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Inquiry-Based Learning and the New BC Curriculum:

Supporting All Students in Inclusive Classrooms

by

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We accept this thesis as conforming to the required standard.

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Abstract

There is currently a massive shift occurring in the field of education in British Columbia. With a new curriculum being implemented across the province, teachers are now expected to shift the focus towards the development of core competencies and skills to help prepare them for life in the 21st century. One model that teachers are encouraged to use in order to enhance these skills is called *inquiry-based learning*. The question of how to effectively implement this model in an inclusive classroom setting, while supporting all students with a *Universal Design for Learning* approach, was the focus of this study. Conducted over four months in a primary classroom, this action research study demonstrates how Knowledge Building Circles, multimodal methods of instruction, sociodramatic skits, video modeling, and collaborative group work projects can be used as effective teaching strategies. Key themes emerged around: speaking and listening skills, ways of learning, means of expression, fostering collaboration and higher order thinking skills, student engagement, and experiential learning. Overall, this study demonstrates how the inquiry process can be a meaningful way to enhance the learning of all students while implementing the new curriculum. It is hoped that other teachers may apply these findings to their own practice, and that further research will be done in this area.

Keywords: 21st century skills, inquiry-based learning, Universal Design for Learning

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Dedication

This project is dedicated to my exceptionally patient and wonderful husband Andy, my generous and loving parents Rob and Donna, my kind and thoughtful brother Joey, and my loyal dog Marvin (who often reminded me to take walk breaks). Without their continuous love and support, this journey would never have been possible. I also want to thank my amazing friends and colleagues who have supported me over the past two years. Thank you for everything!

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Introduction

Introduction

There is currently a massive shift in education occurring in the province of British Columbia. The BC Ministry of Education is in the process of implementing a new curriculum for teachers to use, and by the 2018/2019 school year these curricular changes will be mandatory for all grade levels (Government of BC, n.d.). This new educational model has been designed to prepare students for a world that is ever-evolving and changing at a rapid pace. The document entitled *Introduction to British Columbia's Redesigned Curriculum* states that:

> Today we live in a state of constant change. It is a technology-rich world, where communication is instant and information is immediately accessible. The way we interact with each other personally, socially, and at work has changed forever. Knowledge is growing at exponential rates in many domains, creating new information and possibilities. This is the world our students are entering. (BC Ministry of Education, 2015, p.1)

The new curriculum implements changes to the content that is taught within each grade, but, more importantly, to the *way* that it is taught. The document goes on to state that:

> British Columbia's redesigned curriculum brings together two features that most educators agree are essential for 21st-century learning: a concept-based approach to learning and a focus on the development of competencies, to foster deeper, more transferable learning. Deeper learning is better achieved through "doing" than through passive listening or reading. (BC Ministry of Education, 2015, p.1)

Traditional educational models, with students sitting in rows as quiet, passive recipients of

content-driven information, are a thing of the past with this new curriculum. Alternatively, the

BC curriculum presents a new model:

> All areas of learning are based on a "Know-Do-Understand" model to support a concept-
>
> based competency-drive approach to learning. Three elements, the Content (Know),
>
> Curricular Competencies (Do) and Big Ideas (Understand) all work together to support
>
> deeper learning. (BC Ministry of Education, 2015, p.1)

Within this new model there is also a shift towards the development of 21st century skills which

"refers to a broad set of knowledge, skills, work habits, and character traits that are believed—by

educators, school reformers, college professors, employers, and others—to be critically

important to success in today's world, particularly in collegiate programs and contemporary

careers and workplaces" (Hidden curriculum, 2014). The goal of education in BC is to develop a

society with "well-educated citizens who are able to think critically and adapt to change" and

who, among other things, "can communicate information" and "are capable of making

independent decisions" (BC Ministry of Education, 2015, p.1). In order to achieve this, there are

skills known as the Core Competencies embedded into each subject of the new curriculum:

> The Core Competencies are the intellectual, personal, and social skills that all students
>
> need to develop for success in life beyond school. BC has identified three Core
>
> Competencies – Communication, Thinking and Personal and Social Competency as
>
> essential for all learners. (BC Ministry of Education, n.d.)

The BC Ministry of Education has developed a draft set of competency profiles for each core

competency which describes the skills required for each in more detail. In the communication

draft (Ministry of Education, n.d., p. 1), it states:

> Communication competency encompasses the set of abilities that students use to impart

and exchange information, experiences, and ideas, to explore the world around them, and

to understand and effectively engage in the use of digital media. Communication

competency provides a bridge between students' learning, their personal and social

identity and relationships, and the world in which they interact. (p. 2)

The document goes on to state that students are expected to "connect and engage with others (to

share and develop ideas)" by participating "in informal and structured conversations where they

listen, contribute, develop understanding and relationships, learn to consider diverse

perspectives, and build consensus" (p. 2). Students are also expected to "inquire into topics that

interest them" and "work together to accomplish goals… through solving a problem, conducting

an inquiry, and working together on community projects" (p. 3). It is clear that the ability to

communicate and collaborate effectively has been embedded into the new curriculum. One way

that educators are encouraged to do this is with the use of *inquiry-based* learning, which is also

outlined on the new curriculum website:

Through demonstration of the core and curricular competencies, students are bound to

form questions that provide teachers with insight into their thinking. Questions generated

by both students and teachers are critical to encouraging a sense of wonder and curiosity

among students. This dialogue can take place through many question-based approaches,

including, but not limited to inquiry… (BC Ministry of Education, 2015, p. 6)

As a relatively new educator, I have many questions of my own regarding the new curriculum

and the educational approaches we are now expected to use. Specifically, I wonder how I can

best support students with exceptional needs in inclusive classroom settings while using the

inquiry-based model. In inclusive settings, students with exceptionalities are included in most of

the day-to-day classroom activities as much as possible, so it is critical that I am prepared to

support all students in this new type of learning environment.

Personal Context

As a primary teacher in British Columbia, I am now required to implement the new curriculum in my classroom. I am excited about the possibilities within this curriculum, and the inquiry model, as they appear to give students and teachers more freedom to explore personal questions and ideas. From my perspective, it also appears that the new curriculum allows teachers to cover topics in more depth which has the potential for more meaningful learning. I also think the inquiry model has the potential to increase student motivation as students will have more say in what they learn and how they show their understanding. That being said, I do have some concerns. Through my experience using inquiry-based learning, I have observed that some students with social interaction difficulties, whether due to a specific diagnosis or not, found the inquiry model challenging. Based on my observations and personal experience, it seems that many students have not yet developed the communication, collaborative, and problem-solving skills that are essential components of inquiry and 21st century learning. This has been the biggest challenge for me while implementing inquiry-based learning in the past. It has also been difficult to encourage all students to come up with and share their own questions and ideas. So, even though I have experimented with inquiry-based learning in the past, I am still left with many questions on how I can effectively implement this new educational model in a way that all students are engaged and supported. These concerns are the driving force behind my research in this study.

Statement of Problem

Based on my personal experience with inquiry-based learning, it became clear that the 21st century skills required for inquiry-based learning may need to be explicitly taught before

students can be expected to excel in this new learning environment. This realization led to the question of how I can enhance skills such as inquiry, collaboration, and communication for all students, especially those with social interaction difficulties or specific diagnoses such as Autism Spectrum Disorder (ASD). In the next chapter I explore the communicative and social challenges that students with ASD and other exceptionalities have and how this may have an impact on their learning in inquiry-based learning environments. I also examine what teaching strategies have been shown to support these students in general education classrooms. As I will outline in the next chapter, some research has been done on how to best support students with ASD and other exceptionalities in more open-ended, inquiry-based learning environments. But how can I apply these findings to my own primary classroom? What methods and strategies can I use to teach communication and collaborative skills in a way that not only supports the student(s) with learning challenges, but all students in the class simultaneously? Will teaching these skills to all students have an impact on their ability to effectively engage in inquiry-based learning together? And finally, how will I know if this has happened?

Research Question

Based on the concerns listed above, my research question is: *What strategies can I implement to improve inquiry-based learning for all students in my inclusive classroom?* I explored my question with the use of action research in my own classroom, using the cyclical steps outlined by Efron and Ravid (2013): "Identifying an issue… gathering background information… designing the study… collecting… analyzing and interpreting data… writing, sharing, and implementing the findings" (p. 8). Action research was an appropriate method to answer my question, as I examined my own practice in order to improve as an educator. As stated by Efron and Ravid (2013), the ultimate goal of action research is for the researcher to

"improve their own practice and foster their professional growth by understanding their students, solving problems or developing new skills" (p. 4). In order to conduct my research, I began by observing the students and then implemented research-based strategies based on their needs. I used a research journal and other methods of assessment such as student questionnaires, self-assessments, and interviews, in order to determine the effectiveness of each strategy. I then used these assessments to help plan and prepare for a total of three cycles in the action research process, before finally writing and sharing my findings.

Rationale

The question of how to effectively implement the new curriculum is a current and relevant topic for educators across British Columbia, and in other parts of the world where curricular changes are being implemented. In BC, this curriculum is mandatory for all educators in the public school system to use. As a result, teachers will need to think about how to support students with exceptionalities in their classrooms. More information is needed in this area for educators in British Columbia, and it is my hope that this research will not only support my own practice as a teacher, but to others across the province who are facing similar challenges. The ultimate goal of this research, is to ensure that I (and hopefully others) will feel better prepared to implement the new curriculum in inclusive classroom settings. It is my hope that this will have a positive impact on the students, as they will be better supported and more successful in their learning, both academically and socially.

With this study I focused on qualitative research methods and depended on my own interpretations of the data. I was immersed in the study as a researcher, but also as a participant. I used journals, personal experiences, observations, student self-assessments, and feedback from the students to help formulate an answer to my question. The knowledge I discovered will not be

generalizable to all educators in the province, but it is my hope that it may be transferable to the

practice of others who are in similar situations.

Chapter 2

Literature Review

Chapter Overview

In this review, literature is gathered from a variety of sources beginning with the BC Ministry of Education's new curriculum website. This source provides information about the curricular changes that are being implemented. Next, key themes are identified that have led to this curricular shift - from the need to update educational models that were created during the industrial revolution, to preparing students for life in the 21st century and beyond. The development of 21st century skills, inquiry-based learning, and the types of skills necessary to engage in it effectively are explored. A description of the inquiry-based model and how it can be used in classrooms is also discussed. The challenges that some students with exceptionalities such as Autism Spectrum Disorder (ASD) have, and how this may have an impact on their ability to engage in inquiry-based learning, is outlined next. Current studies that focus on strategies for supporting these students in inclusive classrooms, including the use of peer mentoring, modeling, and the use of sociodramatic skits to enhance social skills are summarized. Recent studies on how to support students with ASD and other learning disabilities in science-based, inquiry-based learning environments are also explored. This chapter concludes with a description of the Universal Design for Learning (Katz, 2012) approach and how it can be used to promote inclusion and participation for all students while teaching social skills in inquiry-based learning environments.

Overview of Field

The curricular shift in BC has come as a result of many collaborative consultations across

the province. In *Exploring Curriculum Design: Transforming Curriculum and Assessment* the BC Ministry of Education (2013) states that:

> In 2010, the province began a process to transform education in BC to better meet the needs of all learners. Transforming a system as complex as education takes time and to do it well involves extensive ongoing consultation, thorough research and exploration of possibilities, and detailed planning… There have been formal and informal consultations with provincial partners, school district-hosted sessions with local stakeholders, provincial and regional conferences and meetings, conversations with international experts, and online dialogue. (p. 3)

As described, these curricular changes have been years in the making, and it is an exciting and challenging time for everyone involved - from teachers and administrators, to educational assistants an support workers, to the parents and, of course, the students in the classrooms. Many educators and researchers are excited about the possibilities of curricular shifts and believe these changes are critical to the success of students in the 21st century. Yelland (2006) states that:

> Traditionally, the curriculum in schools prepared students for an era in which they had to perform mechanistic tasks and learn routines for application…what remains is a system created in a previous era with little relevance to the lives of the young people who exist in it, except for some pockets of innovation in which there have been attempts to reconceptualise education and curricula so that we are able to prepare citizens for the 21st century. (p. 123)

This viewpoint is echoed by many in the educational field, including Ken Robinson (2012). In his well-known TEDTalk entitled "Do Schools Kill Creativity?" he discusses the uncertainty of the world in which our students are growing up, and the purposes of public education. He points

out that traditionally, the purpose of education was to prepare students for work during the industrial revolution. He goes on to explain how this educational model has remained intact as the world around it has shifted, and how we must evolve our educational models to prepare students to think creatively as they face complex and problematic futures (Films Media Group, 2012). Care, Griffin, and McGaw (2012) similarly describe the uncertain future of our students, and how:

> In this context, it is crucial [for students] to respond flexibly to complex problems, to communicate effectively, to manage information dynamically, to work and create solutions in teams, to use technology effectively, and to produce new knowledge, continuously. All of these are skills are needed in the twenty-first century. (p. v)

As outlined in Chapter 1, the development of 21st century skills as a way to prepare students for the future is inherent in the new BC curriculum. Larson and Miller (2011) state that in the classroom, these skills include "communication and collaboration… where communication skills are fostered as students collaboratively solve problems, engage in inquiry-based activities… or research a particular topic" (p. 122). They go on to state that these skills also include the ability "to use technology to research, organize, evaluate, and communicate information" (p. 122). Finally, Larson and Miller (2011) conclude that 21st century skills in the classroom also include "innovative thinking and problem-solving" (p. 122).

There also appears to be a push towards inquiry-based learning as an educational model in the new curriculum as a way to develop these skills. As stated in Chapter 1, the BC Ministry of Education (2015) document points to "inquiry and question-based approaches" (p. 6) that encourage "a sense of wonder and curiosity among the students" (p. 6). Blessinger and Carfora (2015) state:

> IBL [inquiry-based learning], as an approach instead of a specific method, is a cluster of teaching and learning strategies where students inquire into the nature of a problem(s) or question(s). The problem or question scenario thus serves as a mechanism and catalyst to engage actively and deeply in the learning process. This approach is constructivist in nature because it allows the student to take greater ownership of her/his learning by allowing them a means by which to construct their own knowledge rather than just having that knowledge merely spoon-fed to them by others. (p. 5)

Inquiry-based learning should ultimately allow students to formulate their own questions based on their own interests and passions. The students attempt to answer their own questions by gathering information and doing their own research and/or experiments. This is very different form the traditional education model where students sit in their desks and passively receive information from the teacher. Traditionally, the teacher has been responsible for passing on knowledge, often by speaking in front of the class or by reading textbooks with pre-determined information. In inquiry-based learning, however, the students are responsible for creating and developing their own knowledge (with the assistance of the teacher), often with new digital technologies. The role of the teacher in this model shifts to that of a guide or a facilitator. At first glance it appears that the role of the teacher is diminished in this new role. But Blessinger and Carfora (2015) point out that it is up to "the instructor, as the learning architect and instructional leader, to decide how to design the course to best meet the needs of the students and the learning outcomes sought" (p. 6). They also emphasize the importance of having projects that are "designed purposefully" (p. 7). So, even though the role of the teacher has shifted, it is still critical that there is significant planning and purpose in the learning activities in order to ensure student success. Chiarotto (2011) states that:

Inquiry-based learning is a dynamic and emergent process that builds on students' natural

curiosity about the world in which they live. As its name suggests, Inquiry places

students' questions and ideas, rather than solely those of the teacher, at the centre of the

learning experience. (p. 7)

Chiarotto (2011) goes on to describe the three main benefits of this type of model, including:

- Honoring students' questions increases their motivation, leading to higher levels of

  engagement, improved understanding, and a love of learning

- Inquiry stimulates students' curiosity, leading to progressively deeper questions and

  habitual critical thinking

- Inquiry builds lifelong learning skills that transcend content mastery (p. 9)

Elliot and Kozak (2014) state that IBL is "an approach to learning that is directed by

questions, problems, a hypothesis or a challenge that individuals and groups of learners work

together to address" (p. 63). They go on to provide a structure that can be utilized by the

classroom teacher. They state that an inquiry project typically begins with an event that is

experienced by the whole class. This experience leads to questions, Knowledge Building Circles,

the pursuit of knowledge (whether independently or in groups), and finally applying and acting

on that knowledge (pp. 71-72). This form of *Knowledge Building* is outlined by Chiarotto

(2011):

Knowledge Building pedagogy refers to teaching and learning approaches that: are based

on fundamental guiding principles rather than on procedures alone, focus on improving

the ideas of the entire classroom community instead of solely on the individual learner,

emphasize collaborative learning experiences within a classroom environment, where

students openly and publicly negotiate their ideas with each other… (p. 9)

Chiarotto (2011) goes on to state that *Knowledge Building Discourse* is "a communal activity in which learners come together to pose questions, posit theories, and to revisit, negotiate, and refine their ideas… with a focus on deepening students' understanding through increased exposure to the diverse perspectives and ideas of the class" (p. 11). Chiarotto (2011) also argues that this type of discourse "is reserved for working out students' emergent questions and ideas, rather than a teacher-directed forum for eliciting 'correct' answers to curriculum-based questions" (p. 11). One way to implement this type of learning is with a *Knowledge Building Circle.* Chiarotto (2011) explains that this "refers to the seating configuration of the students as they engage in Knowledge-Building Discourse" (p. 12) and that this strategy can be used to "promote attentive listening and communication, eliminate hierarchy" while teaching students how "to communicate respectfully with others" (p. 12). It seems that this strategy could be an effective tool for increasing communication and collaboration while engaging in inquiry-based learning.

