DIFFERENTIATED INSTRUCTION THROUGH CHOICE IN MATHEMATICS

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Abstract

Differentiated instruction through choice is a teaching approach commonly used in classrooms. Bender (2012) states that differentiated instruction is commonly used in general education classes and is particularly helpful to students with an array of learning needs and interests. This research focused on differentiated instruction through choice in mathematics and was focused on developing an early career teacher's understanding of differentiated instruction through choice using the self-study methodology of action research. The question that guided the research was, "How can self-exploration of knowledge and practice lead to improved teaching, confidence, and self-efficacy for an early-career teacher?" Throughout the research, data was analyzed on how differentiated instruction through choice was implemented and how it supported student learning. The data was collected and analyzed on the use of differentiated instruction in support of learners with diverse abilities, including students who are working below, at, or above the graded curriculum. Four themes were identified, these included the dynamics of class routine, the decision between literacy and numeracy, collaboration amongst all classroom members, and students making successful choices. The self-study provided the researcher opportunity to reflect on the experiences of implementing differentiated instruction through choice through focused data collection and reflection in an effort to improve teaching practices

Keywords: differentiation, choice, student learning, diversity, self-study, action research, reflection, self-efficacy

Acknowledgement

This paper is dedicated to my parents, Frank and Rosa.

For all their support, encouragement, and love.

I could not have done it without them.

Thanks mom & dad.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Narrative Beginning: Becoming a Teacher

As the eldest sibling of three, I made my two younger siblings play school. I had a makeshift whiteboard made out of plastic sheet protectors and printer paper. I am able to still visualize my siblings sitting at the children's red circle table in our basement, as they listened to me teach the alphabet and numbers to ten. I was five years old. This is my first memory of wanting to be a teacher. When I was in seventh grade, I volunteered in my brother's kindergarten classroom. I loved spending time in his classroom during my afternoons off from school. It was satisfying and a truly enjoyable experience. These experiences reinforced my desire to be a teacher. When I began high school, I volunteered as a reading buddy at a community school, I also taught at my church's Sunday school program and volunteered to teach skating lessons at the local community rink. I sought out every chance I had to work with children.

As a student, I struggled academically. I was not a strong student and was often left behind because I did not understand a math question or comprehend what I was reading. I recall my first-grade teacher sending books home for me to use, and my mom sitting with me to do extra math practice. The areas I excelled in at school were art projects and lessons that included drawing, creating things, and hands-on activities. Over the years I have realized that I am a hands-on learner and preferred to demonstrate what I knew through art, color, and squiggly lines. I excelled when I was allowed to use my interests to guide my learning and when presented with choices.

I have come to the realization that I am a visual and spatial learner. When I think about the students I have now, and how diverse each one of them is, I reflect on myself as a student and how I found success when I was allowed to demonstrate my learning using

my strengths. I see each of my students as being unique, with their own strengths and interests when it comes to learning. As a teacher, I believe it is my responsibility to support my students and their learning by using their strengths as a tool for success. This is why I became a teacher, and why I chose to research differentiated instruction through choice.

My research was focused on wanting to increase my understanding of differentiated instruction through choice and how to implement the practice in my daily teaching. One of my primary goals was to find ways to meet my students' diverse learning styles and interests. Differentiated instruction through choice is an approach that I believe supports all students. Giving students choice allows them to demonstrate their knowledge and understanding. It is a way to support students who are working below, at, or above the graded curricular level. Differentiated instruction through choice also provides educators more flexibility, time, and opportunities to support all students.

Research Context

Being an early career teacher, my experience in the classroom is limited. I have only been teaching for four years. As my experience grows and I develop as a teacher. I have started to develop expertise in different approaches used in the classroom, for example, guided reading, math centers, and small group work. I am motivated to educate myself on a variety of teaching practices and strategies I can use to improve my teaching and ultimately help my students find success.

For the last four years I have been teaching in a low socio-economic community school with a diverse student population. The school provides for the students academically and also works to meet their basic needs such as nutrition, clothing, care,

and belonging. This current school year I have thirty grade two students, who demonstrate diversity in their abilities, needs, and interests. Many of my students are working significantly below graded curricular level, and require differentiated lessons, activities, and assessments. The ability to use different teaching concepts and strategies is critical to ensure the success of the students and will provide me with a variety of tools to add to my teaching toolbox.

Research Aims and Objectives

Differentiated instruction is an important teaching strategy and is critical in classrooms, as classrooms are composed of students with diverse academic levels, interests, and needs. In a classroom setting, teachers have students who are working below graded curricular level, at the graded curricular level, and above graded curricular level. Teachers are navigating the expectations of teaching curriculum while ensuring students' learning needs are being met. Carol Tomlinson's research focuses on differentiation and the importance of implementing it. In an interview with Wu (2013), Tomlinson states that she "was routinely teaching classes that had such diversity in them that [she] realized that if [she] just did one thing for all the students in the same way and at the same time, [she] was missing nearly everybody" (Wu, 2013, p.127). Tomlinson's research reinforces the importance of differentiation.

Differentiated instruction is "a teacher's response to the diverse learning needs of students in the general education classes" (Bender, 2012 p.2). The diversity within our classrooms is not solely based on the learning abilities, but in addition their backgrounds, cultures, and languages of our students. The education system also needs to meet the physical, emotional, and psychological needs of students which translates to teachers

dedicating time to learning about their students. This includes understanding their interests, needs, and their abilities to be able to tailor our instruction to meet every student's learning needs. Meeting the unique needs of every student can be very difficult, especially in classrooms with a large number of students and minimal additional adult support. Teachers are struggling to find the time to meet their student's diverse needs.

