Hamline University

DigitalCommons@Hamline

Differentiation And Online Learning

Emily Nelson

DIFFERENTIATION AND ONLINE LEARNING

by

Emily Nelson

A capstone thesis submitted in partial fulfillment of the requirements for the degree of
Master of Arts in Education

Hamline University

Saint Paul, Minnesota

December 2021

Capstone Project Facilitator: Karen Moroz, Ed.D
Content Expert: Kyle Schwarting
Peer Reviewers: Jay Carr, Tamer Abdel Hamid, Jennifer Baker, Aly Sartain, Emaline
Kelley

TABLE OF CONTENTS

Capstone Chapter 1

Introduction

Background

On March 15th, 2020 the following email arrived in my inbox:

"District 196 Community,

In response to an executive order from Governor Walz regarding the novel coronavirus (COVID-19), District 196 has decided to cancel school beginning Monday, March 16 until Monday, March 30. This includes all programs and activities. Teachers will not be providing instruction this week.

School buildings will be open Monday, March 16 from 7 a.m. to 6 p.m. for the limited purpose of allowing students/families and staff to collect necessary items. During this time, families can pick up student prescriptions, technology devices, additional bags of food and other items.

If necessary, we will implement our e-learning plan on or after March 30. More information regarding e-learning, student services and a full list of canceled and scheduled programming will be provided later. We will continue to communicate regularly with families as this situation evolves via our various communication channels, including text message."

I've kept this email in my inbox and over a year later I still marvel at the unprecedented nature of its message. For weeks we had seen news stories of COVID-19 ravaging the world as it traveled from Asia, through Europe, until it inevitably arrived in Minnesota. This email was the first in a series of communications from the district and school which would shape the teaching and learning experiences for the next fifteen

months. With the spread of the COVID-19 virus, life changed in many ways including the way our schools functioned during a pandemic.

My last in person teaching day was Friday March 13th, 2020 and this email was sent only days later in what would become weeks of fluctuation, flexibility, persistence, and unknown. The rapidly evolving expectations for students and teachers changed our school suddenly and drastically. With buildings closed, schools switched to emergency distance learning. Through this switch, an emphasis was placed on digital learning unlike ever before. While online learning opportunities recently increased in popularity for our district high schools, it was a great leap for elementary and middle schools. Through this tumultuous time, interesting learning opportunities have developed and continue to evolve. Integrating more readily available technologies such as laptops, tablets, and learning applications deserve attention as they can hold novel approaches and improvements to our current education system. This inspired my capstone project research question: How can digital teachers utilize differentiation strategies to best meet the needs of their learners in an online environment?

This question has both personal and professional significance. I will be teaching online next year and want to develop best practices for my students. The need for optimized instructional practices is one that is shared by teachers who are faced with technology needs. To better understand the relevance of this investigation, one must examine the educational response to the pandemic, the history and possible future of distance learning, the effects of distance learning during the pandemic, the development of online learning platforms, and a reflection of personal online learning experiences.

COVID-19 and Distance Learning Response around the world

In the spring of 2020 nearly all 55 million U.S. school children under the age of 18 were forced to stay home due to the COVID-19 virus with another 1.4 billion children around the world out of school or child care (Garcia & Weiss, 2020). Teaching and learning through online means is an opportunity that not all students get to experience. According to UNICEF, "31 percent of schoolchildren worldwide (463 million) cannot be reached by the broadcast and internet based remote learning policies either due to the lack of necessary technological assets at home, or because they were not targeted by the adopted policies" ("Education and Covid," 2020).

The World Bank has tracked how countries have continued educating students during this pandemic. Many countries utilized television programs, education broadcasts available on local or state tv programs or online (frequently YouTube) in addition to utilizing online learning platforms such as Google Classroom. Countries adapted final exam schedules and methods. Some countries built on established methods and materials while others created distance methods for the first time. For example in Fiji the Ministry of Education has created radio broadcasts for students in addition to online learning resources. This differs from Finland which is using established online learning methods and communications that students and families are used to. They also have national resources such as their Library of Open Educational Resources and content repository of materials that are maintained by the Finnish National Agency for Education ("How countries are using edtech," 2020). While the specific response of each country varies, all methods required educators to share their lessons in new ways utilizing technology. There

is a world wide need for access to digital learning which can be differentiated to meet the needs of all students.

District Online Learning Initiative

In an effort to meet these student and family learning preferences, districts have begun to develop their own digital learning platforms. I am now part of one of these newly developed digital schools which is called 196Online. It is a K-12 school that will consist of teachers, counselors, English Language teachers, and Gifted and Talented teachers. All instruction will be done online utilizing curriculum created by teachers and the district. In preparation for the upcoming school year we are developing and improving the existing resources to optimize the learning experience for students. As part of this improvement process, I am investigating methods and techniques to provide differentiation for students.

Current enrollment for 196Online is approximately 470 students with expected increases and fluctuations before the start of the 2021-2022 school year. The student population is expected to be more diverse than the district average. The class sizes range from 20-45 students. Large class sizes typically can present a wide range of learners with differing ability and readiness levels. Therefore, a focus on differentiation strategies will be particularly important. Integrating differentiation into an online learning environment is a new frontier that deserves the attention and study to optimize the learning experience for students. While teaching online since the spring of 2020, I noticed there was not a wealth of differentiation opportunities. My class included students who were English Language learners, high ability students who didn't qualify for gifted/talented services, and students who were below and above grade level for reading and math. Using

pedagogical strategies I was able to adjust to meet student needs, however I believe this can be improved at a personal level as well as through the district's curriculum.