Elliot and Kozak (2014) also argue that inquiry-based learning is an effective method for presenting the "big" questions in the curriculum (pp. 64) – which is precisely how the new BC curriculum is presented. Each subject area is broken down into the "big ideas" that students are expected to learn. Within each big idea, the teacher has more autonomy on how to present and explore the content.

Based on the literature reviewed so far, it seems that inquiry-based learning can be an effective model that will allow the teacher to address the big ideas of the curriculum, while enhancing the collaboration and communication skills of all students in the class. It also appears that it will engage students more effectively as they will be pursuing their own questions and ideas.

Knowing this, it is important for classroom teachers to consider how to best support students with certain exceptionalities using this model in inclusive classroom settings. Katz (2012) states that "the terms *inclusion* and *inclusive* are used increasingly to mean that all students have the opportunity to learn and grow in learning communities alongside their peers" (p. 5). So, although there are possibilities inherent in the inquiry-based model, it is still important to consider how to best support students who may not have the necessary skills to effectively engage in independent questioning, group work, and research. The types of skills that are necessary for inquiry-based learning may be difficult for some students, particularly those with social interaction difficulties. This leads me to my question: *What strategies can I implement to improve inquiry-based learning for all students in my inclusive classroom?* There are a variety of exceptionalities that affect social interaction, such as Fetal Alcohol Syndrome, Autism Spectrum Disorder (ASD), and Attention Deficit Hyperactivity Disorder (ADHD). Unfortunately I will not be able to provide a comprehensive review of studies that have been done in all of these areas. However, the following section will analyze recent studies that have been done in order to support students with ASD and other disabilities in a variety of learning environments.

Emerging Issues

Leach and Duffy (2009) describe the challenges that can exist for students with Autism Spectrum Disorder (ASD) in inclusive classrooms:

> Teaching students with ASD requires the use of specific strategies and approaches with which general education teachers may not be familiar. The social, communication, behavioral, and cognitive challenges that may affect the performance of students with ASD can be barriers to successful inclusion… (p. 31)

Simpson and Myles (1998) state that "actively engaging in the environment is one of the main difficulties for students with ASD" (as cited by Leach and Duffy, 2009, p. 32). Dunlap (1999) claims that "students with ASD will often go into "their own world" and, as a consequence, often lose out on crucial learning opportunities" (as cited by Leach and Duffy, 2009, p. 32). The American Psychiatric Association (2000) found that "one area that frequently needs to be targeted for children with Autism Spectrum Disorder (ASD) is improvement in social functioning, including how to impart skills involved in interacting with peers (as cited by Hundert, Rowe, and Harrison, 2014, p. 206). Banda, Hart, and Liu-Gitz (2010) state that:

> Students with autism spectrum disorders (ASD) display significant deficits in social skills in a wide variety of settings. In schools, students with ASD may display several problems in social skills involving peers and/or adults, such as: making eye contact, recognizing or displaying nonverbal body language, participating in cooperative play, beginning or sustaining conversation, responding appropriately to conversations or nonverbal expressions, and developing lasting friendships. (p. 619)

The ability to engage with others socially and collaboratively are critical for inquiry-based learning and the development of 21st century skills, so the following studies will outline what can be done to support students with ASD who have challenges in these areas.

Leach and Duffy (2009) state that a variety of "instructional activities (e.g., small-group instruction, peer teaching, cooperative learning, hands-on learning centers, one-on-one instruction, computers, and whole-group lessons that build in opportunities for active engagement) need to be part of the everyday learning experiences in the classroom" (p. 33). This is promising, as these forms of instruction fit in with the new curriculum and the inquiry-based learning model. Additionally, Harrower & Dunlap (2001) found that "flexible grouping

strategies (e.g., cooperative learning, class wide peer tutoring) enable students with ASD to participate in class more autonomously (as cited in Hart & Whalon, 2011, p. 275). Peer tutoring would work well in an inquiry-based learning environment, as students with autism (or those with other learning disabilities) could be placed with peers who have strongly developed social interaction and academic skills.

Nikopoulos and Keenan (2006) point to modeling as an effective strategy for supporting students with ASD. They discuss three different types of modeling that can occur, including peer-modeling, self-modeling, and video modeling (pp. 74-75). They go on to state that "video modeling as a treatment procedure has been effective in a variety of situations, both with typically developing children and those with developmental disabilities" (p. 75). Hughes and Yakubova (2016) also outline the various types of video-based interventions (VBIs) that exist for students with ASD, and state that:

> While there are characteristics that are unique to each type of VBI, several characteristics are common across types. VBIs provide personalized and pre-recorded instruction on a targeted skill. The video clips generally include both visual and auditory components. A student watches the skill being correctly performed and listens to an explicit description of how to perform the skill. The student is then able to imitate the behavior and follow the steps necessary to complete the skill. (p. 15-16)

Hughes and Yakubova (2016) also point to video modeling as an effective tool. In this type of VBI "an adult or peer" demonstrates "the accurate completion of a target skill in one video clip. Teachers can create a script for the models to follow and record the desired skills in the natural context where the student is expected to use them" (p. 116). A second type of modeling that has been shown to be successful is called video self-modeling. Hughes and Yakubova (2016) explain

that this "is comparable to video modeling, with the greatest difference being that the individual modeling the skill in the video is actually the student for whom the video intervention is intended" (p. 116). They go on to state that the teacher can either provide a script or record real-life examples of the child completing the desired task or skill (pp. 116) and the child can watch the edited video afterwards. This is promising as students could learn how to interact with others effectively by watching themselves (or others) perform the skill on a video.

A number of studies have been conducted using peer support, scripts, and video modeling with the ultimate goal of improving social skills and interactions for children with ASD and other disabilities. A sample of these studies is outlined in the following section.

Current Studies

Banda and Hart (2010) explain that "teaching social skills is one of the major goals for teachers and professionals working with persons with autism, irrespective of age group and level of severity" (p. 124). They paraphrase DiSalvo and Oswald (2002), who found that "providing direct instruction of social skills to persons with autism and training for peers without disabilities to teach both to respond to, and initiate conversations with, each other is essential to augment social skills" (as cited by Banda & Hart, 2010, p. 124). With this study, the researchers set out to see if "direct instruction of social skills in both students with autism and a peer would enhance social initiations, responses and sharing behaviours of students with autism during play activities" (p. 125).Their study included "two participants, both diagnosed with autism, and a peer" who "was recommended by her teacher to assist in the study because the peer displayed appropriate social skills in the classroom" (p. 125). One of the children with autism was described as high-functioning, however she exhibited "problem behaviours, such as screaming" and she "preferred to play alone" (p. 125). The other student also "displayed problem behaviours

including stereotypic behaviours (i.e., walking in circles in the classroom and swinging arms when walking), lack of socialisation with peers, inappropriate laughter, self-talk, crying, hitting others, pulling hair, and refusing to comply with the teacher's directions" (p. 125). This study was conducted in a "sectioned-off area of the participants' special education classroom" (p. 126). The researchers "examined three dependent variables: initiations, responses and sharing behaviors" (p. 126). The researchers started their investigation by observing and recording interactions amongst the participants in the designated area to set a baseline (pp. 126). They then began to initiate short training sessions for the participants where they explained the purpose of the session (to speak and respond to their peer while sharing toys), and modelled the desired behaviours (pp. 27). After training "a special education graduate student familiar with data collection methods sat outside of the designated area to collect data" and "recorded the incidents of peer initiations, responses and sharing instances…" (p. 127). The study revealed that "the direct instruction intervention method increased initiations in both participants", but that the "sharing behaviours, however, are mixed, and a functional relation cannot be established between the intervention and sharing behaviours" (p. 129). A limit of this study is that it only examined a small group of students (three in total) in a controlled environment. That being said, this study is still interesting as it highlights the importance of modeling and direct instruction of desired behaviours. Although the sharing behaviours did not necessarily improve, their social interaction skills did.

Hundert, Rowe, and Harrison (2014) claim that "one of the challenges in supporting young children with Autism Spectrum Disorder (ASD) in inclusive classrooms is the generalization of improved social behaviors" (p. 206). They go on to outline how a "number of interventions have been used in school settings to increase the peer interaction of children with

ASD with varying levels of success" (p. 206). In their study, Hundert et al. (2014) focused on the use of social scripts and "peer buddies" to increase the amount of interactive play of three participants with ASD. They state that because "of the practicality of its implementation by school staff, social script training has particular promise as an intervention that can be used in an inclusive setting" (p. 206). They also state that the use of "peer buddies" (where students with ASD are paired with typically developing peers) is another type of intervention that can be used for similar purposes in inclusive classrooms (pp. 207). All three of the children who participated in the study were "receiving one-on-one early intensive behavior intervention (EIBI) in their home" while "attending a general education preschool or kindergarten classroom on a part-time basis…" (p. 207). These participants, who were between the ages of 4 and 5 and attended different schools, were selected because each displayed a similar lack of communication with peers. During free play times "participants would display little or no occurrence of peer interaction… they tended to engage in stereotypic behaviors and isolate themselves from other children in the setting" (p. 208). In this study there were three trained observers who "noted whether participants were engaged in interactive play or not" (p. 208). These observations were conducted twice a day during 20 minute play sessions that were assigned either as a "training" session or a "generalization" session (pp. 209). During the "training" sessions, "theme-related play materials associated with a social script developed for that child were available…" (p. 208). The "generalization" session "was identical to training sessions except that the play material associated with a social script was not available and no interventions were introduced to increase the interactive play of participants" (p. 208). The authors state that a "non-concurrent multiple-baseline study across participants was used to evaluate the effects of interventions on the peer interaction of participants during both training and generalization sessions…" (p. 208) and that

data was "collected on the occurrence of participants' interactive play under typical conditions in each of the three classrooms" (p. 208). Initially, only two of the students received social script training. Social scripts are intended to "teach participating children with ASD and their typically developing peers a sequence of reciprocal play interactions that involved a play theme of strong interest to the child with ASD" (p. 209). The play script was introduced to the entire class while sitting in a circle together but it was made clear that the script was intended for the child with ASD. The class would watch a brief video together that taught the script, and after watching the video, volunteers would be asked to play the game with the child with ASD (pp. 209). The peer buddies program was introduced for the third participant, and in combination with the social scripts for the other two participants. The peer buddies training consisted of "a 20-min initial verbal presentation to the whole class by the teacher and play leader modeling: (a) how to initiate play… (b) how to accept a play invitation… and (c) how to maintain play behavior" (p. 209). The peer buddies program was introduced to one participant without the use of social scripts at first to see if "this condition by itself, without being combined with social script training was sufficient to produce generalized results" (p. 212). Script training was eventually introduced to this student at a later time. The researchers conclude that there was "an increase in the occurrence of peer interaction for each of the three participants with ASD when social script training alone was introduced during play sessions" but that "there was no increase in interactive play during generalization sessions" (p. 212). They also conclude that in their study, a "generalized increase in children's interactive play did not occur until it was combined with the peer buddies program" (p. 212). A limitation of this study is that it was only conducted with three participants who all exhibited similar behaviours (pp. 212). A possible implication of this

study is that multiple, targeted, and individualized interventions may be needed to address the

various needs of children with ASD (pp. 213).

In their study, Buggey, Hoomes, Sherberger, and Williams (2011) examined the use of

video self-modeling to improve the social initiations of preschoolers while playing outside on the

playground. They state the video self-modeling (VSM) "gives individuals the opportunity to

view themselves performing a task… using video software" and continue to say that VSM "holds

promise for individuals for ASD" (p. 25). The belief is that VSM allows the student to see

themselves successfully completing a task which will "promote self-efficacy" (p. 25). The

authors argue that VSM "has been shown to be an effective treatment across an extensive range

of behaviors, ages, and abilities" (p. 26). In this study there were four participants with

developmental disorders between the ages of 3 and 4 who were attending private preschools in a

small urban area (pp. 27). Two participants were in each class. The dependent variables in this

study were the "physical and vocal social initiations with peers in a natural environment

(playground at recess)" (p. 29). The four observers in this study "carried clipboards and moved

into the proximity of the child being observed so that verbalizations could be heard" (p. 29). The

independent variable in this study "was a 2.5 to 3.5 min video featuring each participant socially

interacting with peers" (p. 30). In the videos one or two typically developing peers participated

and were asked to make social initiations with the child with ASD. The "researchers mainly

followed the lead of the children, giving prompts to the peers at key times during play" (p. 30).

The videos were then edited by two of the researchers to show the child with ASD initiating and

sustaining play with peers. The students with ASD were then shown the videos, and the

researchers noted that all of the participants appeared to recognize themselves and appeared

happy to see themselves on the screen (pp. 30). Each participant was shown the video daily for

two weeks and after that they continued to be observed to see if the new skills were maintained over time. Based on the visual inspections of the data alone, the researchers found that 3 out of the 4 participants "made gains in the frequency of their social interactions…" (p. 33). They also conclude that their findings "suggest positive outcomes of using VSM to stimulate social interactions of preschoolers with ASD…" (p. 34), despite one child not progressing. They also point out that the limited number of participants is a major limitation to their findings.

As discussed, this research is interesting and useful to my study as it points to a variety of teaching strategies that involve peer collaboration and the development of specific skills using technology and other supports such as scripts. But what research has been done on how to support students with exceptionalities in more open-ended learning environments? The following two articles summarize what is known about supporting students with ASD and other learning difficulties using inquiry-based learning with a focus on science instruction.