Howard Gardner suggests that "all human beings have Multiple Intelligences, and different intellectual profiles" (Lunenburg & Lunenburg, 2014, p. 2). Because of this, we all learn differently, including the students in our classrooms. Providing students with choice to demonstrate their learning based on their unique needs, interests and talents, results in greater motivation, and authentic learning (Lunenburg & Lunenburg, 2014, p. 6).

Using differentiated instruction through choice in my classroom, I believe will result in greater student motivation, autonomy, authentic learning, and opportunities for successful learning. Tamilselvi and Geetha (2015) state that students process and retain information based on their learning styles (p.6). Student success in a diverse classroom relies on a teacher's ability to meet the unique needs and learning styles of their students. Differentiated instruction through choice supports educators in this theory. The literature supports when teachers provide students with different choices to demonstrate their knowledge it results in success for teachers, and ultimately success for students.

Literature Review: Differentiated Instruction through Choice

Differentiated instruction is considered a common strategy used in modern classrooms and helps to recognize students' varying background knowledge, readiness, language, learning styles, and differing abilities (Bender, 2012; Lawrence-Brown, 2020).

The concept of differentiated instruction focuses on the need for teachers to differentiate their instruction to meet the diverse needs and learning styles of their students in a general education classroom. “Teachers must know the learners in the class, understand not only such things about each learner as her learning abilities, her academic levels, and her individual learning styles and learning preferences but must also show a concern for each student by tailoring instruction to meet her unique needs” (Bender, 2012 p. 2).

Carol Tomlinson, a well-known academic scholar in education focused her work on differentiated instruction. She dedicated her research to understanding differentiation, how teachers use it, and ways it can benefit students in a general education classroom. In an interview with Wu, she defines differentiation as "differentiation as I envision it, does not seek to label and segregate students, but rather to serve them effectively in heterogeneous classrooms that are responsive to their varied needs" (Wu, 2012, p. 127). Tomlinson also suggests that differentiation proposes that we teach not out of habit or teacher preference but in response to the students we serve (p.128). Serving our students means using strategies such as choice in the classroom to meet the needs, interests, and abilities of our students daily through choice based on their strengths and not the teacher’s regular teaching methods.

Differentiated instruction is a complex strategy and can involve many different concepts. Strategies of differentiation in a heterogeneous classroom can include student grouping, adapted assignments, use of technology, choice boards, and more. The list of possible strategies is endless, it simply depends on your classroom and students as well as which strategies you feel confident in implementing. Tomlinson (2000) states that "differentiation suggests that you can challenge all learners by providing materials and

tasks on the standards at varying levels of difficulties, with varying degrees of scaffolding, through multiple instruction groups and with time variations" (p. 9). Tomlinson (2000) states that,

> Most important to differentiated instruction are the elements of choice, flexibility, on-going assessment, and creativity resulting in differentiating the content being taught, or how students are processing and developing understanding of concepts and skills, or the ways in which students demonstrate what they have learned and their level of knowledge through varied products. Teachers determine at the onset of their planning what their students should know and what each child should be able to do at the conclusion of the lesson or unit. (Anderson, 2007, p.50)

Differentiated instruction through choice in the classroom is a strategy that can be applied and results in student success, engagement, and motivation (Servilio, 2009, p. 3). Students have varied interests and depending on the grade they are in; many are aware and confident in their interests and learning preferences. "Each learner brings unique learning characteristics to the classroom with a preference on how they learn the content" (Danley & Williams, 2020, p.83). For example, in a prior school year, I had a student who loved to draw. Drawing was what he did often and usually was caught doodling instead of doing his work. I began to use drawing to help him complete his work, instead of writing a story, or making a presentation, he often would make a comic, or diagram to demonstrate his knowledge. By providing him with this choice, I met his learning needs, interests, and preference of how he learned best. It resulted in success for him, better behaviour in the classroom, and motivation and engagement in his learning. Drawing is a learning preference many students favour, and it is closely linked to visual-spatial

intelligence as identified by Gardner (Lunenburg & Lunenburg, 2014; McClellan & Conti, 2008). This intelligence involves using pictures, graphs, and diagrams to demonstrate one's understanding. Using differentiated instruction through choice, with the integration of multiple intelligences, teachers can support students' learning preferences and interests.

Tomlinson's research on differentiation compliments the theory of multiple intelligence by Gardner. Gardner's multiple intelligence theory stated there are nine intelligences: linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, naturalistic, and existential.

McClellan and Conti (2008) discuss using the Gardner's various intelligences to help identify students' differences and they classify each intelligence as:

- Verbal/Linguistic Intelligence focuses on one's ability to understand, manipulate and use words.
- Logical-Mathematical Intelligence focuses on one's ability to understand and use numbers.
- Visual/Spatial Intelligence focuses on one's ability to see an image or situation and assess it.
- Bodily-Kinesthetic Intelligence is the use of one's body to express their ideas and feelings, demonstrating one's understanding through the movement and use of their body.
- Musical Intelligence focuses on one appreciation for music.
- Intrapersonal Intelligence focuses on knowing oneself and acting based on one's direction and goals.

