry of Education, 2000). The expectations in the IEP can be based on modified goals from other grade levels, or alternative goals

(Ministry of Education, 2000), often taken from a published curriculum for students with autism such as the Assessment of Basic Language and Learning Skills (ABLLS). Schools are required to utilize an evidence-based teaching method, applied behavior analysis, with students with autism according to PPM140 (Ministry of Education, 2007).

The evidence suggests that summer break has an negative effect on the achievement of specific groups of students, such as low socio-economic class students (Cooper et al., 1996), and students with special education needs (Shaw, 1982). The existing evidence also suggests that students with special education needs recoup skills lost over the summer more slowly than students in the regular program when returning to school in the fall (Menousek, 1983). The purpose of this research is to investigate the effect of summer break on the academic, social, life, communication, and behaviour skills of elementary children with severe autism. This research will also assess the recoupment of skills. Skills will be assessed using the Vineland Adaptive Behaviour Scale (VABS) and the Academic Skill Area of the ABLLS at various time points before and after the summer. This research is important because if students with autism regress over the summer break, and recoupment requires a significant amount of time in the fall, then students with autism are not learning to their full potential.

The research on the stress of parents of children with autism suggests that they experience more stress than other parents (Pisula, 2003). Child variables that influence the level of stress of parents of children with autism include the child's autism symptom severity (Ingersoll & Hambrick, 2011), adaptive skills (Hall &Graff, 2011), and problem behaviours (Phetrasuwan & Miles, 2009). Also, when there is support in the form of care for the person with autism, parent stress is reduced (Ekas, Lickenbrock, & Whitman, 2010). A secondary purpose of this research is the impact of summer break on the stress of parents of

children with severe autism. Stress will be assessed using the Parent Stress Index (PSI) and in-depth interviews during the summer and the school year. The interviews will be coded thematically, and the results of the research will be framed with disability theory. This research is important because parents of children with autism already experience a great deal of stress, and if summer break, through dealing with child regression in areas that influence parent stress or lacking care support for the child with autism, increases this stress, then families of children with severe autism may require more assistance over this break to reduce their levels of stress.

How is the Impact of Summer Break from School on Children with Severe Autism and their Parents Interdisciplinary in Nature?

I will demonstrate how the research problem of the impact of summer break from school on children with severe autism and their parents is interdisciplinary by looking at the various disciplines involved, discussing how the various subjects, methods, tools, theories, concepts, and assumptions will contribute to the research, and looking at the interdisciplinary process used.

This research problem requires the disciplines of psychology, education, and disability studies. Psychology is the study of behavior and the mind. Education is the study of pedagogy. Disability study is an interdisciplinary field that looks at models of disability. Klein (2005) considers disability studies one of the "activist" disciplines.

Subject, topic, or phenomena studied is one important aspect of disciplines, and these subjects can be integrated in interdisciplinary studies. Psychology studies adaptive behavior and achievement, which are two constructs that will be used in my research. It also studies stress, which will also be assessed in my research. Education also studies adaptive behavior and achievement, and academic achievement from

the point of view of education is important to this research because a criterion-referenced tests of achievement is used, rather than a norm-referenced test. Disability studies looks at disabled people and their role in society, and my research is specifically on children with severe autism.

Method is another important aspect of disciplines that can be integrated in interdisciplinary studies. Psychology frequently uses norm-referenced rating scales in both adaptive behavior and stress. It is common for them to use t-tests and ANOVAs in research. In education, on the other hand, although norm-referenced scales are used, they are not nearly as common as criterion-referenced tests, such as the teacher made tests based on the Assessment of Basic Language and Learning Skills goals in the Individual Education Plans used for achievement. Interviews are used in both psychology and education, and content coding is frequently used with education interviews. The models of disability are currently exclusive to disability studies, although they can be applied to other disciplines.

Mixed methods research collects qualitative and quantitative data, and takes on the strengths of each (Creswell & Plano Clark, 2011). Mixed methods research is recommended when one data source may be insufficient, or when "one type of evidence may not tell the whole story" (Creswell & Plano Clark, 2011). This is the case when assessing the effects of summer break on the achievement of student with severe autism who may regress in ways that are not detectable by most assessments, or in ways that may be detectable, but that may have implications for the child and the family beyond the test scores. This is also the case for exploring the effect of summer break on the stress of parents of children with autism. Mixed methods research is also used for methods triangulation (Hesse-Biber, 2010).

Tools from the three different disciplines are also integrated in this interdisciplinary study. I will be combining the use of the Vineland Adaptive Behavior Scales and the Parent Stress Index from psychology with the Assessment of Basic Language and Learning Skills and Individual Education Plans from education with the medical and social models of disability from disability studies.