Watt, Therrien, Kaldenberg, and Taylor (2013) claim that "the shift over the last decade from traditional textbook-based instruction in science to more of an inquiry-based approach has led to improved science education and has increased inclusion for students with disabilities" (p. 41). They point out that the "approaches to assessment and academic interventions described… support the underlying ideas outlined in the Universal Design for Learning (UDL) framework…" (p. 41) which CAST (2011) describes as a "framework that addresses the variability of learners in the classroom by promoting multiple means of representation, actions and expression, and engagement" (as cited by Watt et al., 2013, p. 41). Watt et al. (2013) compare two types of inquiry that exist, which are called "open" and "structured". In the "open" approach the students lead their own questioning and learning, while in the structured approach there is more direction, feedback, and support from the teacher (pp. 41). The authors argue that a more structured

approach is optimal for students with disabilities and that there are a range of supports teachers can use while implementing this type of inquiry (pp. 41). The first strategy listed is to ensure on-going collaboration with other teachers, especially the special education teacher who may be working with the student(s) in the class, as they may be able to "provide ideas on how to scaffold the lesson to meet the learning needs… of students within the classroom" (p. 42). Another instructional strategy is to "focus daily and weekly lessons around big ideas" which are "the major concepts a teacher wants students to learn by the end of the unit" (p. 42). This takes the focus away from more traditional methods and allows the teacher to incorporate a variety of instructional techniques that "allow students to learn and understand through numerous modalities embracing UDL concepts" (p. 42). In order to help the students learn and understand the big ideas of a unit, the teacher must also "keep in mind the specific material and vocabulary and find multiple ways to represent these foundational ideas to ensure a richer inquiry-based learning environment for all students" (p. 44). In order to achieve this, Watt et al. point to three instructional techniques: "multimodal presentations, graphic organizers, and mnemonic strategies" (p. 44). Multimodal presentations refer to the way that information is presented by the teacher. It is beneficial for all students in the class to interpret information in a variety of ways and the teacher can accomplish this with the use of graphs, models, diagrams, etc. (pp. 44). Graphic organizers are "visual devices" (p. 44) that can "help students connect science concepts visually, thereby helping them acquire and retain new science information" (p. 45). Finally, mnemonic devices can be used as they "connect language and ideas for functional use" (p. 45). One example includes learning new vocabulary with the use of rhyming words, images, or phrases (pp. 45). To conclude, the authors emphasize the importance of on-going, formative assessments to track the students' progress, provide feedback, and to "help students recognize

misconceptions and reinforce the core content" (p. 47). All of these strategies will help promote

a more inclusive learning environment that supports UDL principles (pp. 48).

In their study, Gebbels, Evans, and Murphy (2010) implemented an inquiry-based project

that "focused on local marine and coastal environments" (p. 139) with a class of 16 students with

"moderate learning difficulties" (p. 139) in north-east England. The authors discuss the declining

enrollment in science classes in secondary schools and argue that "laboratory-based science

should be complemented by out-of-school science that draws on the actual world…" (p. 139).

They argue that science courses should allow students to engage as active citizens in their

community in order to address local problems (pp. 139). The authors also address the challenges

faced by educators when implementing science in inclusive learning environments (pp. 139).

They argue that these students "should follow similar programs of learning to their age peers"

with "differentiation in learning tasks" that are still "challenging and significantly more than

'watered down' versions of those given to other members of the class" (p. 140). Their study

lasted for one year and included 24 teaching sessions (pp. 140). This project was part of a

collaboration with "Creative Partnerships, the Governments flagship creative learning program"

which was "designed to develop the skills of young people across England…" (p. 140). The goal

of the project was to "evaluate the effectiveness of an enquiry-based science programme taught

to a group of… children (aged 11 to 12 years), primarily with moderate learning difficulties, on

their interest in and attitude and motivation towards science" (p. 140). All of the 16 students in

the participating class had either moderate or severe learning disabilities (pp. 140). Over the span

of the project, the teachers and researchers engaged the students in a wide range of learning

opportunities that focused on conservation of a local coastline (pp. 140). For example, they

investigated the properties of sea water, visited a research vessel to collect plankton and observe

marine life, studied shells, conducted surveys with the public, developed recommendations for

conservation, and used the project as inspiration for art, music, literature, and dramatic activities.

They concluded the project by developing a brochure and making a public presentation on their

conservation recommendations with local councillors, the mayor, and radio and news stations in

attendance (pp. 141-143). To evaluate the effectiveness of this inquiry-based study, the authors

"designed a questionnaire to investigate the pupils' attitudes towards the teaching programme

and assess the extent to which these were different from their attitudes towards 'normal' lessons"

(p. 141). There were also a series of questions that focused on: "student's pride in their

achievements, their motivation towards science, their confidence to pass on their knowledge to

other people, their enjoyment of the programme, [and] the extent to which they developed the

bonds of friendship towards other members of the class…" (p. 141). The Creative Partner also

conducted their own independent evaluation to assess the effectiveness of the program, and

informal conversations with other teaching staff were also used as part of the overall evaluation

(pp. 141). The results of their study show that the programme was highly successful from the

perspective of the students, as positive responses were shown in all questionnaires in the areas of

engagement and enjoyment compared to 'normal' lessons (pp. 143). The authors conclude that

the participants "claimed a sense of pride in the programme's outcomes… motivation to learn

more science… and the confidence to tell people about their work" (p. 143). It was also clear that

the participants "believed the programme would have long-term benefits… and enabled them to

learn about local people and the local environment…" and also "helped them to form

friendships" (p. 143). The authors conclude that despite its apparent success "the reasons for the

success of the programme are undoubtedly complex, and cannot be attributed solely to one

particular factor" (p. 145). This research is important for my study as it highlights the importance

of using multimodal instructional approaches to engage all learners and seems to show the

benefits of inquiry-based learning as an educational approach. The assessment strategies used by

the authors also tie in well with the action-research approach I undertook in my own study.

The strategies and supports reviewed so far tie in with the key themes of 21st century

learning as they promote communicative skills and collaboration with peers. The question of

how to incorporate these skills in my primary classroom led to further research on the use of

dramatic skits and scripts to teach social skills for students with ASD and other exceptionalities,

and how this could be used with my entire class using the UDL approach.

Kempe and Tissot (2012) studied the "use of drama to teach social skills in a special

school setting for students with autism" (p. 97). They acknowledge that while:

> Current thinking on the best way to attain high academic standards for all learners is
>
> through inclusive education… the integration of pupils with special needs into
>
> mainstream education is not always regarded as being wholly or universally positive,
>
> with additional demands being placed on teaching staff to meet the needs of all learners
>
> in mixed settings. (p. 97)

So, while their study was conducted in a special school setting, the authors set out to maintain

"high expectations, learning from peers, [and] diverse curriculum opportunities" while exploring

"how a supportive… climate was created for two girls with autism… through the use of drama

with a group of non-autistic peers" (p. 97). Their study was conducted in south England in a

class of 12 students, most of whom had moderate learning difficulties. Two of the girls were

diagnosed with ASD (pp. 98). The project involved 13 sessions spread out over five months and

concluded with a day of filming the final dramatic performance (pp. 98). The aim of this study

was to enhance the students' creative and communicative abilities, as they argue that "drama can

provide a context in which skills can be practiced and learned…" (p. 98). Because their dramatic

experience was limited, the researchers and teachers taught the students a wide range of different

dramatic techniques to help them develop their dramatic skills (pp. 98). In order to collect data,

they depended on qualitative methods such as note taking, a collaborative research journal, and

staff and student feedback (pp. 99). Throughout the span of the project, the teacher and students

collaborated together "as participants while simultaneously making, performing, and reflecting

on an evolving 'play'" (p. 99). After the initial meeting it was decided that "the goal for both

girls [with ASD] would be to build their confidence in working collaboratively and actively

contributing their own ideas to the emerging drama" (p. 99). The class ended up creating a

fictional character named Lauren who was the basis of their dramatic skits (p. 99). For example,

they imagined that Lauren was a new student in the class and had to act out different

conversations and scenarios with her. The authors explain that throughout this process both of

the girls successfully interacted with their classmates and were engaged in the dramatic skits.

Kempe and Tissot (2012) point out that while there are challenges with drama (e.g. it is

underused, staff may not be comfortable or experienced enough), the use of drama provided an

opportunity for students with ASD to practice important social skills (pp. 101). They conclude

that "through the process of interacting and co-creating a dramatic context a 'safe space' was

established which enabled two young women with autism to practise transferable social skills"

(p. 101).

　　　　Pecaski (2012) also emphasizes the potential benefits of creative drama in the classroom.

She argues that "young children learn best through cooperative play that encourages them to

explore and extend areas of child-led interest" (p. 407). She goes on to say that by "engaging in

collaborative problem-solving opportunities, children realize that every person has an important,

unique point of view" and that it is "essential for children to practice problem solving strategies

in order to gain the skills necessary to confidently and proactively resolve social conflicts" (p.

407). She claims that *sociodrama* is a tool that students can use to take on roles and act of

scenarios in order to help them solve everyday problems (pp. 407). Pecaski (2012) argues that

role-playing "can promote rich learning in children as it engages their emotional, cognitive, and

verbal skills through active play that explores real life personal feelings and situations" (p. 408).

She states that it is important to establish a safe, trustworthy, and caring learning environment

prior to engaging in sociodrama to ensure that all students feel comfortable (pp. 408).

The evidence that sociodramatic skits, inquiry-based projects that focus on local issues,

multimodal presentations, video modeling, scripts, and peer support can be used to enhance

social skills and engagement while helping students to problem-solve and collaborate inspired

me to use them as teaching strategies in my class. The question of how I could apply these

various strategies with all of the students in my class led to me the UDL approach.

Related Research

It is evident in the previous studies that there are a wide range of methods and strategies

teachers can use to ensure the success of students with social interaction difficulties in inclusive

classroom settings. It appears that these methods have the potential to assist all students in the

classroom, not just the student(s) with the challenges. This approach to education is known as

Universal Design for Learning. Katz (2013) states that UDL is a "framework for creating

inclusive classrooms" that "focuses on ensuring that the social and academic life of the

classroom is accessible for diverse learners…" (p. 1). Katz (2012) begins her book by explaining

UDL's link to architecture and design. She states that in the "late 1980s to early 1990s, architects

were exploring the concept of accessibility to accommodate people with disabilities" (p. 1).

Unfortunately, many buildings at the time weren't accessible for everyone (e.g. a person with a disability in a wheelchair) which was not fair as entrances were designed "to evoke a particular emotional experience…" (p. 1). Katz (2012) explains how architects began to "push for buildings to be designed so that all people could enter a structure at the same point" and how they eventually "discovered that many people benefited from the additional options" (p. 13) such as ramps, elevators, or escalators. She argues that this is a key part of UDL – that certain supports and strategies will not only help students with disabilities, but other students in the class as well (pp. 13). Katz (2012) goes on to ask the important question of "how do we diversify our curriculum, instruction, and assessment in a way that students who have previously not been able to participate can be actively involved – without dumbing down the curriculum?" (p. 14). She argues that in order to do this, "we must teach in a variety of ways, give students choice within their learning, and give them opportunities to show what they know in a variety of ways" (p. 16).

In my study I set out to utilize these UDL principles when implementing new teaching strategies, as I wanted to support the students with learning difficulties and the rest of the class simultaneously.

Identified Gaps

In the BC Ministry of Education (2015) documents created to provide information on the new curriculum, it is evident that inclusion as a principle is valued:

> British Columbia promotes an inclusive education system in which student with special needs are fully participating members of a community of learners. Inclusion describes the principle that all students are entitled to equitable access to learning, achievement, and the pursuit of excellence in all aspects of their educational programs. (p. 10)

There is also some information provided on how to support students with exceptionalities:

Government policy supports the principles of inclusion of all students. Students with

special and/or ELL needs can achieve the prescribed learning standards through the

strategic use of personalized instruction and assessment methods. Some students with

special needs may require program adaptation or modification to facilitate their

achievement of the learning standards in this curriculum. (p. 9)

They go on to provide a list of examples which can be implemented in adapted or modified

programs, such as:

- Digital/audio texts or peer helper to assist with assigned readings

- Access to assistive tools/technology

- Alternative ways of demonstrating learning standards

- Graphic organizers/strategy lists to assist students

- Extended time to complete assignments or tests

- Support to develop and practice study skills

- Pre-teaching key vocabulary or concepts; multiple exposure to materials

- Working on select learning standards from different grade levels

- Specify personal support (by peers or educational assistants, for example)

- Set individualized goals that may consider learning standards but are developed to

  suit the student's special needs

- Modify activities by providing parallel ones for students with special needs (p. 9)

This list incorporates a variety of useful strategies which would be helpful in an inclusive

classroom. What is lacking, however, is any specific information on how to support students

with special needs to develop their ability to communicate more effectively while working

collaboratively with others. These are essential skills for success in inquiry-based learning and the development of 21st century skills.

        Based on the research I have conducted, there seems to be a lot of information on how to support students with special needs in inclusive classrooms. I have also found many articles and books on how to incorporate inquiry-based learning. What seems to be missing is how to bridge these two things together; how to support all students in inclusive classroom settings using inquiry-based learning and the new curricular model in British Columbia. There is some research, as I summarized previously, that focuses on how to support students with learning disabilities in inquiry-based science environments. During my study I chose teaching strategies that were inspired by these studies while using an UDL approach and engaging in the inquiry-based learning process. I developed assessment strategies to monitor the progress of all students in the class in order to determine which strategies were most effective, and why. It is my hope that the findings of my study will help me to better understand how to support all students while implementing inquiry-based learning in my own classroom. While not generalizable, the findings may be transferable to other teachers across the province who are in similar situations.

Chapter 3

Research Methods

Methodology

This study was conducted with a cyclical action research process in order to explore the

research question: *What strategies can I use to improve inquiry-based learning for all students in*

my inclusive classroom? This included identifying a problem, planning potential ways to address

that problem, carrying out a strategy, and finally evaluating and assessing its effectiveness before

beginning the cycle again (Cohen, Manion, & Morrison, 2007, p. 355). After completing these

cycles, I analyzed the data and developed theories based on the research, modified my teaching

practice as a result, and wrote this report to share my findings (McNiff, 2016, pp. 22-23). This

form of research allowed me to become a participant as well as a researcher, in order to develop

and enhance my own practice. This approach is supported by McNiff and Whitehead (2009):

> Action research is about two things: action (what you do) and research (how you learn
>
> about and explain what you do). The action aspect of action research is about improving
>
> practice. The research aspect is about creating knowledge about practice. The knowledge
>
> created is your knowledge of your practice. (p. 5)

As stated above, with this type of research I sought to create new knowledge for myself as a

practitioner in order to inform and strengthen the way I teach, as "the highest aim of all research,

including action research, is to create original knowledge and explain its use value in personal,

social, organisational or political contexts (McNiff, 2016). With this study I wished to apply the

original knowledge I created to my own personal practice, as part of my on-going journey as a

life-long learner. As McNiff (2016) states:

> In action research you use your learning to improve your practices for your own and
>
> others' benefit. You then offer your personal theory of practice to explain and justify
>
> what you have done. The aim of an action research project is not to reach successful
>
> closure or achieve externally imposed targets or 'outcomes'; the aim is to show personal
>
> and collective processes of learning with potential for generating personal theories of
>
> practice. (p. 26)

With this research I sought to validate any claims to new knowledge that I made as this is a

critical aspect of any type of research, including action research. McNiff (2016) states that

practitioners "will be able to explain how and why the improvement has happened and how the

validity of the claim has been tested. The research therefore involves offering validated

explanations for ongoing practice improvement" (p. 23).