- Interpersonal Intelligence focuses on being aware of the emotions, mood, goals, aims and motivation of oneself or others.
- Naturalistic Intelligence focuses on one's appreciation of nature and the connection they make with it.
- Existential Intelligence focuses on an appreciation for one's spirituality. Using this intelligence to demonstrate one's understanding through exploring and finding a deeper understanding. (p. 15)

In order to provide a variety of choices for students, learning and understanding of the nine multiple intelligences must come first. The "multiple intelligences holds that every student is smart not just in one or two ways but in many. Gardner believes instructors must attempt to reach all students and develop their diverse intelligences" (McClellan & Conti, 2008, p. 16). Different learning styles, preferences, and needs that student demonstrate can be supported through the use of multiple intelligences, choice, and differentiation. For a teacher to support their students' learning preferences, they should consider integrating the multiple intelligences and differentiation in their classroom.

Lunenburg and Lunenburg (2014) state that Gardner's theory suggests that students have each of the multiple intelligences (linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, naturalistic, and existential), and these intelligences help guide the way they learn and process information (p.6). Therefore, educators must consider integrating as many of these intelligences in their classroom activities, lessons, and assessments to increase the success of the student. By implementing choice and using the multiple intelligences in our classrooms we can

"provide opportunities for authentic learning based on student's needs, interests and talents" (p.6).

When using differentiated instruction through choice, teachers need to consider the multiple intelligences when differentiating, the students' educational capabilities, preferred learning styles, needs, and interests. Not all students will learn, process knowledge, and demonstrate their understanding in the same way. "Not everyone learns best with a single technique. Students actually learn best through various styles: learning by seeing, learning by hearing, learning by doing, learning with music, learning by analyzing, and learning by discussing" (Tamilselvi & Geetha, 2015, p.6). The implementation of choice allows educators the flexibility to meet more students' needs, and interests, while "choice increases student engagement and learning" (Servilio, 2009, p.9).

For this research project, I have chosen to specifically look at differentiated instruction through choice as my strategy to support my students' learning. Using choice in the classroom supports all students' needs, interests, and abilities, while also encouraging their strengths as learners. Choice in my classroom incorporated the use of choice boards, with 3-9 choices on a board, based on the varying intelligences by Gardner. Each choice board, depending on curricular outcome, allowed students the flexibility to use their strengths and interests to demonstrate their knowledge.

Methodology: Action Research and Self Study

I conducted a self-study using the methodology of action research adopting an inquiry-based stance on my practice, experiences, and reflections. My research inquiry was

grounded in my desire to understand my practice using differentiated instruction through choice and to improve my teaching, confidence, and self-efficacy.

Kitchen and Stevens (2008) state that action research is defined as a form of educational research where a professional is actively involved in the practice while being engaged in systematic, intentional inquiry about an aspect of their practice for the purpose of understanding and improving it. Throughout my research, I implemented the six steps of action research below to support my research. Clark et. al (2020) and Mertler (2021) both reference the steps of action research steps. The steps include:

- Creating & Planning: These stages involve researchers identifying their research topic, gathering their information, reviewing related literature, and developing their research plan.
- Acting & Observing: The acting and observing stage involves a researcher implementing their plan of action and beginning to collect and analyze the data.
- Reflecting & Revisiting: These stages are when a researcher begins to share and communicate their results and reflects on the research process.

Creswell (2019) describes two approaches to action research and discusses the key elements of each in his book Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research. The first approach he discusses is the practical action approach. This approach focuses on teachers as researchers who are wanting to research a problem in their own school setting for improvement. In this approach educators are looking at a specific area to improve, that is relevant to their classroom or school and can also include how they can improve their teaching practice and engage in their research. A few of the major principles of this approach include

decision-making, commitment to professional development and improvement, a reflection of one's practice, and data collection, analysis, and interpretation of data.

The second approach is participatory action research. It focuses on elements outside the field of education and does not focus on an individual teacher. This approach emphasizes a community at large. Researchers focus on improving and empowering individuals and organizations in educational and other settings. Some key elements of participatory action research are: exploring relationships between individuals, a form of inquiry, it is practical and collaborative, and is reflective and focused on bridging change.

Both approaches to action research are important and can serve individuals and organizations differently in making a change. I chose the methodology of practical action research because it is "a systematic procedure completed by individuals in an educational setting to gather information and subsequently improve the way in which their particular education setting operates, how they teach, and how well their students learn" (Creswell, 2019, p.587). This approach was selected because I am interested in researching myself and my practice.

My research focused on differentiated instruction through choice but is a self-study of how I implement and use differentiation to benefit my students' success in the classroom. A self-study is defined and best understood as "self-initiated and focused; it is improvement-aimed; it is interactive; it includes multiple, mainly qualitative methods" (Hamilton et al, 2008, p. 21). Self-study is also "characterized by its focus on one's practice and one's role in it, and looking more deeply to identify motivations, beliefs, and concerns around an aspect of practice" (White & Jarvis, 2019, p. 1). I chose practical action research and self-study, simply because I am an early career teacher, and I wanted

to focus on myself, the strategy, how I used it and reflect upon my choices, my teaching, and practice. By using self-study and action research it provided me with a deliberate way to document and analyze my teaching, improve my pedagogy and practice with the ultimate goal to develop my toolkit on differentiated instruction through choice and improve my practice.

My research did not require the recruitment of participants, as I was the sole participant. As a researcher, I had a responsibility to follow the ethics of confidentiality. I conducted my research on myself as the teacher using different strategies in my classroom. Therefore, I had to take extra precautions to keep my students, school, and division confidential. I anonymized the students to not include names, ID numbers, or pictures in my reflections or journal. I also kept the school and school district I work for confidential throughout the research and data collection. This ensured privacy and confidentiality throughout my research.