Theories can also be integrated in interdisciplinary studies. Many theories have the potential to be used in this research. Since the impact of summer could be on adaptive skills, including behavior, academic skills, or even parent stress, theories in all of these areas, as well as in learning and forgetting, could be useful. Psychology lends us theories on stress, learning, and forgetting, as well as behaviorism, specifically operant conditioning, which overlaps with Applied Behavior Analysis in Education. Social Learning Theory also overlaps psychology and education. Finally, disability theory will be used to considered whether or not the impact of summer break is a medical issue, a social issue, or a mix of the two.

Some of the concepts in these theories are unknown in the general population or may mean something different in the general population or in other disciplines. For example, the concepts of stress and coping in stress theories, as well as the concepts of savings and decay from theories of forgetting in psychology might have different meanings elsewhere, but may become useful in this research. Also, the concepts of regression and recoupment in education research are relevant. Finally, the concepts of disability and impairment from disability studies must be defined and contrasted to be used in this research, because the definitions used in disability studies may be different than that used in the general population.

Finally, the assumptions in psychology and education are mainly empirical, with testing of smaller populations applied to larger populations. Although interviews are done in both disciplines, the results are often codified. Disability theory, on the other hand, constructs theories and believes in the social construction of disability. The assumption, or worldview as it is called in Creswell & Plano Clark (2011), used in this research will be pragmatism, which values both objective and subjective knowledge and uses aspects of these postpositivist and constructivist worldviews to create a more problem centered, real-word, pluralistic worldview. Pragmatism is important in answering the question of the effect of summer break on students with severe autism and their families because it is important to gather quantitative, objective data to show where regression has actually taken place, but it is also important to see how the families of children with autism experience summer break and make meaning from those experiences.

	Psychology	**Education**	**Disability Studies**
Subject, Phenomena	Stress, Adaptive Behaviour, Academic Education	Academic Education, Adaptive Behaviour	Disabled People
Method	Norm-referenced rating scales, interviews, observations, t-tests, ANOVAs	Teacher assessments, norm-referenced rating scales, interviews, content coding	Applying models of disability
Tools	VABS, PSI	ABLLS, IEPs	Disability models
Theory	Stress Theories Learning and Forgetting Operant Conditioning Behaviorism	Applied Behaviour Analysis Social Learning Theory	Disability theory
Concepts	"stress", "coping", "savings" (forgetting), "decay" (forgetting)	"regression", "recoupment"	"disability", "impairment"
Assumptions	Empirical observation and measurement	Empirical observation and measurement	Social and historical construction

My interdisciplinary process is based loosely on Repko's (2008) method for doing interdisciplinary work, keeping in mind that there is currently no one correct standard for doing interdisciplinary work. Step one is to define the problem, which is the impact of summer break from school on students with severe autism and their families.

Step two is to justify using interdisciplinarity, which is the need for both psychological assessments and teacher-made tests based on the ABLLS and IEP, as well as the desire to look at the model of disability that applies to the impact of summer break on these students. Step three is the disciplines of psychology, education, and disability studies.

Step four is the literature review, which has been completed on summer regression in students with special needs and the regular population and parent stress of parents of children with autism by using the databases ERIC from education and PsycInfo from psychology as well as other relevant databases.

Adequacy in relevant disciplines, step five, is an ongoing process, where theories, concepts, methods, and tools from disciplines other than the primary discipline of the researcher are learned, such as the theories and concepts from stress theories and theories about learning and forgetting.

Step six is to analyze the problem from each point of view and evaluate each insight, and the problem has been analyzed from education and psychology, while disability theory has been applied to the literature review on parent stress as a model for its use in the results of this research.

Step seven looks for conflicts between insights, but I do not expect many conflicts between psychology and education, especially educational psychology and special education, because there is so much overlap. There is difficulty integrating the ideas of disability theory into

education because the social model of disability attempts to change society instead of the individual, but education by definition changes individuals by teaching them. Creating common ground, step eight, may not be required between psychology and education, only between disability studies and the other disciplines. I have been thinking about how to fit education in a model of disability when, in disability theory, trying to change the individual is considered a medical perspective, but in education, the purpose is to change individuals by teaching them, whether or not they have disabilities. I have been reading how various theorists have suggested moving beyond a medical/social model of disability to a model that is post-modern and accounts for the complexity of disability.

Steps nine and ten are to integrate insights and to produce an interdisciplinary understanding of the problem, which is also ongoing during the writing of this paper and through my data collection and analysis.

The variety of subjects, methods, tools, theories, concepts, and assumptions from psychology, education, and disability theory used in the research on the impact of summer break from school on students with severe autism and their families, as well as the interdisciplinary process used, shows that this research is interdisciplinary.

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