With this study, I set out to determine how I could improve my own practice as an

educator using inquiry-based learning in my inclusive classroom. Overall, my focus was on my

personal values as I am choosing to teach in an inclusive classroom environment. According to

Katz (2012) it is critical for educators to embrace diversity and inclusion, as all students have the

right to be integrated and honoured for their individual strengths:

> It is important that we recognize that *diversity* does not refer to children with exceptional
>
> needs, nor does it refer only to ethnic, racial, or linguistic diversity. Diversity
>
> encompasses all children – their diverse personalities, ethnicities, languages, family
>
> structures, and learning styles all contribute to the makeup of a diverse classroom. (p. 3)

As a new educator, I know that I have more to learn in order to ensure that I am adequately

supporting all students in my inclusive classroom. I tested my belief that action research was the

most appropriate research method for me to use in this study, as it was my goal to assess my own

teaching strategies in order to improve my practice. It is my hope that this research will allow me to meets the needs of diverse learners in my classroom. Although I recognize that this is a personal journey for myself as a practitioner, it is my hope that the personal knowledge I create will be transferable to other teachers in similar situations.

Participants

This study was conducted in a primary classroom in a rural community in eastern British Columbia. This is a small K-7 school with just under 150 students. The study was conducted in a classroom of twenty students with a range of abilities and exceptionalities. At the beginning of the school year I recruited student participation by requesting assent from parents during one-on-one parent interviews. I let parents know that my intention with the study was on improving my own practice as an educator. I emphasized that my focus was on what teaching strategies worked well to support all learning styles while using the new curriculum. I explained how we would engage in an inquiry project based on the salmon life cycle and explained how the inquiry process worked. I let them know that the students would be helping me by providing me with feedback on what they thought was working well or what they liked/didn't like about the strategies that I used. I also let them know that they would be self-assessing their own learning throughout the process. I ensured them that the confidentiality of students would be kept as I wouldn't be using any student names or naming the school itself. At the end of the meeting I provided parents with assent letters and envelopes and asked them to mail it or drop it off at the office for the school secretary. I explained that this would ensure I was unaware of participants until after the study was completed (in order to address potential ethical concerns, such as spending all my time with students who had been given assent). The school secretary kept the envelopes in a confidential folder at the office until the study was completed in December. In

total I received assent from 16/20 parents and/or guardians to allow their children to participate in the study.

Even though I engaged in this study with a class of twenty students, the principal participant in this study was myself. The focus of my research was on what I can do to improve inquiry-based learning experiences for all students in my classroom. I focused on implementing research-based teaching strategies followed by assessments to determine whether or not the strategies are working. All of the data I collected provided me with information on my own teaching practice. In terms of gathering information, I did not ask the students to do anything out of the ordinary. I modelled and demonstrated different techniques, and the students carried out the activity (e.g. group project) as they normally would. The hope was that my learning and the actions I took during this study would benefit all students, but there were no particular benefits to those who assented to participate. As there were potential risks of coercion, favouritism, identification, etc. with an action research study, all students participated in all activities, and I didn't know which students assented to participate until after the study was concluded. In this write up, I have been very careful to ensure the confidentiality of participants.

Ethical Issues

As an educator in a small town, it is critical that I ensure the confidentiality of the students in my class. In rural communities it may be easier for people to know who I am speaking about in my writing, even if my aim is to keep the identity of students confidential. To address this, I used the UDL (Universal Design for Learning) model in order to support all students in the classroom simultaneously. Katz (2012) states that "*inclusion* is not just about children with special needs; it is concerned with all students accessing their right to the very best education regardless of race, religion, language, socioeconomic status, sexual orientation, or

disability" (p. 9). Using this model helped to ensure confidentiality of the students in my class, as

I did not be focus on any one particular student or exceptionality. Rather, the focus was on

improving my own practice and reflecting on whether or not the strategies I utilized were

effective for *all* the students in my classroom. So for example, even if I used a strategy that has

been shown to support students with autism, my reflection on its effectiveness was based on

results of the entire class (as opposed to one student). With this approach, it is my hope that the

confidentiality of students in the classroom has been maintained.

Research Process

I started this process by observing the students in my class and identifying their needs. As

is typically the case in general education classrooms, there were some students in my class with

communication difficulties. This led to my focus on how to improve social communication and

interaction while collaborating in inquiry groups. Based on the literature I researched, I chose

specific strategies and implemented them within my classroom. After implementing the strategy,

I documented the process in a researcher journal that was framed around specific questions. I

also collected data with a focus on observations, student questionnaires, self-assessments, and

interviews in order to determine the effectiveness of the strategies. I then re-assessed the needs of

the class in order to prepare for the next cycle. I conducted three cycles throughout the first term

of the school year before concluding my research to write and share my findings.

Data Collection

I collected data throughout three cycles of action research over a period of four months

(September – December 2016). The main source of my data collection was with a researcher

journal where I reflected on daily lessons and activities, learning goals, and general reactions of

students. In this journal I asked myself questions such as:

- What are my learning goals?

- What strategy did I use? How was it implemented?

- What were the general student responses to the activities?

- What would I change next time?

These questions provided me with a focus when I reflected on the lessons at the end of each school day. In my journal I also reflected generally on how groups were interacting with each other, and whether or not they were attempting to use strategies that we discussed. McNiff and Whitehead (2009) argue that:

> Possibly the most powerful form of data… is in those instances when you are able to comment critically on your own processes of learning, when you demonstrate reflexive critique, and show how and why you have deliberately changed your thinking, informed by your values. Doing this involves a different form of data gathering, which usually takes the form of self-reflection. Possibly the best way of monitoring how you are developing the capacity for self-reflection is by keeping a learning journal. (p. 145)

They go on to state that "by monitoring your learning in this way, you are able to use the diary entries as data that show the processes involved in your learning, and how they potentially influence new actions (p. 146).

I also collected data from the students in the form of one-on-one interviews, questionnaires, and child-friendly self-assessments (see Appendix A-C). For example, when assessing the effectiveness of a social-interaction strategy (the use of a Knowledge Building Circle) intended to improve speaking and listening skills during group work, I included questions such as:

- I listened to the comments of my classmates (yes/no)

- I was able to share my ideas during the group activity (yes/no)

- I made sure everyone in my group had a turn to speak (yes/no)

I also scribed their responses after asking various questions on what they thought was working

well and what areas they feel they still need to work on. For example, after recording a dramatic

skit together about how to work in a group, I asked the following questions:

- Did making a video help you work together as a group? Why/Why not?

- What do you think would help your group improve? Why do you think that?

- What is something that you think you can try differently next time?

I asked these questions during informal one-on-one interviews, which is something I would

normally do as part of my formative assessment. McNiff and Whitehead (2009) describe

interviews as a live method of data collection where "you interview people to get their

impressions of what is happening and their responses to it" (p. 149). Receiving feedback directly

from the students was beneficial as it provided me with another perspective on whether or not the

students were learning the skills I was trying to teach. During the interview process I also

gathered quotes based on written notes as another way of collecting data.

Throughout the process I collected and analyzed examples of students work such as

group-created lists, posters, and videos. In addition, I used a student questionnaire to track the

growth of the students' ability to communicate effectively in groups after teaching them how to

use scripts and dramatic skits to engage effectively in group work (see Appendix B-C). I also

used their responses as feedback on what learning experiences and activities and/or strategies

stood out for them.

My overall plan was to incorporate effective formative assessment strategies in order to

provide students with feedback and to receive on-going feedback from them. This allowed me to determine the next steps when preparing to move on to the next cycle.

Data Analysis and Interpretation

When analyzing the data, my goal was to see if the strategies I used were effective. I wanted to determine if the communicative and collaborative skills of the students improved over the course of the study, and whether or not these skills led to the "deeper learning" goals imbedded in inquiry-based learning and the new curriculum. I reflected generally on group work and relied on student feedback and formative assessments to provide data for interpretation. The use of interviewing, self-assessments, and questionnaires with the students helped with triangulation, which is what Efron and Ravid (2013) describe as "the practice of relying on more than one source of data by using multiple methods or obtaining varied perspectives" (p. 70). For example, during the interviews with the students I asked questions based on their experiences during group work as opposed to simply relying on my own observations and interpretations. This allowed me to "get multiple perspectives on issues" (McNiff, 2016, p. 183). The issues in this case were whether or not the strategies I implemented were helping to develop the communication and collaborative skills of the students in my class, and whether or not these skills were leading to deeper, more meaningful learning on the topics studied.

In this study I depended on my own analysis and interpretation of the data collected. McNiff and Whitehead (2009) state that "many people… have been able to show how they can make judgements about the quality of their research, by producing evidence that shows their understanding of epistemological issues and their appreciation of the need for methodological rigour" (p. 177). That being said, McNiff (2016) points out how "taking one's values as criteria and standards for making judgements about the quality of practices is problematic. It is grounded

in the idea that one's values are fully justified and unquestionable, which is not and should not be

the case" (p. 182). McNiff (2016) goes on to state that "while at a technical level personal values

may stand automatically as criteria and standards, at a real-life level they cannot. Values must be

negotiated and justified with others before being claimed as viable criteria and standards" (p.

182). While I understand the importance of this, in my study I still relied on my own analysis and

interpretation of the data as I was the sole researcher involved in the project. However, I was

able to create triangulation by including the perspectives of the students in my class. It is my

hope that their perspectives will help to validate the claims of knowledge that I make.

Application of Understandings

I will apply the final knowledge from this study to my future practice. It is my hope that

my findings will be applicable to other educators across the province as they grapple with

implementing the new curriculum and inquiry-based learning in inclusive classrooms.

Limitations and Potential Value

As my research is mainly qualitative in nature, I understand that there are limitations to

the knowledge created in my study. I conducted this study independently in my own classroom. I

depended on my own observations, reflections, and interpretations of the data with some

triangulation provided with the use of student input. Due to the highly subjective nature of this

study, I know that my findings will not be generalizable to other teachers and other classroom

environments. Efron and Ravid (2013) state that:

> Schools are complex, socially constructed institutions that comprise multiple realities.
>
> The meaning assigned to school experience is varied, shaped by individuals' subjective
>
> interpretations, and influenced by their personal, cultural, and historical background.
>
> Actions, behaviors, expectations, norms, and beliefs are strongly influenced by the

uniqueness of each context and perceived differently by each individual. Thus, qualitative

research results cannot be generalized across time and locations. (p. 40)

That being said, the potential value of this study is in my own personal practice, as I have learned

how to implement a variety of teaching strategies that I can apply in the future. It is my hope that

my findings will be transferable to other educators in the province, as perhaps the teaching

strategies that were successful in my class will also be successful in other classrooms in various

grades if other teachers are willing to implement them.

Chapter 4

Findings

Overview

This chapter outlines how I set out to answer my research question: *What strategies can I implement to improve inquiry-based learning for all students in my inclusive classroom?* It explains how I implemented Knowledge Building Circles, multimodal forms of instruction, and adapted forms of sociodramatic skits and video modeling with a UDL (Katz, 2012) approach to help all of the students engage in the inquiry process in a meaningful way before completing a collaborative group project. Key themes emerged around: speaking and listening skills, ways of learning, means of expression, fostering collaboration, the development of higher order thinking skills, student engagement, and experiential learning.

First Action Research Cycle

In order to answer my research question: *What strategies can I implement to improve inquiry-based learning for all students in my inclusive classroom?* I utilized the action research process. This process allowed me to make observations in my class, identify potential problems, plan the actions (which is this case were effective teaching strategies based on my research), carry them out, and reflect on their overall effectiveness with collected data. I planned to go through the process three times between September and December of 2016, and throughout this time I collected data with daily reflections in my researcher journal. With the journal I explored my teaching and learning goals and assessed their effectiveness based on the general responses of the students in the class and my observations. I also collected data in the form of student feedback with one-on-one interviews (questionnaires, written responses, yes or no questions).

With this process in mind, I started my first cycle of research in September 2016.

Throughout this time frame I observed the students in my class and noticed that there was a wide range of academic and social abilities. I wanted to promote an inclusive and supportive learning environment early on, so I used the learning styles questionnaire from the Three Blocks of UDL book (Katz, 2012) to emphasize that we all have our own strengths and different learning styles. The intention of this was to create a positive learning environment where all students felt valued and included. I continued to observe and reflect on the needs of the students throughout the month as we engaged in typical activities done at the beginning of year (e.g. establishing classroom expectations and daily routines). After a month of observing and reflecting I determined that the students in my class would benefit from explicit skill instruction on how to share their own ideas and listen to the ideas of others in a collaborative way (e.g. many students often interrupted each other or the teacher during class discussions or were not participating at all). My goal was for each student in the class to be able to share their own ideas and build on their own knowledge by listening and learning from others. Additionally, I hoped this would contribute to more meaningful learning throughout the inquiry process. At this point I decided I would start the inquiry project and reflect on each lesson and activity with my researcher journal to begin collecting data.

I started by analyzing the science curriculum for Grade 2. The new format divides each subject area into three sections: the *Big Ideas,* the *Curricular Competencies* (what students are expected to do) and the *Content* (what students are expected to know) (BC's New Curriculum, n.d.). One of the *Big Ideas* of the Grade 2 science curriculum is "Living things have life cycles adapted to their environment" (BC's New Curriculum, n.d.). In terms of content, students are expected to learn about the "metamorphic and non-metamorphic life cycles of different organisms" (BC's New Curriculum, n.d.). The *Curricular Competencies* involve a range of skills

involving: asking questions, predicting, processing and analyzing information, evaluating, applying, innovating, and communicating. These skills are related to what Bloom (1956) considered higher order thinking skills. Sweet, Blythe, and Carpenter (2016) describe how:

> Back in 1956, Benjamin Bloom collaborated with four other educational psychologists to publish their *Taxonomy of Educational Objectives*. In the cognitive domain, they listed six skills in ascending order—knowledge, comprehension, application, analysis, synthesis, and evaluation—what most educators now refer to as Bloom's Taxonomy or Bloom's Pyramid. (p. 7)

These six skills were later adapted into a pyramid form, which has also been adapted slightly. It is now known as "Bloom's Revised Pyramid and includes remembering, understanding, applying, analyzing, evaluating, and creating" (Sweet, Blythe, and Carpenter, 2016, p. 8). Remembering and understanding are generally considered lower order thinking skills, while applying, analyzing, evaluating, and creating are considered higher order thinking skills (Sweet, Blythe, and Carpenter, 2016, pp. 8). It seems that the *Curricular Competencies* in the new curriculum were modeled after this pyramid, as students are now expected to engage in these skills. After deliberating on this, I decided to focus on the questioning and communication competencies, as they seemed to fit well with the inquiry process. Specifically, I chose the following competencies from the science curriculum:

- Demonstrate curiosity and a sense of wonder about the world

- Observe objects and events in familiar contexts

- Ask questions about familiar objects and events

- Communicate observations and ideas using oral or written language, drawing, or role-play (BC's New Curriculum, n.d.)

After completing this research, I decided to focus our study on the salmon life cycle. One reason I was drawn to this topic is because we would be able to observe the spawning salmon locally in an outdoor setting. As stated previously, having a shared, outdoor, group learning experience is recommended by Kozak and Elliot (2014) as a way to initiate inquiry projects. I also decided to incorporate the Knowledge Building Circle (KBC). I chose this strategy as it is recommended as a method to increase dialogue and communication amongst the students in the class while engaging in inquiry-based projects. Chiarotto (2011) states that "Knowledge Building Discourse builds upon a tradition of classroom discussion, with a focus on deepening students' understanding through increased exposure to the diverse perspectives and ideas of the class" (p. 11). In addition to encouraging the students to listen to each other and share ideas, the KBC also allowed the students to share their own individual questions regarding salmon – which is another important aspect of the inquiry learning process and the new BC curriculum. Chiarotto (2011) states that the KBC "is a class discussion time that is specifically reserved for working out students' emergent questions and ideas, rather than a teacher-directed forum for eliciting 'correct' answers to curriculum-based questions" (p. 11). Allowing students to formulate their own questions using the KBC model also seems to fit within Blessinger and Carfora's (2015) argument that:

> In the process of learning to take more responsibility for their own learning by engaging in a process of inquiry, creative learning (the essence of higher order thinking) is more likely to be cultivated because students are provided with the opportunity (and responsibility) to answer questions and solve problems themselves or in collaboration with their fellow learners. (p. 8)

The KBC provides an opportunity for students to share ideas and ask questions in a collaborative way. It was my hope that this would lead to the higher order thinking skills embedded in the new curriculum. As opposed to solely depending on information (or correct answers) from the classroom teacher or textbook, the students would be pursuing their own questions while learning from each other.