Pathway to Research

I followed the six steps of action research to assist, influence and guide my research at different stages. The steps acted as a pathway for my research. Below is a description of the actions taken in each step.

Creating and Planning

To begin my research, I created and planned my research project. This included researching differentiation and choice, while also reading on action research and self-study, in order to familiarize myself with my methodology. Developing a thorough understanding of both, and how they would benefit my research goals allowed for better planning. Focusing on differentiation, I also had to plan my approach to implementing

choice in the classroom. The following are elements I had to consider: Who were the participants? What is the end goal? How am I implementing differentiated instruction through choice? What would my data collection look like? And finally, how will this improve my teaching? The planning was an extensive process, as it took approximately 6 months dedicated to researching my topic, reading the literature and planning my research process.

Action and Observing

During these steps of the action research, I implemented my research and collected data for six weeks. The data collected included my reflections, teaching, and differentiated strategies that were implemented. Using a journal as my data collection, provided me with an outlet and opportunity to reflect, and think about my implementation of differentiation. Focusing on action research using self-study was for the purpose of being able to collect data to support myself as an educator.

These steps also included analyzing the data on an ongoing basis. This involved reading my journal entries and utilizing a set of Likert-like scales to find common themes, key words, and analyzing how I used differentiation. During this stage, I determined where my research was successful, where my students benefited, and the limitations present and changes I would need to make to improve the outcome. The data collection process was valuable because I was able to reflect on my strengths and see where I had difficulties. It also encouraged me to step back, and assess myself, the strategies I was using, and whether or not they were effective for my students.

Reflecting and Revisiting

Upon finishing collecting my data, I reflected on and revisited my journal entries numerous times. I used the entries to explore my understanding of using differentiated instruction through choice to improve my teaching. During this stage, I read my journal beginning with the first week through to the end reflecting on the growth I had made as an educator during this process. Throughout the reflecting and revisiting stages I learned that I need to be more flexible, accommodating, accountable, patient, and mindful of my students' learning needs. Also learning that differentiated instruction through choice allowed me to support all levels of learners, and that choice can provide a positive experience for learning.

Data Collection

Data collection included completing a daily reflection journal and utilization of the Likert-like scale on a daily basis. Both forms of data collection were used to reflect on my use of differentiated instruction through choice strategies, my teaching practice, and overall how I felt as a teacher. Data was collected daily, after school, and in my own space at home.

The data collection included these components:

1. A Teacher Reflection Journal
    - I represented my experiences narratively through the use of personal journal entries.
    - I reflected while teaching (How is it going? What adjustments seem necessary? What is most important here?), after the lesson (How was the lesson? How do I know?), and in my journal after school (reflecting on

Likert-like scale questions and thinking about next steps and/or what I want to do differently).

- I reflected daily on the strategies and methods I used in the classroom.
- I reflected on how the day went, how I was feeling that day, and how I felt my teaching was that day.

2. Likert-like Scales
    - As part of my daily reflection, I reflected on the following questions using Likert-like scales.
    - I answered the following questions daily as part of my reflection:
        - How do I feel as a teacher today? (emotions, stress, etc)
            - Happy, Good, Average, Poor, Bad
        - How do I feel overall about my teaching today?
            - Very satisfied, Satisfied, Neither satisfied nor dissatisfied, Dissatisfied and Very dissatisfied
        - How do I feel about the implementation of differentiated instruction through choice today?
            - Very satisfied, Satisfied, Neither satisfied nor dissatisfied, Dissatisfied and Very dissatisfied
        - Did the strategy used go as planned?
            - Very satisfied, Satisfied, Neither satisfied nor dissatisfied, Dissatisfied and Very dissatisfied
        - Is this a strategy I would use again?
            - Yes, No

The Shape of the Data

My research and data collection were based on the six steps of action research. Each action research step supported me as I embraced the research journey while teaching a class of thirty students. I conducted a self-study focusing on myself as the only participant. My students were members of my classroom daily, participating and engaging with the choice boards and different strategies used, but no data was collected from my students. All data was documented throughout using my teaching journal and daily Likert scale. The students in my classroom were observed throughout, but these observations were used to guide my reflections, specifically answering questions such as: How was the lesson? What adjustments were needed? What would I do differently next time?

In using the six steps, I began to feel as if I was improving my teaching and strategies in the classroom. Often reflecting on my day, and teaching strategies, led to me being more flexible and willing to implement and try new things.

Considerations before Implementing

Before beginning my data collection, and using choice boards with the students, I took several days to prepare both myself and my students. Differentiation has been a focus in my classroom since the start of the year. At the beginning of the 2021-2022 school year, my students were assessed using both government and school division assessments. The tests assessed the literacy and math skills students are expected to have learned. The results of the assessments showed gaps and a decline in my students learning. In my classroom the gaps between my students' learning levels are significant because of the socioeconomic status of the community, English language barriers, and

lack of basic needs such as food. In addition, the COVID-19 pandemic added to the decline in learning levels of my students. Many of them were struggling because of online learning the past eighteen months, initially going online in kindergarten. Thirty percent of my class was online for eighteen months, not having experienced first grade, in person, in a normal classroom setting.

When I began preparing for my research topic at the beginning of my master's degree, I was a grade six teacher. In my grade six class I used strategies such as flexible seating, student-centered learning, and choice often in my classroom. I originally thought I could translate this understanding of implementing differentiated instruction into my grade two class. I intuitively began to understand that the choices for a grade six student compared to a second grader were very different. My second graders struggled the first few weeks, as they did not understand the choices or how to use them to benefit their learning. As a result, I needed to pause and reflect, and prepare for student understanding at a different grade level before I started to collect my data. The week of preparation included explanations, expectations, and communication centered around using choice and the choices students had. It also was centered around teaching the students about using strengths and interests to guide their choices.

Initially I focused on collecting data on both literacy and numeracy. It soon became apparent that using both literacy and numeracy choices resulted in confusion and difficulty for students to demonstrate their learning. Two weeks into my data collection I decided to discontinue providing choices in literacy activities and only focused on offering choices during numeracy activities.

In addition to students needing prior instruction on making choices, further issues arose. The district I work in provides teachers with a curricular outcome guide that must be followed throughout the year. The pacing guide is a result of the impact of COVID-19 on student attendance and the high rate of student and family transitions between online and in-person learning. Because the order in which I taught the learner outcomes were predetermined, making choice boards for certain concepts and units was complicated at times.

Choice Boards

My choice boards were developed using Gardner's multiple intelligences, sometimes using 3 choices, and other times with 6 choices. The choices implemented depended on the concept being taught, and the complexity of it. In preparation my students were introduced to multiple intelligence theory prior to increasing their understanding of the differences between the choice. Below are a few examples of choice boards used in the classroom.

Mathematical	Visual	Linguistic

- Using manipulatives to support you in skip counting by 2, 5, and 10's	- Using math tools (technology) to demonstrate skip counting by 2, 5, and 10's.
	- Students can use:
	  - Whiteboards
	  - Math journal
	  - Clear Pocket Charts
		- Using technology (speech to text)
		- Or working with partners to verbally demonstrate your understanding of skip counting by 2, 5, and 10's

Table 1. Skip counting by 2, 5, and 10.

Mathematical
- Using manipulatives to demonstrate place value and even and odd numbers
  - Manipulatives
  - Technology
	Kinesthetic
	- Using space around the room to demonstrate place value and even and odd numbers
	  - Reading corner
	  - Flexible seating options
	  - Using movement cards to support learning
		Visual
		- Using math tools to demonstrate place value and even and odd numbers
		  - Whiteboards
		  - Math journal
		  - Clear pockets

Table 2. Place Value & Even and Odd Numbers

Demonstrate your understanding of addition and subtraction to 100 using ten frames.	Demonstrate your understanding of addition and subtraction to 100 using manipulatives	Demonstrate your understanding of addition and subtraction to 100 using whiteboard
Demonstrate your understanding of addition and subtraction to 100 using your mental math/counting skills	Demonstrate your understanding of addition and subtraction to 100 using paper and pencil	**Addition & Subtraction**

Table 3. Addition & Subtraction to 100

Outcomes and Findings

Throughout the research process, I followed a four-step process: think, plan, act, and reflect to discover themes about my research. This process allowed me to use my daily reflection journal as a tool to support my teaching to be flexible, reflective, accessible, patient, attentive, and aware of my students, classroom environment, and lessons.

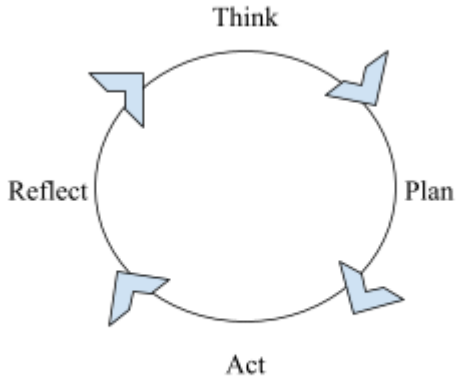

Figure 1. Four Step Process.

The reflection of my data analysis led to the discovery of four common themes. These themes include classroom routine, the concept being learned, use of differentiation, and collaboration.

Theme 1 - Class Routine

Throughout my data collection and research, I often found myself reflecting on the classroom routines and observed that some days the routine was smoother than other days. My classroom schedule consisted of language arts at the start of the day, math after recess, and then social, science, and other subjects rotated in the afternoon. While the cycle worked some days, it became apparent that making it to the end of the day was harder some days than others.

My reflection journal provided insight to what I was feeling about the routine and rhythm of the day. During the data collection I would reread entries from previous days

to uncover patterns and find solutions. I began to consider the idea of switching math and language arts, based on observing how my students were acting and behaving in the classroom. I also became increasingly more attentive to the students' needs, their behaviours, and the extracurricular events happening that week in the school. Switching my routine allowed flexibility, but also increased my patience. Planning math lessons to be the first subject of the day turned out to be beneficial as the students were focused and ready to learn first thing in the morning. It also benefited me, as I found collecting my data in the morning allowed me, for the rest of the day, to focus more on my teaching and the students.

In the process of reflecting on the previous day's data and my teaching, I understood the importance of being flexible in making decisions to change my routines. Understanding my students' behaviour, effort and readiness taught me to step back from my teaching and reflect on my teaching using differentiation and my teaching routines. Before reflecting daily on my teaching, I may have ignored the cues that the routine was not working. Assessing myself, evaluating the lessons at hand, and reflecting on the strengths and weaknesses supported my teaching and execution of lessons using differentiation. My self-efficacy and confidence improved during this process because I was able to understand that I had the opportunity to improve the success of my students.