We started the project in October 2016 with a field trip to a local creek to view the salmon spawning. This trip was led by a local wildlife biologist. On this trip we learned about the history of salmon in the area and how the numbers have dwindled immensely over time. We viewed the salmon in the creek and our guide taught us about the salmon life cycle and how they lay and fertilize their eggs. Afterwards we played a life-cycle game that taught us about the challenges faced by salmon over the course of their lives. To conclude, our guide dissected a salmon which had eggs inside. The intention of this shared experience was to "hook' the students into the topic, to increase engagement and interest, and to allow them to start generating their own questions.

The following day, we had our first Knowledge Building Circle. My goal for this lesson was to teach the students how to conduct a KBC, and to generate a list of inquiry questions based on the salmon life cycle. We sat in a circle and I told them that only one person was allowed to speak at a time. I explained that if any of them wanted to speak, they could put their hand into the circle and wait. When the person speaking was finished, that person was responsible for choosing someone with their hand in to speak next. These rules are a key feature of the KBC process and has links to Aboriginal perspectives on learning. Chiarotto (2011) states that the "Knowledge Building Circle is not a novel idea. It aligns with the wisdom of a time-honoured tradition of Indigenous cultures, the Talking Circle, in which individuals take turns sharing

ideas" (p. 13). As previously discussed, it was my hope that this strategy would allow the

students to not only generate questions, but to learn how to listen to each other respectfully in

order to learn from each other. In order to practice this technique, I asked the class to go in a

circle so that everyone had a turn to put their hand in, get chosen, and share their ideas. When it

was their turn to speak, I asked them to share a question they had based on the field trip the

previous day. I sat with them in the circle with a big piece of chart paper and recorded their ideas

as we went around to each student. The students shared a wide range of questions, such as:

- How do salmon breathe underwater?

- How do salmon breathe if their gills are outside of their body?

- Do salmon hibernate?

- Why do salmon fight over gravel?

- How do salmon swim upstream?

- How do salmon swim up waterfalls?

- How do the males fertilize the eggs?

- Do they swim away from their eggs after? Or do they watch over them?

When analyzing the types of questions asked, it became clear that most of the questions were

'fact-based' or empirical questions that started with "How" or "Do". These types of questions are

more content-based and can be answered quite easily. Only one student asked a question that

started with "Why". This type of question is more challenging to answer and requires a deeper

understanding of the subject-matter in order to answer. This type of question reflects the goals of

inquiry-based learning and the new curriculum. When reflecting on this, I concluded that perhaps

the students were asking more 'fact-based' questions as this has been the dominant teaching (and

learning) style that they're accustomed to. I decided to analyze their responses over time to

determine if their questions would change as we continued to engage in more open-ended learning experiences.

In order to begin addressing some of the student's questions, I began to develop a variety of activities to help them learn more about salmon. One important aspect of IBL is for students to engage in research in order to begin answering the questions that they formulate. As the students in my class are primary students (with many still learning to read), I knew that this process would have to be guided in order for them to be successful. I chose a variety of multimodal learning experiences to enhance the learning opportunities for all students. This concept, as summarized previously, is recommended as a teaching strategy by Watt et al. (2013) as a way to present the information in multiple ways in order to teach the "big ideas" of the topic to reach all of the diverse learners in the class. Watt et al. (2013) state that "the repetition provided by the multiple representations increases retention of core concepts or big ideas, specifically for students with disabilities…" (p. 44). Katz (2012) also argues that using "an instructional framework that respects multiple intelligences and accommodates multimodal learning and assessment will stimulate all the brain's major areas and methods of processing" and that "differentiating instruction, whether through differentiated content, process, or product, allows diverse learners to work through their strengths, develop skills in areas of challenge, and learn at their own unique developmental pace" (p. 22). The following examples outline how I incorporated differentiated content while continuing to engage in KBCs throughout the first action research cycle.

After the first KBC I introduced salmon life cycle puppets as a play centre. I chose not to explain what they different stages were (e.g. egg, alevin, smolt) and instead just stated that the puppets represented the life cycle of a salmon. The goal of the puppets was to help initiate more

questions that had to do with the life cycle to guide the learning back to the curricular

expectations. The puppets generated a lot of interest and further questions form the students and

many of them chose to play with the puppets during centres. The students' responses included

excitement, engagement, curiosity, and more questioning; however, I did notice some off-task

behaviours with the puppets that deterred from the intention of the activity. For example, some

of the students were throwing the puppets at each other and disrupting other students around

them. This type of disruption could also be displayed by students with exceptional needs when

implementing inquiry in inclusive classroom settings. Scattone, Wilczynski, Edwards, and

Rabian (2002) state that, "disruptive behavior can interfere with the education of both the child

creating the disruption and other children who share the class" (p. 535). Harris, Milich, Corbitt,

& Hoover (1992) state that "it may also interfere with the social interactions of the child

disrupting the class because this child is often identified as "troublesome" or "different"…" (as

cited by Scattone et al., 2002, p. 535). In order to address the behaviours demonstrated in my

class, I explained to the students that the puppets were not intended to be used that way. In my

journal, I reflected on what I would do differently next time, and concluded that when

implementing new tools/methods (in this case, a puppet), it is important for some students to

receive direct modeling on how to use the tool. It is also important for me as a teacher to set clear

expectations beforehand to help avoid such disruptions.

  The following day I initiated a second KBC. The learning goal of this KBC was to

introduce the concept of a life cycle and to let the students practice putting their hand in the

circle when they wanted to speak. I also wanted to introduce some of the challenges that salmon

face when they migrate (a concept that was introduced during our field trip). We sat in a circle

together after our quiet reading time after lunch. I introduced the question, "What is a life

cycle?" and explained that anyone could put their hand in at any time to share (this was different

from when we all took turns going in a circle during the first KBC). I also explained that students

could pose questions they had about life cycles as well. Once again I recorded their ideas on

chart paper. Some examples include:

- Just like salmon, butterflies have a difficult life cycle. They start as eggs, then turn to

    caterpillars, then cocoons, then butterflies!

- Why do we change in life cycles?

- Do all creatures change?

- How do salmon get to the sea?

- How do salmon break out of their eggs?

During this KBC I observed that most of the students stayed on topic, waited for their turn to

speak, and shared their existing knowledge which led to more questions. In addition, the types of

questions that were asked seemed to expand to include higher order thinking as opposed to the

'fact-based' questions compiled during our first KBC. This was exciting as it shows more

students were starting to think more deeply and ask questions that required more thought and

interpretation. This type of learning coincides with the goals of IBL and the new curriculum.

I did notice that with this more open-ended format (where sharing was optional) there

was less participation from the students (there were 12 responses out of a possible 20 students).

There are a multitude of different explanations for this. A students' lack of verbal participation

does not necessarily mean that they aren't engaged or interested in the topic. Perhaps some of the

students were thinking about their peers' responses and needed more time to reflect and process.

Alternatively, perhaps some students felt shy or that they didn't know enough to contribute to the

topic. It is also possible that this type of instructional format (which relied on verbal expression)

was not ideal for some of the students. For example, a student with autism may have difficulties with expressive language. Teachers are encouraged to "take responsibility for finding a way to access the student's need for communication. Many people with autism have word retrieval issues - even if they know an answer, they may not be able to come up with the words" and that it is important to "offer visual supports, cue cards, multiple choice options…" ("Supporting Learning", 2012, p. 82). In addition, whole-group discussions are not always ideal for students with autism. Leach and Duffy (2009) state that:

> For example, if a child with ASD is in a class in which whole-group instruction makes up the typical instructional format of the class, this format likely will not provide enough variety to keep the student engaged. Because of language and social interaction difficulties that students with ASD have, they often are simply unable to participate in the sit and get method of instruction. (p. 33)

Overall, there appears to be potential pros and cons to using this approach. Even though some students were quiet during this session, the majority of students still participated and the types of questioning began to shift towards deeper thinking as opposed to quick responses. However, I also noticed that it was difficult for many of the students to sit for too long as their stamina at this time of the day was low. In my journal I reflected that while some students appeared more engaged, many of the students were restless and fidgety by the end. When reflecting on this portion of the lesson, I determined that the length of the KBC could be kept shorter in the future as a way to better hold their attention.

After the KBC was completed, I took them into the computer lab to play an online game called Egg and Spawn Race (Wildscreen Arkive, n.d.). In this game the player gets to be the salmon and learns about the various challenges during migration, such as fishing nets and other

predators. There was very high engagement and interest in the computer game compared to when we were sitting together in the KBC. For example, I observed that all of the students in the class played the game with enthusiasm. Many of the students excitedly shared what was happening with the person beside them. Some of the students also made statements about the challenges the salmon had in the game, which was a reflection of their growing understanding of the salmon life cycle. The success of this strategy supports the UDL concept that multiple modes of instructional formats are needed to keep students engaged and address all of the various learning styles (and abilities) in the class.

The following week we had our third KBC. I explained that once again we would have open-ended sharing but that I still expected everyone to put their hand in when they wanted to speak and wait for their turn. The goal of this KBC was to ask the students to share how they think they can start answering their questions. This proposition to the students required them to engage with higher order thinking skills, as they were required to think beyond 'fact-based' responses and actually propose their own original ideas. Initially, this appeared to be a difficult task. I reflected in my journal that some students seemed to come up with their own ideas after they heard responses from others, which was exciting as they were learning from the examples established by their peers. Eventually they came up with an excellent list of how to start answering their questions, including:

- More Knowledge Building Circles

- More field trips

- Go fishing and dissect them

- Use an iPad or computer to look up information

- Go to my Grandpa ("Ask an expert")

- Study them with a paper and pen

- Look it up in a book

- Watch a video

- Play a game

While they were able to come up with this great list, there were some off-task behaviours from some of the students in the class (e.g. rolling around inside the circle) which led to some frustration for the other students. I had intended to keep this KBC shorter because of what happened during the previous time we met, but due to the behaviours it ended up going longer than I planned. As a result, many of the students appeared tired and/or bored by the end. Once again, the reason for these off-task behaviours is difficult to pinpoint. Perhaps the child was simply bored or uninterested in the topic. However, this type of behaviour does relate back to my concerns about inquiry and inclusion for students with special needs. Katz (2013) points out that some "students with learning disabilities… experience high levels of frustration and anxiety because they are unable to express their thinking or keep up with their peers, and are afraid they will be humiliated if found out. They often, therefore, prefer to be seen as the class clown…" (p. 100). Katz (2013) also states that "differentiating instruction and providing opportunities for this student to be successful will reduce such behaviour" (p. 100). This seems to back up the idea that providing differentiation in instructional formats will allow more students to learn and feel successful. Additionally, students could also be better supported if the teacher explained to them that it is a difficult task to propose ideas for their own learning, and that it's ok if it feels hard to do at first. The teacher can also suggest that the students listen to each other's suggestions in order to help them think of their own ideas.

Throughout the rest of the week I explained that I would use one of the suggestions from

our class-generated list to help them learn more about the salmon life cycle. I showed them a non-fiction book called *The Life Cycle of a Salmon* (Kalman, 2006). After reading part of the book I had the students write down or draw everything they had learned about salmon. Chiarotto (2011) recommends this as a way of gathering assessment with young children (pp. 72). I also read another book entitled *Salmon Creek* (Lebox, 2002). I explained that we would use another suggestion from the list and brought them into the computer lab to look up information about hydro dams and how humans have built fish ladders to help salmon get around them. This was another topic that came up during our field trip and many students had shared questions about how salmon are able to swim upstream. We visited a variety of child-friendly websites such as National Geographic Kids where we learned about fish ladders (Hennessey, n.d.). The purpose of these alternative teaching strategies was to present information in a variety of ways for the different learning styles in the class. This supports the UDL approach, as teachers are encouraged to "use an assortment of differentiated instructional methods to address multiple intelligences and different learning modalities" (Katz, 2012, p. 23).

At the end of the week we had another KBC earlier in the day. The goal with this lesson was to see if the students could start answering some of their questions using a "What have we learned?" chart. I started the circle by sharing the questions and asked if we had found out the answers to any. This was an excellent way to allow students to share what they have learned and some of the students were really engaged and eager to share. Unfortunately, other students continued to demonstrate some of the off-task behaviours which interrupted some of the discussion. This solidified my previous interpretation that differentiation is critical when engaging all students in inclusive classroom settings. Although it is difficult to know for sure what purpose their misbehaviour served, it was clear to me that sitting still and listening in a

KBC was challenging for some of the students. Despite this many students were still able to share thoughtful responses to many of the questions on our list. When reflecting on this lesson I was happy with the progress that most of the class was making. Many of them were able to wait for their turn to speak, share their ideas, and overall they seemed to be learning a lot about the salmon life cycle. Obviously, there were still some students who seemed to be disengaged from the learning activities.

When reflecting on this further, I realized that many of the activities we had been doing required the students to be sitting and listening quietly (e.g. reading, visiting websites, sitting in circles). Once again, this finding supports the UDL concept that students have different learning styles and that we as educators must provide them with multiple instructional formats to meet all of their different learning needs. By doing this, we can create more inclusive learning environments for all students while engaging in inquiry-based learning. As a result, I decided to incorporate more outdoor, active, experiential, and creative learning experiences to address the different learning styles in the class.

Prior to the final KBC, we engaged in a variety of learning activities to help re-engage the learners who were starting to lose interest. On a sunny day I took them outside to the school field to play a salmon life cycle game that was developed by the Alaska Department of Fish and Game (Alaska, n.d.). The goal of this lesson was to teach students the challenges that salmon face with a focus on human-caused problems. I also wanted to encourage them to develop more questions and inquiries. I recruited some volunteers in the Grade 6 and 7 class to help, and our Aboriginal Education teacher also joined. In this game, the students had to pretend to be young salmon leaving the creek to head into the ocean. There were various obstacles set up (played by the volunteers), such as hydro dams, fishing nets, bears, eagles, and pollution. The object of the

game was to make it past the obstacles to the "ocean" and run around a pylon 4 times (representing the average amount of years a salmon spends in the ocean). After this they needed to run backwards through the same obstacles to represent migrating back upstream to lay their own eggs. During this lesson I observed that all of the students were highly engaged and motivated and appeared to enjoy the opportunity to go outside and run. It also allowed the students to experience first-hand a simulation of the challenges that salmon face during their migration. There were many comments that showed the students' appreciation for how hard a salmon has to work to survive. While playing the game, the students were determined to make it back to their "home" where they were "born". Many of the students were not able to make it back which also taught them how few of the salmon actually make it back to their spawning grounds. The success of this game points to the importance of incorporating multi-age groups and making learning engaging with the use of games. This type of activity also reduces the dependence on verbal and/or written communication which may be difficult for some students.

Later that week we also completed a collaborative art lesson where the students created a life cycle mural to display in the hallway. The goal of this activity was to provide a visual representation of the life cycle for the diverse learners in the class. Another goal was to teach them how other species are dependent on salmon for their survival. Students worked together to paint pictures of the salmon during the various life stages (with labels) and placed them in a forest scene with a painted river. While they worked, I read a story entitled *Fraser Bear* (de Vries, 2010) which outlines how animals such as bears and eagles eat the salmon to survive. There was a high level of excitement and engagement from the whole class. There appeared to be meaningful understandings of how other species interact with salmon, as the class suggested we create a bear and eagle eating salmon as part of the mural. The final reveal of the mural was

exciting for our class but also the rest of the school. The students took pride in explaining their

mural to family and friends who walked by. This type of activity may be beneficial for students

who have difficulty listening and speaking as they can express their learning in a visual way.

When considering students who have difficulty sustaining their attention and/or sharing their

ideas during a KBC, perhaps the solution is to allow them to share their learning using drawing

or writing. This would provide more differentiation for the various types of learners in the class.

The final activity prior to our last KBC was a historical lesson on traditional Shuswap

fishing practices which was led by our Aboriginal Education teacher. The goal of this lesson was

to include Aboriginal viewpoints and content as this another important aspect of the new

curriculum. I also wanted to give the students another chance to get out of their seats and move

with an engaging activity. Our Aboriginal Education teacher showed us a model of one of the

spears that would have been used and displayed historical pictures. Afterwards, she taught the

students how to play a fishing game. During this lesson the kids were really interested in the

spear. The fishing photos led to an impromptu discussion on conservation (only taking what we

need). The students also appeared to enjoy the game tremendously and were cheering loudly for

their teammates in the race.

The next day I had the students join me for a final KBC before moving on to the next

cycle of the project. The goal of this KBC was to finalize our understandings of the salmon life

cycle and to answer any outstanding questions left on our chart. The students were much more

focused overall so we were able to keep it at a shorter length. Many students shared thoughtful

responses and it was clear that their knowledge had expanded and now included many other

ideas revolving around migration, challenges faced by salmon, and the concept of conservation. I

concluded by letting the students know that in the next lesson they were going to have the

opportunity to learn how to work in a group by acting out a skit using a script and an iPad. There was a lot of excitement about this, and I was pleased to see that their engagement levels had risen once again. The following section outlines some of the feedback I received from students based on our one-on-one interviews and questionnaires completed after the final KBC session (see Appendix A). Some of self-assessment and interview questions included:

- I shared my ideas during most of the Knowledge Building Circles

- I listened to the comments of my classmates during the KBC

- The KBC helped me to learn more about salmon

- I think the KBC helped us share our ideas and learn more about salmon

Findings of the First Cycle

When analyzing the student responses, I discovered that there were three general themes that emerged. The first theme involved responses that focused on *respect*, *rules*, and *listening skills* while engaging in the Knowledge Building Circle. For example, some of the responses include:

- We sat in a boy-girl pattern so boys don't sit beside each other and interrupt. (Student 4)

- You can't interrupt others. (Student 7)

- Sometimes in the KBC we put our hands in to say something and mostly we didn't interrupt. (Student 6)

- We learned rules. (Student 1)

- You put your hand in to be respectful. I thought it was a good way to learn about salmon! (Student 14)

- We were all quiet when the person was talking and sharing ideas. (Student 15)

- We were good listeners sometimes. (Student 16)

- We were too noisy. (Student 3)

- Some people were being silly and talking to their friends. (Student 9)

When reflecting on these responses it became clear that there was a big focus on respect and class rules during the KBC process, which suggests that the students associate *listening* with *learning*. This is likely due to my focus as a classroom teacher in ensuring that the students were following the rules of the KBC process. As a classroom teacher it makes sense that I would do this from a management perspective, but as a researcher it appears that this focus may have deterred from the more important goal of allowing the students to share and learn from each other. As a researcher I also know that there are other ways of learning and it is important that I communicate this to the students as a classroom teacher.

Despite this, there were still many responses from the students that involved *learning from each other*. This was the second theme that emerged from the student feedback. Some of these responses include:

- It's fun to sit and hear our friend's ideas. (Student 15)

- It's fun sharing your ideas with the whole class. (Student 16)

- We shared a lot of knowledge. (Student 8)

- Other people have different ideas. (Student 14)

- We got to listen to other people's ideas. We could connect to it and do it. (Student 15)

- It helps us learn more about salmon. We hear other ideas and get more ideas for our self. From another person! (Student 16)

- It was your friends and we listened to our friends. (Student 2)

- We shared our ideas. (Student 13)

- All the questions didn't help me learn better. (Student 3)

This feedback was promising as it seems to demonstrate that the students were beginning to recognize and value this type of collaborative learning, as opposed to the teacher-driven learning that occurs in a typical classroom setting. As opposed to being passive recipients of information, the students began to actively engage with each other to share ideas and learn new things. It is important for students to recognize that not all answers come from the teacher and that collaboration can lead to meaningful learning.

A third theme that emerged revolved around *movement*. This is an important theme as it reflects the opinions of the students who weren't engaged with the KBC process. When asked if they enjoyed learning how to do a Knowledge Building Circle, some of the responses included:

- No, because we have to sit. (Student 3)

- No, because I don't like sitting for a long time. (Student 11)

- No, because I don't like learning. I like to play! (Student 12)

As previously discussed, this understanding that many of the students were not able to sit (and therefore, not able to learn) for extended periods of time is part of what led me to include more multimodal activities that involved movement and play. In the findings section for the third cycle I will refer back to this theme of *movement*, as it resurfaces in an important way.

Overall, the data suggests that in this class, most of the students found the KBC to be an effective way to share ideas, listen to others, and discuss what they learned about salmon. From my perspective as a classroom teacher, it was often quite challenging to manage the class while they were sitting in the circle for extended periods of the time. There were often disruptive

behaviours from some of the students which led me to realize that this learning format was not ideal for them. There were some instances when the KBC went smoothly and was more successful (usually when I shortened the time or had it earlier in the day). When reflecting on what I learned in the first cycle, I have concluded that the KBC can be an effective tool to keep track of learning throughout an inquiry project. It can also be an effective teaching strategy for inquiry as it appeared to help the majority of students develop their own ideas and learn from each other (which are key skills for 21st century learning). The question for teachers of inclusive classrooms, through a UDL framework, is about how else students can express learning, as that is the goal of the Knowledge Building Circle. Upon deeper reflection, perhaps student participation would have increased if I had offered movement choices or drawings to share knowledge, as opposed to solely relying on verbal responses. In addition, I reflected that the KBC strategy needs to be part of a wider range of multimodal instructional techniques to address the various learning styles and needs of the students in the class. Overall, I provided students with a range of instructional techniques that helped support inclusion while engaging in the inquiry process.

The next cycle of research was intended to prepare the students for collaborating in a group on a final project on the salmon life cycle using effective communication and problem-solving techniques. The reason for this direction is outlined in the following section.

Second Action Research Cycle

After completing the first action research cycle, I once again reflected on my research question: *What strategies can I implement to improve inquiry-based learning for all students in my inclusive classroom?* I knew that I wanted to continue building to the conclusion of the inquiry process, and according to Kozak and Elliot (2014), there are multiple directions an

inquiry project can take after engaging in the "Group Knowledge Building" (p. 71) stage. This includes: "Individual Knowledge Consolidation… Applying Knowledge and Skills within School… Making Connections and Moving On… Pursuing Knowledge… [and] Acting on Learning beyond School" (p. 72). I chose to take the "Applying Knowledge and Skills within School" route, which involves creating a final product, often through artistic expression. I chose this direction as I wanted the class to create a final project with a group in order to demonstrate their knowledge. I also wanted to continue to focus on improving social communication and collaboration, and I thought a group project would be an ideal opportunity for students to apply the listening and speaking skills developed during the first cycle.

Before jumping into the group project, I reflected on how some students still lacked some of the social skills required to engage in a group project (e.g. actively listening to the ideas and views of others, sharing their own personal thoughts and ideas/opinions, and staying focused during activities). I still felt that more needed to be done to prepare students for a successful group project so that they could work together and problem-solve effectively. In order to address this, I reflected on my previous research on how these types of social skills can be developed with the use of sociodramatic skits. Whitehurst (2012) claims that "many children with learning difficulties lack confidence in their own creative and communicative abilities" (as cited by Kempe and Tissot, 2012, p. 98). Kempe and Tissot (2012) go on to say that "drama can provide a context in which these skills can be practised and learned, understanding fostered and, as a result, confidence heightened" (p. 98). I was also drawn to the use of sociodrama to help students learn how to problem solve. Pecaski (2012) explains that sociodrama "is an arts-based, action-oriented tool of individual and collective social exploration and creative problem solving that allows participants to find potential resolutions to issues of concern and conflict in their lives" (p. 407).

Based on this research, I chose to implement my own adapted versions of sociodramatic skits for all of the students in my class. I also chose to have the students record their skits with an iPad so that we could watch them together as a class. I chose to include these adapted forms of video modeling and video self-modeling, as they are another set of research-based strategies previously identified to support students with social interaction difficulties in inclusive classrooms. My goal was to have the students act out different scenarios while pretending to collaborate in a group. These scenarios, as I will outline in more detail later, were intended to teach the students how to collaborate and problem-solve more effectively, which are both 21st century skills linked to IBL and the new BC curriculum. Nikopoulos and Keenan (2006) argue that modelling "is a powerful tool both for teaching new behaviours and for improving already acquired ones. Modelling occurs when a sample of a given behaviour is presented to an individual and then that individual engages in a similar behaviour" (p. 81). I felt that it would be beneficial for the students to watch themselves act out the skits in a video, as Hughes and Yakubova (2016) argue that students "can relate to the actions in the video because they watch themselves completing the desired behavior or skill. Seeing personal success on the task may contribute to the student's self-efficacy" (p. 116). In addition, Buggey et al.'s (2011) study using video self-modeling had mostly positive results for the students who viewed "themselves performing a task just beyond their present functioning level via creative editing of videos using VCRs or video software" (p. 25).

The decision to implement these strategies for all students in the class was based on UDL principles, as it was my hope that the process would benefit all learners in the class. Katz (2013) explains that "meaningful involvement in a learning community means that *all* students are active participants in the learning, and that they have meaningful interactions with their peers" (p

37). The aim of these skits was for all students in the class to develop their ability to share their

own ideas and listen to others while collaborating with a team on a final project. I also wanted to

determine if explicitly teaching students the skills required for group work would help them to

identify strategies to work well with others (and whether or not this would help them apply those

strategies at a later time).

I started the second cycle by letting the students know that they would be working

together in small groups to act in a dramatic skit. I explained that the skits would help them learn

how to work with others in a group. We used the SMART Board to come up with a list of what it

means to collaborate and how groups can do it well. I also let the students know that they would

be helping to make up the skits. Next, I recruited the help of intermediate student helpers who

took small groups of my students to help them generate ideas based on our lists in the previous

lesson. I asked the students to imagine that they were working together on a group project in the

skit and that there was a problem that needed to be solved. Students were able to make a list of

what their character's names would be and some were able to come up with a scenario. I knew

that the class would need my support to make up a complete script, but I wanted to include them

in the creative process as much as possible. Based on the students' ideas, I made up five short

skits and typed them up as scripts for them to practice and memorize. In all of the skits, the

students were pretending to work on either a poster, book, video, or song about the salmon life

cycle. The groups were faced with various problems, such as: a group members feels left out and

is not sharing his ideas, a group member is being silly and not helping, a group member is not

sharing her supplies, and two group members are fighting over who get to use the iPad. In each

of the skits there is a focus on the students solving the problems independently without any

support from the teacher. All skits also have a focus on calm, direct dialogue with clear

communication. There is also an emphasis on listening to each other respectfully. The intention

was for the students to learn that by sharing ideas and materials, staying focused, and listening to

each other, they could achieve their collective goal (completing a group project collaboratively).

The intention of the skits was to provide them with the necessary language to use in actual group

projects in the future. Students spent the next week practicing their skits and we recorded them

towards the end of November. We watched the skits as a group and identified the problems in

each and discussed how the group members solved them. We also discussed the strategies that

the group members used and how they were able to solve problems without getting help from the

teacher.

Findings of the Second Cycle

In this cycle, I set out to prepare students for completion of the inquiry process by

teaching them how to collaborate with a group to complete a final project. I also wanted to

support the development of communication skills for all students based on the UDL principles of

inclusion, where all students benefit from strategies that are designed to support the students who

may be struggling or need extra support. In order to do this, I chose research-based strategies that

have been shown to improve social skills for students with learning difficulties and specific

diagnoses such as Autism Spectrum Disorder (ASD). It was my hope that these interventions

(sociodramatic skits with scripts and video modeling/self-modeling) would support the learning

of all students in the class.

To analyze the effectiveness of these interventions, I utilized my research journal and

interviewed the students individually. Based on my own observations and journal entries, the

class was highly engaged during these activities and appeared excited about the chance to act out

scenarios and use the iPads. For example, during the initial stages of this cycle when students

were collaborating with the intermediate helpers, I recorded that there appeared to be a positive sense of collaboration amongst the groups. On that day the students were working well together and all of the groups were laughing and smiling while sharing their ideas with the intermediate helpers. As the project went on, the students moved from making up their skits and practicing their lines to actually recording the skits with an iPad. This stage appeared to be the most exciting for the students. In my journal I reflected that there was a high sense of engagement amongst all students in the class at the opportunity to use the iPad. I took each group one at a time to help support them with the new technology and recorded them while they acted out the skit. I reflected on my journal how the students watched themselves after to see if the recording was good enough for the "final version" and how many chose to re-record multiple times until they were satisfied. I concluded that the use of the iPads to implement video modeling was highly engaging for the students involved.

When analyzing the responses from my interviews with the students (see Appendix B), there were once again three general themes that emerged from the data. The first theme seems to back up some of the findings in my journal, as it involves the idea of *student engagement*. Some of the student responses include:

- It was fun that we pretended not to work together but some people figured the problem out. (Student 16)
- It was boring. We sat there and read a piece of paper. (Student 8)
- It wasn't fun until I learned my lines. (Student 3)
- It was fun! (Student 10 and 11)
- I like drawing on the board and fixing the problems that we had in the skit. (Student 14)

- It was really fun pretending and playing. (Student 15)

- I liked that we got to watch ourselves on the video. (Student 16)

This feedback was interesting as there were a couple responses that demonstrated that this teaching strategy may not have been ideal for all students in the class. This once again speaks to the need to differentiate instruction to support the various learning styles in the class. That being said, the remaining feedback was positive from the majority of the students.

A second theme that emerged from the data was the positive impacts on student learning as a result of effective *group work*. This was promising as this was one of the reasons for implementing the skits in the first place. Some of the student responses include:

- It taught us how to work with a group and not fight. (Student 4)

- I liked doing skits with my friends because it helps our brain learn what we're doing. (Student 9)

- It helps me learn how to work with a group. (Student 3)

- It helps me work together with my group. Teamwork! (Student 7)

- I think you'll learn something in the skit that you actually work together as a group. (Student 16)

This feedback seems to provide evidence that some of the students were learning the value of effective group work and collaboration. As previously discussed, these are key aspects of inquiry-based learning and the new curriculum.

A third theme that emerged once again involved *movement*. While there weren't as many responses, I still felt it was important to include as this more active approach to learning helped address some of the problems from the first cycle. Some of the responses include:

- I liked the skits because I didn't have to sit down. I don't like sitting down. It's not fun. (Student 11)

- Because it was fun to walk around and pretend to be silly in the skit. (Student 3)

- I liked the skits because we got to talk and draw on the board. We got to go to another room to record our skits. (Student 8)

This feedback from some of the students seems to demonstrate that they appreciated the opportunity to get up and move around. I also reflected generally on this in my journal and concluded that overall, there were less behavioural concerns compared to the KBC. This could be because the students were given the opportunity to speak more freely with their peers and move around the room.