Theme 2 - Literacy Versus Numeracy - Teacher & Student Learning

When preparing for my data collection and research, initially I wanted to collect data in both language arts and math. At the start of my master's, I was teaching sixth grade. Students at this level are more in tune with their learning needs and strengths and could make choices independently. However, teaching second grade, during my research

revealed challenges when teaching two subjects incorporating choice. Students at a second-grade level are not as aware of their strengths and weaknesses, and when given a choice, often make multiple choices or change their choices each lesson or day. As a result, I chose only to focus my data collection and providing choices in mathematics.

When focusing on mathematics for my research and data collection, it became evident that most students based on the assessments conducted at the beginning of the year were below grade two academic level and were struggling to catch up. The community I teach in is a lower socioeconomic status area, many students have limited access to online learning and resources. “In some grades, students who did not have access to remote instruction may be starting this school year close to a full year behind in mathematics" (Kuhfeld, 2020, p. 560). This is an important reason why differentiation, and meeting students' learning needs is critical at this time.

When collecting data, areas of reflection included subject area, choices being given, and the differences of students working at lower graded curricular levels versus higher graded curricular levels. These three areas were present throughout my journal reflections. Changing from two subject areas to one, made data collection and my reflections easier as I could narrow my focus and really target the area of mathematics. It also made it simpler when teaching and providing the choices for differentiation focusing on teaching my students three to six choices for one subject area versus teaching this in two subjects. This also improved their confidence when making choices. Many students by the end of my research had a good idea of their strengths and choices they preferred to demonstrate their understanding.

Learning to be flexible with my differentiation and choice took time, and required trial and error. The first few weeks I found myself in a juggling act trying to implement choice, manage student behaviour and teach the curricular expectations. It was difficult to get into a routine with all three areas: choice, student behaviour, and curricular expectations. I had to find what worked for myself and my students and choosing one subject area to focus on alleviated much of the stress. Also implementing similar choices on each choice board made it easier for students to be independent in making their choices.

Theme 3 - Collaboration

To provide some guidance during my data collection, I met with a consultant from the district. We discussed my research, class size and the struggles I faced having the students be independent so I could have small group lessons at my small group table. My colleague suggested finding more ways to implement collaboration. They suggested that collaboration would allow for more independence amongst my students, allowing me to work more frequently with students in small groups. "Collaboration, in turn, is when students actively work together and with the teacher, shifting the nature of authority to the group" (Frykedal & Chiriac, 2017, p.195). Reflecting on this conversation I put a plan into place to increase student collaboration. I set up expectations for the students and added working with partners as a choice. This allowed my students to work in small groups of 2-3 to support each other's learning and demonstrate their learning. The students still worked on the same curricular expectation and could still choose how to demonstrate their learning within their group. This was one of the most successful strategies I implemented throughout my research.

The implementation of collaboration as a choice and strategy allowed my educational assistant and me to shift authority and support more students in small groups. I was able to assess students' learning, develop small groups and implement support daily for all subjects. The collaboration choice is a concept I began to use in language arts, math, and when assigning independent work for other subjects. Specifically, for math it allowed me to host small groups and reteach students' concepts. Through using mini lessons and demonstrating different strategies, I was able to help students be successful with the curricular expectation they were learning.

Collaboration gave me the flexibility, patience, and awareness of my students, while being attentive to small groups, and being mindful of their needs and strengths. This is a strategy I will continue to use in my journey as a teacher. Students can provide each other support, allowing teachers to step away and focus on students who need that additional support or lessons.

Throughout the process I witnessed my students become more independent and rely on each other for support. Frykedal & Chiriac (2017) discussed multiple skills learned when group work is present. These include feedback, asking and giving help, discussion, sharing authority, accountability, and seeking clarification. Upon implementing collaboration in my classroom, I witnessed my students develop independence, but they also developed skills as mentioned by Frykedal and Chiriac. My students were more willing to ask for help, they provided each other feedback and support, they were accountable to their learning and the learning of each other and while doing so they had fun.

My students are now more confident in asking each other for help before they come to me, especially if I am working with a small group. This has allowed more opportunities for me to teach, and for my students to be independent. It has supported them in other ways, such as with their dialogue, social skills, and their confidence. Implementing collaboration, setting expectations of what this looks like, and allowing my students the opportunity to work with their peers has changed the dynamic of my classroom.

Theme Four: Student Choice - Success for All

Reviewing my reflections, another area of improvement was my ability to distinguish between below, at, and above graded curricular level students and their academic needs. Providing choice for students allowed all the students to participate. Students below grade level required additional support. I had one student who was well below grade level, testing at about kindergarten level. This student required choices and learning concepts to be further modified and additional support was required from my educational assistant and me. Compared to students at grade level, or above grade level, I found the choices provided allowed for successful demonstration of learning, and in some cases also allowed for the challenge when needed. My above grade level students often took the initiative to pick choices that would give them a slight challenge as it was something new to them. They enjoyed challenging themselves and also using their strengths to support students around them with the choices they made. I also provided above grade level work, and access to technology sites like Mathletics, which were programmed with above grade level activities to provide a challenge.