With this cycle I also wanted to analyze if the strategies implemented helped the students to learn new skills. Specifically, I wanted to see if the skits and video modeling helped the students to identify different ways to collaborate and problem-solve with a group. Eventually I also wanted to see if they could apply these skills in an actual group project (in the third action research cycle). In order to determine if they could identify some of the strategies learned in the skits, I mainly depended on student feedback. When asked, 13/16 students were able to identify strategies that were related to the skits. Most of the student responses (11/16) involved talking and listening to each other, and sharing materials. For example, some of the responses include:

- Talk about problems with my group. (Student 2)

- Share and be nice. (Student 8)

- Share our things. (Student 9)

- Listen to my group. (Student 10)

Two of the other responses involved sharing the workload and taking turns:

- Take turns. (Student 4)

- Do my fair share. (Student 14)

This data encourages me to conclude that most of the students were able to identify problem-solving strategies. This was exciting as these problem-solving skills, if applied, would improve the communication and collaboration amongst the group members which was a goal of the skit and video modeling process.

When asked if they thought that the problems in the skit could happen in real life, all of the students agreed (16/16) and 15/16 thought they could use some of the problem-solving strategies that they learned. When asked if they thought learning the skit would help them work in a group better, 12/16 said *yes*, and 4/16 said *no*. Some examples of their responses to this question include:

- Yes, it will help me work together with my group. Teamwork! (Student 7)

- Yes, because we're spending more time and figuring out what things we need to do. (Student 8)

- Yes, because it helps us do it. Since we already practiced it we can use the same words. It's like reading a book and making a connection. (Student 9)

- No, at preschool we always had to work on sharing every day. (Student 1)

- No, because when I'm with my group we don't really have any fights. (Student 6)

- No, because I just think that it won't. (Student 11)

This data is also encouraging as it shows that all of the students felt the scenarios were realistic and that nearly all of them felt they could try some of the problem-solving strategies in real life.

While it appears that some students recognized that the skits helped them to practice these skills to prepare them for a real group work project, this is not the case for all of them. Some students felt they already knew how to do it, while others felt the skits simply wouldn't help them (without providing any further explanation). The implications of this are outlined in the following section.

After analyzing my data I have concluded that primary students are able to successfully complete the dramatic skit process (even if they can't read the script) as long as they have direct support from a teacher or help from an older student. As primary students, this strategy was challenging but overall I felt it was successful as students were engaged, enthusiastic, and all groups successfully completed the video. Even though these strategies were based on research on how to support students with learning disabilities or ASD, it appears that the intervention was beneficial for most of the students involved. This supports the UDL principle that what is helpful for struggling students may in fact support the learning of other students in the class.

Some of the themes that emerged from this cycle include: *engagement*, the positive impacts of *group work* on student learning, and *movement*. As summarized previously, these themes are a reflection of the various learning styles in the class. While some students were able to make claims of how they learned and what they preferred, I think more could have been done to help the other students learn to identify their effective learning modalities and goals.

In addition, because students were able to identify strategies for how to collaborate in a group, it is possible that these teaching strategies have helped prepare the students for the final stage in the inquiry process. However, whether or not these strategies helped students apply these skills in order to problem solve and collaborate more effectively cannot be answered at this point, as I still need to reflect on their actual group project in the third and final cycle.

Third Action Research Cycle

I began my third and final cycle of action research by returning once again to my research question: *What strategies can I implement to improve inquiry-based learning for all students in my inclusive classroom?* As stated previously, in order to complete the inquiry-cycle, it is argued that students should create a final project that demonstrates their learning framed around the idea of positive actions, or "What can we do now?" Chiarotto (2011) argues that:

> In inquiry-based learning, students' questions and ideas are at the centre of their learning, leading the students to believe that what they think and do actually matters. As a result, students are more motivated to participate in, or even initiate, acts of stewardship, environmental or otherwise. (p. 56)

Chiarotto (2011) goes on to state that as educators it is our role to create active citizens "who make sustainable life choices by critically questioning how human actions affect the balance of the world's social, economic, and natural systems" (p. 56). Gebbels (2010) also describes how the students in her study were able to "make valuable and constructive recommendations for the sustainable management of the local coast" (p. 145) by creating an illustrated informational booklet together. Gebbels (2010) goes on to explain how the "experience of producing it may have a lasting impact on the lives of the young participants, giving them confidence and motivation to act as responsible environmental citizens…" (p. 145). Throughout our inquiry project, students learned not only about the salmon life cycle, but about the serious challenges they face (many of which are cause by humans). The focus in this third stage of our project was to allow the students to reflect on what can be done to help alleviate some of these challenges. Larson and Miller (2011) argue that this type of thinking is critical. They argue that:

> Despite increasing knowledge of how the brain works and the continued emphasis on

developing skills in innovative thinking and problem solving, many students function at

Bloom's (1956) knowledge and comprehension levels. It is vital that teachers encourage

students to apply knowledge, analyze that knowledge (in multiple ways), synthesize or

create new knowledge, and continuously evaluate. All of these skills can be integrated

with technology and practiced collaboratively. (p. 123)

This type of learning (and thinking) that I was expecting ties back to the goals of achieving

'deeper learning' beyond 'fact-based' responses, which is also a shift that has occurred in the

new curriculum.

Another aim, in addition to the environmental stewardship and 'deeper learning' goals

listed above, was to see if students were able to apply the group work problem-solving strategies

that they identified in the previous cycle. It was my hope was that as a result of the KBC and skit

process, the students would be better prepared to collaborate together to brainstorm ways to

create solutions in teams. In order to determine this, I depended on feedback collected from the

students in addition to my own observations made in my researcher journal.

To begin this cycle, I let students know that they would be working together in small

groups to complete a final project and to demonstrate what they have learned over the past three

months. In order to implement a UDL approach (provide differentiation for different learning

styles with multiple forms of output) the students were able to choose how to demonstrate their

learning with a poster, book, video, song, or dance. In each of these areas the students had the

same expectations (show the salmon life cycle, the challenges faced by salmon, and what can be

done to help salmon). Students were split into groups based on their preferences and worked on

their projects over the span of a week.

When creating the groups, I also thought about my research and the benefits of peer

tutoring for students with ASD and other learning disabilities. With this in mind, I deliberately placed students into groups based on their strengths so that students could provide supports to each other. It was my hope that the more advanced students (e.g. those who had been collaborating and communicating consistently) would model the desired skills for others. These group placements were based on my observations during both the KBC process (e.g. students who participated frequently) and their participation during the skit process. While I did not specifically provide the students with scripts, I did consider these intentional placements as an adapted form of peer modeling. This would be different if I was working with a child with ASD, as Banda and Hart (2010) argue that just placing students with autism with typically developing peers is not enough to increase their social skills (pp. 124). It was my hope that the skit process was enough direct instruction for the students in my class to achieve success in the mixed ability groups.

Once the groups decided on what they were going to do (a poster, book, video, song, or dance) they began their final project. This finally gave me the opportunity to observe their group to determine if they were applying any of the strategies learned. In total there were seven groups (six groups of three and one group of two). I wanted to keep the groups small as I felt they would have more success in smaller groups. Throughout this time I frequently reminded the students that the skits they did previously were to prepare them for this group project. We had on-going discussions and daily reminders about how to problem-solve with their groups based on the strategies learned in skits. These strategies, which many of the students were able to identify in the previous cycle, included:

1) Listening to each other's ideas and suggestions

2) Sharing and expressing their own ideas

3) Solving problems independently

4) Sharing materials and workload

5) Working together as a team

At the end of each school day I reflected generally in my researcher journal to keep track of how the groups were doing. As I was often the only adult in the room, it was difficult for me to check in with all seven groups to get a clear sense of how they were interacting. As a result, I depended on student feedback to determine if they had any problems with their group and whether or not they were able to use strategies to solve those problems. The following table provides an overview of the problems I observed during the final group work project. It also provides a snapshot on whether or not I felt the students were able to independently apply the strategies learned in the skits in order to solve their problems.

Group Number and Project Choice	Observed Problems	Independently Applied Strategies (Yes/No)
1 *Song and Dance*	• Disagreed on what to include in song/dance	• No – Required teacher support
2 *Book*	• Walked around the room • Not focused on work	• No – Required teacher support
3 *Poster*	• Had different ideas for what to include on their poster	• Yes

4 *Poster*	• Disagreed on what to include on their poster and how to share space	• No – Required teacher support
5 *Book*	• Off-task behaviours • Not focused on work	• No – Required frequent teacher support • One student did try a strategy but it didn't work
6 *Poster*	• None observed	• Yes
7 *Poster*	• Disagreed on what to include on their poster	• No – Required teacher support

Table 1. Problematic Group Behaviours Observed by Teacher

Overall, it appears that most of the groups experienced problems while collaborating with their group, and most of them required teacher intervention to solve those problems. Despite this, I was impressed to see what the groups had included in their final projects. As previously mentioned, the students needed to include a diagram of the salmon life cycle (content, fact-based information), a list of the challenges faced by salmon, and a list of how we as humans can help the salmon (a more inferential, deep-thinking question). The following chart provides an overview of the learning in these areas for each group.

Group Number	Included an Accurate Diagram of Salmon Life Cycle (Yes/No)	Group's List of Challenges Faced by Salmon	Group's List of Ways to Help Salmon

1	Yes	• Fallen logs • Hydro dams • Oil spills • Bears/Eagles/Sharks • Humans	• None listed
2	Yes	• Nets • Other fish • Eagles/Bears • Hydro dams • Fisherman	• Catch less • Don't fish when they're spawning • Use fish ladders
3	Yes	• Pollution • Hydro dams • Fisherman • Predators	• Don't litter in the water • Catch less • Use fish ladders
4	Yes	• Nets • Hydro dams • Bears • Pollution	• Stop catching salmon • Use fish ladders • Keep water clean
5	Yes	• Sharks • Waterfalls • Hydro dams • Pollution • Fisherman	• Use fish ladders • Catch less • Don't throw garbage in water • Keep water clean
6	Yes	• Hydro dams • Bears/Bull trout • Fisherman • Oil spills • Waterfalls	• Don't put garbage in water • Don't put hydro dams in water
7	Yes	• Hydro dams • Bears/Eagles • Seals/Sharks	• Catch less • Use fish ladders • No polluting

Table 2. Overview of Demonstrated Learning in Final Group Project

As outlined, it is evident that most of the groups were able to engage in inferential thinking in order to brainstorm solutions to some of the problems faced by salmon. This ability to think critically and problem-solve demonstrated innovative thinking skills by the majority of the groups. The importance of this is emphasized by Larson and Miller (2011) who state that:

The abilities to solve problems and think innovatively across all content areas involve

multiple levels of Bloom's taxonomy. As students encounter real-life problems, they

must be able to 1) sort through large masses of materials and identify key problems; 2)

create viable options or solutions; and 3) identify and use appropriate criteria for

evaluation. (p. 123)

Overall, I was pleased with their abilitiy to engage in this type of thinking, considering that they

are a primary class. For many of them, this was likely the first attempt at this style of applied

thinking. In order for them to continue developing these skills it is vital that they are provided

with more opportunities to engage in these types of collaborative projects.

Findings of the Third Cycle

Based on my observations and reflections, it appears that the skit and video modeling

process in Cycle 2 allowed students to identify problem-solving strategies that would increase

their communicative and collaborative skills when engaging in group work. Unfortunately,

although most of the students were able to identify the strategies, many of them were not able to

apply them in a real-life group work situation. As outlined in *Table 1*, according to my

observations, only two of the seven groups were able to independently apply the strategies

learned during the skit process in order to solve the problems in their group. These findings

appear to be backed up by the feedback I received from the students, as outlined below.

On-Task **Behaviours Identified by Students**	**Frequency**
Listening to each other's ideas/suggestions	2
Sharing and expressing their own ideas	2
Solving problems independently	2

Sharing materials and workload	2
Working together as a team	6
TOTAL	**14 instances**

Table 3. Total On-Task Behaviours Identified by Students

Despite this, there were multiple examples of identified off-task behaviour, as outlined below.

Off-Task **Behaviours Identified by Students**	**Frequency**
Difficulty solving problems	4
Distractions due to "silly" behaviour	3
Difficulty listening to each other	2
Difficulty sharing	1
TOTAL	**10 instances**

Table 4. Total Off-Task Behaviours Identified by Students

So, even though the students were able to identify strategies learned in the skits, not all of them were able to or ready to apply them when collaborating with a group. Based on student feedback I would still conclude that with on-going opportunities to practice the skills learned, perhaps dramatic skits and video modeling could be an effective strategy to help them learn how to apply these skills in the future. Many students reflected that during the skit and video process they learned how to solve problems and practice the new skills (see Appendix C for list of

questions).

Despite the fact that many of the groups were not yet able to apply all of the problem-solving strategies learned in the skits, nearly all of the groups were able to engage in higher order or "deeper" thinking when collaborating with each other. Engaging in this type of thinking is one of the purposes of inquiry-based learning. As Elliot and Kozak (2014) state, the goal for learners in traditional educational settings is for students to know all of the right answers through recall (pp. 8). They go on to argue that in transformative learning models, such as IBL, the goal is for learners to develop into "critical thinkers who are able to challenge information based on facts, evidence and examined values; and pursue creative solutions" (p. 8). Despite some challenges along the way, it appears that throughout this entire process, the students were able to not only learn about the salmon life cycle, they were also able to learn how to work collaboratively in order to brainstorm solutions to real problems faced by salmon. While I am pleased with the work completed by the students, it is difficult to pinpoint exactly what led to this positive result. I reflected that perhaps it was due to the various multimodal instructional formats that were implemented in the first cycle.

At the completion of our inquiry project, I asked each individual student to let me know what activity they felt helped them learn the most about salmon (also described as their preferred activity for learning about salmon). The following chart provides a breakdown of their responses. *Please note that there are eighteen total responses as two students provided two answers.*

Preferred Learning Activity Identified by Student	Number of Students who Identified the Activity
Field trip *Outdoor, experiential*	10

Life cycle game *Outdoor, experiential*	3
Online computer game *Indoor, use of technology*	2
Knowledge Building Circle *Indoor, speaking and listening focus*	1
Fishing game *Indoor, experiential*	1
Final project (poster) *Indoor, collaborative group work*	1

Table 5. Preferred Learning Activities Identified by Students

These findings point overwhelmingly to the importance of outdoor, experiential learning experiences from the perspective of the students. Lewis and Williams (1994) define experiential learning as "learning from experience or learning by doing. Experiential education first immerses learners in an experience and then encourages reflection about the experience to develop new skills, new attitudes, or new ways of thinking." (as cited by Schwartz, n.d., p. 1). This relates to my previous findings on the importance of movement for many of the students. It is important for teachers to rely less heavily on traditional educational models and include more multimodal approaches that allow students to experience their learning. This may help to address all of the preferred learning styles in the class.

Conclusion

With this study I set out to answer the question: *What strategies can I implement to improve inquiry-based learning for all students in my inclusive classroom?* During the first cycle

I implemented Knowledge Building Circles in conjunction with a variety of multimodal forms of instruction. When analyzing this cycle my focus was on the effectiveness of the KBC to enhance speaking and listening skills of the students in the class (e.g. waiting for their turn to speak, sharing their own ideas, developing their own questions, and listening to others). This focus on *rules*, *respect*, and *listening skills* was also a theme that emerged from the student responses. It became evident that my focus on these areas influenced the students and as a result many of them seemed to equate listening with learning, even though there are other ways to learn and express knowledge/understanding. Despite this, it appeared that KBC was helpful for most students to develop these skills and to learn about the salmon life cycle from each other. This was another theme identified by the students, as many of them claimed that the KBC helped them to *learn from each other*. A downside of the KBC is that it required students to sit still for extended periods of time. It also depended primarily on verbal communication for students to participate. This may explain why this strategy was challenging for some of the students who demonstrated off-task behaviours experienced during these times. This led to the third theme which involved *movement* as it became evident that I needed to incorporate more opportunities to get up and move in order to support the learning of these students. My conclusion is that the KBC was a successful strategy for incorporating IBL as it allowed students to develop their own questions (a key part of the inquiry process and the new curriculum), but in order for it to be more inclusive of exceptional learners, perhaps it can be adapted so there is less reliance on verbal communication and more opportunities for movement. As an alternative, the students could be given the opportunity to stand (as opposed to sit) in a circle formation, collaborate in partners/small groups to come up with a response (to relieve the pressure from the individual learners), draw a picture, write their thinking down, or act out (dramatize) their responses.