Reflecting Back

As I concluded my research and data collection, I reflected on my research question: *How can self-exploration of knowledge and practice lead to improved teaching, confidence, and self-efficacy for an early-career teacher?* Participating in action research helped me develop skills that I can apply to my teaching and the development of methods I use in the classroom. Action research is the process of examining one's teaching, methods or strategies, and determining ways that it can be improved through one's own research and actions. I focused on differentiated instruction through choice because of my philosophy as a teacher. I believe that all students should be engaged in the classroom, demonstrate their learning based on their strengths, develop confidence, and ultimately have the right to be successful in their learning. My philosophy was at the forefront when implementing action research and exploring differentiated instruction through choice, to develop more knowledge and practice to improve my teaching, but also my confidence and self-efficacy while using the strategy as an early-career teacher.

Self-Efficacy & Confidence as an Early Career Teacher

In Friedman and Kass's (2002) article on teachers' self-efficacy, they define it as "a teacher's perception of his or her ability to perform required professional tasks, regulate relations involved in the process of teaching, and perform organizational tasks" (p.684). As an early-career teacher, I have had the opportunity to teach three different grade levels and be involved in many different organizational tasks throughout the school such as coaching, being the technology and mental health lead teacher, and participating in school events. Participating in extracurricular activities in the school are important to me as a person, aligns to my philosophy and contributes to my career as a teacher.

Self-efficacy as an early-career teacher throughout the research process involved a few key steps: Planning, preparing, and educating myself on the topic; conducting my research; collecting data and analyzing it; learning throughout each step.

Each of these steps have played an important role in the development of my ability as a teacher when using differentiated instruction through choice. I wanted to implement differentiated instruction through choice for both my students' benefit and to advance my learning and further my understanding. With the inclusive dynamic in most classrooms and teachers having to deal with differing levels of learning I believe this concept is critical to my success as a teacher. To successfully implement differentiation through choice I had to educate myself about the approach, develop the tools to implement the strategy, and plan how to implement it. I learned so much through the research process about the concept, about me personally, and the growth I made. Some areas of growth in enhancing myself-efficacy during the research process included: organization; flexibility; professional judgment; classroom management; student involvement; shared authority, and collaboration. Being an early-career educator, there are pressures, expectations, and necessities teachers must meet. Sometimes, these pressures are overwhelming, and teachers may attend to these demands before meeting our students' needs. During this process, I learned to use my professional judgment and be flexible in my approach to balance my students' needs and the needs of my administration. I am more confident in who I am as an educator because of this process of improved self-efficacy, and I am motivated to continue to develop.

Another area of growth for me is my confidence. Having taught different grades, I have not yet developed my full knowledge around a graded curriculum or developed

strong strategies that I can use with a particular grade. Going from lower to upper grades and then back down to a lower grade, I have not had the chance to hone the strategies, and the knowledge to teach confidently and successfully. Participating in this research gave me the opportunity to focus on the important skill of differentiated instruction through choice and to grow as a teacher in this area.

Differentiation is about implementing a strategy or tool to support students' learning but is also about a teacher's way of thinking and doing. Subban (2006) quotes Tomlinson throughout his article, focusing on her expertise of differentiation. "Tomlinson (2000) maintains that differentiation is not just an instructional strategy, nor is it a recipe for teaching, rather it is an innovative way of thinking about teaching and learning" (Subban, 2006, p. 940). Developing my understanding and confidence in using differentiation required understanding the literature and practice as well as understanding why I should use this strategy. Differentiation "provides a crucial platform for all teachers of inclusive classrooms, to create opportunities for success for all students. The differentiated classroom balances learning needs common to all students, with more specific needs tagged to individual learners" (Subban, 2006, p. 940). My reason for wanting to implement differentiation was to meet my students' needs and teach them to learn about their learning strengths and use their interests to guide their learning success.

Throughout my research, I developed my understanding of differentiation, but it was not until I implemented the strategies that I developed my confidence. Going into my data collection, I was hesitant, believing it would fail, I would collect no solid data, and that my students would not understand. It took a few weeks to get into the routine and teach them about the different choices and strategies. I first had to help them develop

their understanding and confidence and apply the strategies for a certain period of time before my confidence increased. In the end, it was a team effort, and without my students and their success using differentiated instruction through choice, I would not be confident in using the strategy.

Key Learnings

Throughout this process, there have been many areas of learning. These include learning about differentiated instruction through choice, implementing it at upper and lower grade levels, student learning abilities, learning to be flexible and supportive, and becoming patient and confident. While this process took time and effort it was rewarding and well worth it.

When I started my research, I was teaching in a sixth-grade classroom. I implemented differentiated instruction through choice as a trial with a few different lessons. This was simply to see how I liked it, and how it would work. It was quite successful, but it was successful because grade 6 level students have a better understanding of their interests and strengths as learners. There was some teaching that needed to happen and guidance in making those choices, but it resulted in a lot of success for my students. Moving into a lower elementary grade level, implementing choice was more difficult. My students had no idea what their strengths were, they knew what their interests were but at this age, their interests changed more frequently. I found myself having to teach them about the choices, and different strengths they could demonstrate as a learner. There was a lot of trial-and-error using different choices and letting them explore. One of my major learning was differentiated instruction through choice can be

applied to a lower grade level but it requires a lot more background knowledge, scaffolding, and classroom management.

Another area was for learning to occur I needed to ensure my differentiation strategies supported all learning abilities and levels. I had to learn about my students, their learning abilities, needs, strengths, but also whether they were at grade, a level below grade level, or above grade level. I wanted to implement choice but still wanted to challenge and support all the students in my classroom. This was another key learning area, wanting to implement choice, but still wanted to challenge and support all students in my classroom. Getting to know my students and their learning is crucial and is something that I will do every year no matter what grade I teach. Getting to know my students is important in creating a supportive, inclusive, safe classroom environment where my students can use their interests, strength, and abilities to shine in their learning.