During the second cycle, my focus was on the use of sociodramatic skits combined with video modeling and video self-modeling to help students identify ways to collaborate and problem-solve when working with a group. These strategies were influenced by my research on how to support students with learning disabilities and ASD in the classroom, and were implemented based on the UDL concept that interventions can support all learners in the classroom. The intention of this was to prepare students for the final stage of the inquiry project where they would complete a final project on the salmon life cycle with a small group. The students created and performed a series of short skits that helped them to identify positive ways to collaborate with others and how to solve problems that may arise. When analyzing the data, themes emerged from the student responses: *engagement*, *group work*, and *movement*. These themes appear to reflect the various learning styles in the class. While some students were able to identify the activities that helped them learn, many were not. I reflected that I could have done more to support these students to identify their preferred learning modalities.

During the third cycle the students were placed in strategic groups in an attempt to encourage peer supports from the students who had been successfully demonstrating positive social and collaborative skills, during both the KBC and skit process. During this cycle I set out to determine if the students were able to apply that strategies learned in an actual group work project. After observing the groups in action and assessing the feedback from the students, I concluded that in this instance, the skits and videos were not enough to help the majority of students apply the desired skills. Only two out of the seven groups were able to independently apply the strategies learned in the skits. However, this is the first group project attempted by these primary students, and it isn't necessarily expected that they excel in this area on their first try. It is my conclusion that the skits and videos provided the students with an opportunity to

learn these new skills and that perhaps, with on-going practice, they will be able to apply these

skills in future group work situations. Despite this, many of the students were able to engage in

higher order thinking skills as they brainstormed solutions to some of the problems faced by

salmon. This demonstrates that the inquiry-process allowed the students to engage with the

subject matter in a meaningful way, which is an important aspect of the new curriculum.

Throughout this process, I assessed the students in a variety of ways. Katz (2012) argues

that we must "differentiate the types of assessment as much as we differentiate instruction…the

assessment in a UDL classroom, therefore, becomes process-oriented, and multi-modal" (p. 145).

I collected formative assessments with daily observations and reflections in my journal. With my

journal I reflected on the learning of the students to check their level of understanding and to

plan subsequent lessons. I also depended on student self-assessments and one-on-one interviews

at the conclusion of each cycle. Katz (2012) argues that "when we teach students to self-assess,

we guide them to become reflexive learners, to deepen their understanding of the criteria and

essential understandings in each discipline, and to develop metacognitive skills, strategies, and

awareness" (p. 148). Throughout the process I also collected and analyzed examples of students

work such as group-created lists, posters, and videos to help inform my next steps. In terms of

summative assessment, I depended on their final product (either a poster, video, song, dance, or

book) on the salmon life cycle. Prior to beginning the final project, I created a list of

requirements that needed to be included: a diagram and/or enactment/demonstration of the

salmon life cycle, an explanation of the challenges faced by salmon, and an explanation of how

we (as humans) can help salmon thrive. When discussing this with the class, I simplified the

requirements to three questions suitable for primary students:

1) What is the salmon life cycle?

2) What are the challenges faced by salmon?

3) How can we help salmon?

When assessing the final product I was looking to make sure all three requirements were included. I made sure that these expectations were clear before the students began the project. Finally, I also utilized student-led conferences at the end of Term 1 which was an opportunity for students to demonstrate their knowledge to both me (as their teacher) and their parents/families who attended. Katz (2012) states that "conferencing means having an individual conversation with a student about their learning. These conferences may be brief… or they can be more structured in a longer discussion with a specific intent…" (p. 146). During our conference the students showed our salmon mural to their parents/families. At this time I asked the student to explain the salmon life cycle and the challenges faced by salmon. This gave me an opportunity to assess their individual knowledge, and I included this as part of my summative assessment.

After analyzing all of these sources as a whole, key themes emerged that have helped to address my question: *What strategies can I implement to improve inquiry-based learning for all students in my inclusive classroom?* These themes involved implementing research-based strategies to support the learning of students in the class, engaging effectively with inquiry-based learning so that students attain the potential benefits, and addressing the needs of all students in the class in a way that both respects differences and embraces inclusion. Some of the key themes include:

- Speaking and Listening Skills

- Ways of Learning

- Means of Expression

- Fostering Collaboration

- Higher Order Thinking Skills

- Engagement and Experiential Learning

These themes, and how they apply to the knowledge and skills needed for BC teachers regarding

the implementation of the new curriculum, and inquiry, will form the basis of the next chapter.

Consideration of the exceptional needs of students who might need support within inclusive

classrooms will also be discussed.

Chapter 5

Discussion

Key Themes and Implications

A key aspect of inquiry-based learning is that students are expected to share their own ideas, develop their own questions to study, and listen and learn from the ideas of their peers and teachers. In order to engage effectively in this process, I discovered that students need opportunities to develop their *speaking and listening skills*. In my study, this was established with the use of Knowledge Building Circles. This structured approach (where students had to wait for their turn to speak, listen to others, and share their own ideas) can be a useful strategy for teachers to use in order to promote these skills. Overall, this strategy seemed to work well for most students in the class. For example, 12/16 students admitted to sharing their ideas during the KBC and 14/16 admitted to listening to the comments of their classmates. While this involves the majority, this wasn't true for all students. This reliance and focus on verbal communication may be challenging for students with exceptional needs. It is important for teachers to provide students with alternative ways of expressing themselves during the KBC (and inquiry) process. As stated previously, this may include varying the responses formats. For example the teacher can allow the students to stand/move, collaborate with a partner or small group to formulate a response, draw a picture or produce a piece of writing to share, or act out/sing a response.

This leads to the next two themes which include *ways of learning* and *means of expression*. In a typical classroom setting the dominant methods of expressing learning include verbal and/or written responses. In addition, traditional classroom models are teacher-centered, meaning that the students are often passive recipients of information imparted by the teacher and/or textbook. One of the goals of the new curriculum is to shift to a more student-centered

approach. This can be achieved with inquiry-based learning, as students formulate their own questions and learn from each other (as opposed to solely from the teacher). Teachers can choose to utilize the Universal Design for Learning (Katz, 2012) model while implementing inquiry-based learning and the new curriculum, as this provides differentiation, multimodal instructional formats, and opportunities for students to express their learning in different ways. This supports the diverse needs of exceptional learners who may struggle with verbal and/or written communication. Another important consideration for classroom teachers is to help students discover their preferred learning modalities and learning goals. While there were some students in my class who were able to do this on their own, there were many who were not. These students would have benefited from teacher guidance in this area. For example, when asked if the skit process helped them work with a group better, there were two students who said no, but couldn't explain why. Another example is when I asked if they thought watching the videos (video modeling) helped them learn how to work in a group, and four students said no. When asked why not, three of those four said they didn't know why. At this point, as a classroom teacher, I could have spent more time working with them to help them determine what they felt would help them work in a group better and try to incorporate their ideas into the project somehow. Ultimately, it is important for classroom teachers to consider how to provide students with alternate ways to learn and express themselves in order to support their different learning styles.

The aim of the second and third cycle of research was to *foster collaboration* amongst the students, which is an essential component of inquiry-based learning and the new curriculum. I provided students the chance to learn these skills with the use of dramatic skits and video modeling/self-modeling. After completing my study I concluded that these strategies can be an

effective way to introduce students to the idea of group work. It was also a beneficial way to

teach them strategies for solving problems in order to promote positive interactions and a sense

of collaboration. The ability to collaborate with a group is a key part of 21st century learning, as

students are encouraged to work with others to brainstorm creative solutions to problems they

may face in the future. With this study it became clear that students need more opportunities to

practice these skills (beyond acting them out in a video) before they can be expected to utilize

them in real-world situations. The dramatic skits and video modeling strategies are intended to

support all students in the class, including those with exceptional needs. This is so all students

can begin to learn the social skills they need for effective group work practices.

Another important theme that emerged was the development of *higher order thinking*

skills, which is another aim of inquiry-based learning and the new curriculum. This type of

thinking moves beyond 'fact-based' approaches that depend on memorization and recall, and

moves towards deeper learning that can be more meaningful for the students involved. In my

study, inquiry-based learning provided the students in my class with an opportunity to engage in

this type of thinking and learning that ultimately led to them brainstorming solutions to problems

faced by salmon. Some of the responses reflected some of the learning we had done in class. For

example, when I analyzed their responses on the posters, many of the groups stated that humans

can build more fish ladders. This was an idea we learned about while exploring the National

Geographic Kids website (Hennessey, n.d.). However, the following responses were based on

their own ideas: catch less, don't fish when they're spawning, don't litter in the water, stop

catching them, keep the water clean, stop building hydro dams, and no polluting. While we had

talked about some of these things (e.g. the dams and pollution during the salmon life cycle

game), the students had used this knowledge to consider their own solutions which was very

exciting for me as a classroom teacher. When considering the exceptional needs of students in

the class, it is important to realize that this type of thinking may be challenging for some

students. In addition, as discussed, there are many students who have difficulty with

communication, collaboration, and problem-solving in general. I would argue that it is still

important for these students to be included in group work so they can be part of the

conversations. One area I researched was the importance of peer supports for students with

exceptionalities, which can be a strategy utilized by teachers to support meaningful inclusion for

the students in their class.

     Finally, another theme that has emerged is the concept of *engagement* and *experiential*

learning, which relates to different aspects of this study. The first concept addresses how

students engage with the lessons and activities. Are they interested in the topic/activities? Are

they enjoying learning? Throughout this study I was faced with this dilemma and had to adapt

the lessons to include a wider range of multimodal presentations to address the various needs of

the students to increase the overall engagement. For example, some students needed to move in

order to learn and so I implemented outdoor games. This was another reason why I chose to

implement dramatic skits and iPads, as I knew that technology was highly engaging for my class

which would increase motivation and interest. Another aspect of engagement that developed was

the ideas of environmental stewardship (or social engagement) which is integral to the inquiry

process. As discussed previously, the IBL process allowed students to become immersed in the

curricular content in a more meaningful way. Inquiry-based learning also allowed the students to

experience their learning with a hands-on approach. This form of experiential learning included

some opportunities for outdoor experiences as well. The feedback from the students in the class

supports this form of experiential learning. When asked, 13/16 stated the field trip (where we

observed salmon with the guidance of a local biologist) and the outdoor game helped them learn the most about salmon. This finding may be important for teachers to consider when playing activities for their students. Another finding is that it is important for teachers to ask for and receive feedback from their students on how they learn. As previously discussed, some students may need some guidance and support in order to do this. As previously argued, researchers such as Leach and Duffy (2009) have stated that having a variety of instructional activities should be part of the daily experiences of students in the classroom (pp. 33). So, when considering the needs of exceptional learners in the class, this movement towards incorporating a variety of instructional approaches may in fact support the learning (and engagement) of all students in the class.

Applications

As outlined, my findings appear to be in line with other research that promotes multimodal approaches, Universal Design for Learning (Katz, 2012), and differentiation (in both instructional formats and student output) to support all learning in the classroom. In this study, I collected evidence that demonstrated the use of Knowledge Building Circles was helpful for most students to develop their speaking and listening skills, which allowed them to begin learning from each other (as opposed to solely from the teacher). The use of multimodal approaches appeared to support the diverse learning styles of the students in my class, which supported engagement and experiential learning. The use of video modeling and dramatic skits introduced the concept of group work and overall, appeared to promote a sense of collaboration. It allowed students to identify strategies to problem-solve with their group members, however, it didn't lead to the application of the strategies in a real group work setting. At the conclusion of the inquiry process, nearly all of the groups (6/7) were able to brainstorm solutions to problems

faced by salmon which means they were beginning to develop higher order thinking skills, which is a goal of the new BC curriculum. This demonstrated that the inquiry process can be a meaningful way for teachers to enhance the learning of students while implementing the new curriculum. While not generalizable to other classrooms settings, my findings may be applicable to other educators who are struggling to grapple with new educational models inherent in the new curriculum.

Limitations and Recommendations

As I was involved in the study as both a participant and a researcher, there are important limitations to consider. As the sole researcher, I depended on my own interpretation of data to reach conclusions for my findings. While this was supported with feedback from the students, it is still based on own opinions. Additionally, due to the social nature of education and the limited number of participants, it is impossible to generalize my findings to other classroom experiences. Each classroom environment is different and while teachers may choose to implement similar strategies, it will never be the same experience. The students and classroom environment will be different in each setting, which has an impact on the results of the strategies. It is my opinion that more research needs to be done in the area of implementing inquiry-based learning, and the new curriculum, and how to best support students with exceptional needs while doing so.

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Appendix A

Cycle 1 (Knowledge Building Circles)

Student self-assessment questions:

- I shared my ideas during most of the Knowledge Building Circles

  YES   NO

- I listened to the comments of my classmates during the KBC.

  YES   NO

- I didn't interrupt my classmates during the KBC.

  YES   NO

- I tried the strategy of putting my hand in the circle when I wanted to speak during the KBC.

  YES   NO

- The KBC helped me to learn more about salmon.

  YES   NO

- I would like to do a KBC again in the future.

  YES   NO

Questionnaire/interview questions:

- I enjoyed learning how to do a Knowledge Building Circle (yes/no). Why or why not?

  _____

  _____

  _____

  _____

- I think the KBC helped us to share our ideas and learn more about salmon (yes/no). Why or why not?

  _____

  _____

  _____

  _____

- I think most of the people in our class used the strategy of putting their hand in the circle. I think we listened respectfully to each other (yes/no). Why or why not?

  _____

  _____

  _____

  _____

Appendix B

Cycle 2 (Dramatic skit)

Student self-assessment and questionnaire/interview questions:

Circle YES or NO to the following questions.

- I enjoyed learning how to make up a skit with my group.   (yes/no)

  Why/why not?

  _____

  _____

  _____

- I enjoyed practicing my lines with my group and recording the video. (yes/no)

  Why/why not?

  _____

  _____

  _____

- I think the problems the groups had in the skit could happen in real life.   (yes/no)

  Why/why not?

  _____

  _____

  _____

- What are some of the strategies that you learned? Do you think that you can use some of the

  problem-solving strategies in real life?   (yes/no)

  Why/why not?

  _____

  _____

  _____

- I think that learning how to do the skit will help me work with a group better. (yes/no)

  Why/why not?

  _____

  _____

  _____

Appendix C

Cycle 3 (Group work)

Student self-assessment and questionnaire/interview questions:

Circle YES or NO to the following questions.

During my group work…

- I tried one (or some) of the problem-solving strategies that we learned in the skits (yes/no)

  If so, which one?

  _____

  _____

- I listened to the comments of my classmates (yes/no)

- I was able to share my ideas (yes/no)

- I made sure everyone in my group had a turn to speak (yes/no)

Answer the following:

- I enjoyed working with my group on the salmon project (yes/no)   Why or why not?

  _____

  _____

  _____

- I think our group worked well together (yes/no)   Why or why not?

  _____

  _____

  _____

- Did making a video help you work together as a group? Why/Why not?

_____

_____

_____

- Did watching the videos help you learn how to work together as a group? Why/Why not?

_____

_____

_____

- What do you think would help your group improve? Why do you think that?

_____

_____

_____

- What is something that you think you can try differently next time?

_____

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- Do you think you learned a lot about the salmon life cycle during this project? Why/Why not?

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