Time, patience, and effort are other key learnings that took time to develop, but I am glad that I did. Differentiation takes a lot of work and a lot of effort from the teacher. We need to know our students, their needs, and abilities, but also, we need to know their interests, strengths, and motivators. As well, implementing differentiated instruction through choice took a lot of learning on my part before I could implement it. While I needed to know my students, I had to also know the curriculum, and the expectations before implementing differentiated instruction through choice. I had to be organized and flexible in my implementation and adapt when needed. I learned a lot and developed a lot of patience when using this strategy, it took effort on my part but once it was successfully implemented and my students were confident and using it, it got easier, and I enjoyed using and implementing the strategy in my classroom.

Moving Forward

When I began my master's degree initially, my research interest was reading skills in literacy. As I progressed through the program and began reading more and reflecting on my teaching experiences I realized student centered learning, particularly differentiation and choice were of interest. I am so grateful I decided to research differentiated instruction through choice as I gained so much knowledge applying this strategy into my classroom as an early-career teacher.

Moving forward, I hope to continue to grow as an educator and implement differentiated instruction through choice with every class I teach. Being an early-career teacher, I am excited for the journey this career is going to take me on. I look forward to continuing to meet new people, build relationships with my colleagues, students and families, and share my own knowledge and expertise. I hope to one day educate other teachers on the strategy of differentiated instruction through choice, sharing the benefits and success I experienced.

References

Algozzine, B., & Anderson, K. M. (2007). Tips for teaching: Differentiating instruction to include all students. *Preventing School Failure: Alternative Education for Children and Youth*, *51*(3), 49-54.

Bender, W. N. (2012). Differentiated instruction: Then and now. In Bender, W.N., *Differentiating instruction for students with learning disabilities: New best practices for general and special educators* (p. 1-24). Corwin Press.

Clark, J. Porath, S, Thiele, J, & Jobe, M. (2020). Action Research. *New Prairie Press.* https://newprairiepress.org/ebooks/34

Creswell, J.W. (2015). Educational research: Planning, conducting, and evaluating quantitative and qualitative research. Upper Saddle River, N.J.: Pearson Merrill Prentice Hall.

Danley, A., & Williams, C. (2020). Choice in learning: differentiating instruction in the college classroom. *InSight: A Journal of Scholarly Teaching*, *15*, 83–104. https://doi-org.ezproxy.aec.talonline.ca/10.46504/15202005da

Friedman, I. A., & Kass, E. (2002). Teacher self-efficacy: A classroom-organization conceptualization. *Teaching and Teacher Education*, *18*(6), 675-686.

Forslund Frykedal, K., & Hammar Chiriac, E. (2018). Student collaboration in group work: Inclusion as Participation. *International Journal of Disability, Development & Education*, *65*(2), 183–198. https://doi-org.ezproxy.aec.talonline.ca/10.1080/1034912X.2017.1363381

Kitchen, J., & Stevens, D. (2008). Action research in teacher education: two teacher-educators practice action research as they introduce action research to preservice teachers. *Action Research*, *6*(1), 7–28. https://doi.org/10.1177/1476750307083716

Kuhfeld, M., Soland, J., Tarasawa, B., Johnson, A., Ruzek, E., & Liu, J. (2020). Projecting the potential impact of COVID-19 school closures on academic achievement. *Educational Researcher*, *49*(8), 549-565.

Lunenburg, F,. & Lunenburg M, (2014). Applying multiple intelligences in the classroom: A fresh look at teaching writing. *International Journal of Scholarly Academic Intellectual Diversity, 16*(1), 1-14.

McClellan, J. A., & Conti, G. J. (2008). Identifying the multiple intelligences of your students. *Journal of Adult Education, 37*(1), 13–32.

Mertler, C,A., (2021). Action research as teacher inquiry: A viable strategy for resolving problems of practice. *Practical Assessment, Research, and Evaluation. 26*(19), 1-12. DOI: https://doi.org/10.7275/22014442

Servilio, K. L. (2009). You get to choose! motivating students to read through differentiated instruction. *Teaching Exceptional Children Plus, 5*(5), 1-11.

Subban, P. (2006). Differentiated instruction: A research basis. *International Education Journal, 7*(7), 935-947.

Tamilselvi, B., & Geetha, D. (2015). Efficacy in teaching through “Multiple Intelligence” instructional strategies. *Journal on School Educational Technology*, *11*(2), 1–10. http://ezproxy.aec.talonline.ca/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1097414&site=ehost-live

Thomas, A. F. (2015). Creating lifelong learners: Fostering facilitation, modeling, & choice in the classroom. *Journal of Curriculum and Teaching*, *4*(2), 17–21. http://ezproxy.aec.talonline.ca/login?url=https://search.ebscohost.com/login.aspx?direct=true&db=eric&AN=EJ1157585&site=ehost-live

Tomlinson, C. A. (2000). Reconcilable differences: standards-based teaching and differentiation. *Educational Leadership, 58*(1), 6–11.

White, E., & Jarvis, J. (2019). Self-study: a developing research approach for professional learning. *LINK-University of Hertfordshire,4*(1), 1-5.

Wu, E. H. (2013). The path leading to differentiation: An interview with Carol Tomlinson. *Journal of advanced academics*, *24*(2), 125–133. https://doi-org.ezproxy.aec.talonline.ca/10.1177/1932202X1348347