Teaching Online

The 2020-2021 school year was unique for many reasons. For me it was my first time teaching fourth grade and teaching entirely online. A new school, teaching team, curriculum, and platform was a lot to take on. Despite these challenges, I saw academic and social growth in my students. Through Zoom, Schoology, and other applications, we were able to build a classroom community where students could learn and succeed. While using a structured daily schedule for morning meeting time, math, and literacy lessons I was also able to integrate flexibility into our days. I could meet with small groups, adjust instruction, and form student groups to provide some basic forms of differentiation.

The feeling of success during this past year can be surprising considering the various reports about learning loss. As John Ewing the president of Math for America describes, "learning loss is complicated" and typically only refers to test score data and not actual learning in the greater sense (2020, n.p). The effects of COVID-19 on student learning and test performance are varied and still being analyzed. According to analysis from the Brookings Institute, student performance on MAP tests indicate that scores are relatively stable. Their findings showed "Students in grades 3-8 performed similarly in reading to same-grade students in fall 2019" while math achievement was "about 5 to 10 percentile points lower compared to same-grade students the prior year." (Soland, et. al, 2020). In the same analysis, they found in all grades the majority of students made gains even if they were smaller than the 2019 school year. These studies rely on test data as the primary way to measure academic growth. There are other variables that have affected

students during this time. Personal challenges affecting students and their families such as illness, economic hardship, access to technology and support are complex factors that frame the data. These reports not only reflect the efficacy of online learning, but learning during a global pandemic and national recession. Therefore, analysis of online learning since the spring of 2019 is not only a reflection of online learning potential. Future onlining learning studies will likely not have to take into account these significant outside factors.

Experience as an online learner

Before I started teaching online, my other direct experience with online learning was as a student. My graduate work has all been online. This has given me opportunities to be flexible with my schedule and allows me to do my coursework around my work schedule. The convenience of online has been most helpful and beneficial for me. This leads me to wonder what is the appeal for online learning for students? In particular, what does this mean for younger students in elementary grades? Flexibility in schedule, content, and instruction are features students and their families can experience through online learning.

Summary

Online learning has potential to meet the needs of diverse learners beyond the classroom. The conditions of the last year have expanded the traditional classroom as distance learning and online learning became necessary. Although it has been a challenging time, students gained experience as digital learners. My personal experience as an online graduate learner and elementary teacher makes me think about how these spheres overlap. My school district has created an online school for students and families

who are interested. The student enrollment shows that there is a demand for this type of learning opportunity.

Preview

Developing differentiation strategies for online learning requires an integration of proven strategies that have worked in classrooms and the development of digital platforms and instructional methods. Chapter two will explore and define differentiation, the philosophies behind it, and common teaching strategies to use with students. Additionally, the realm of online learning will be explored through its history, benefits and challenges, and potential future development.

CHAPTER TWO

Literature Review

Introduction

The landscape of education has evolved over time. In recent years, technology has played a greater role in the education system and learning experience of students. Although technology has the potential to change education, many traditional pedagogical strategies continue to have value. Using differentiation strategies to help all students learn is an important element in creating a successful learning experience. This chapter will examine the question, how can digital teachers utilize differentiation strategies to best meet the needs of their learners in an online environment? To better understand this question, this chapter will examine three primary topics. The first is the role of technology in education. This requires an examination of its history, use during the COVID-19 pandemic, and potential role it can play in enhancing future learning opportunities. The second topic is appreciating the practice of differentiation. Learning about its theoretical framework, pedagogical strategies, and how it relates to curriculum is vital to understanding this practice. Lastly, this chapter will connect the practices of online learning and differentiation to show how these elements can provide an enhanced learning experience for students.

History of Distance Learning

The current pandemic is not the first time student learning has been interrupted because of disease in the United States. During the polio outbreak in 1937, Chicago experienced an outbreak that delayed the start of the school year. While school buildings were closed during the first three weeks of the school year students learned through radio

broadcasts instead. 315,000 children in grades 3 through 8 followed a broadcast schedule printed in the newspaper with a telephone number to call and talk to teachers if they had questions (Foss, 2020). Although this system had challenges, it was another example of teachers and schools figuring out an alternate method for remote learning. This untested adaptation is similar to the switch schools made to online learning due to COVID-19. While the Chicago radio broadcasts lasted only weeks, distance learning for students has lasted for months. As the demand for digital learning is projected to decrease as vaccines increase, some schools and students have found digital learning to be a valuable and sometimes preferred method of learning. Digital learning has the potential to be a permanent part of the k-12 learning experience. According to one research report, the e-learning market is estimated to be worth $375 billion by 2026. While schools might need to close buildings in the future for any number of reasons, digital learning can also be used by choice to reach students in innovative ways.

Digital Learning

In recent years, digital technology has presented new ways for students to learn both inside and outside of the classroom. Although the internet has greatly accelerated the innovation of learning platforms, there were previous iterations of learning beyond the classroom which didn't rely on the internet. The online learning of today has evolved from the practice of distance education. Distance learning uses different methods to bridge the gap of distance and time between teacher and student. Distance education began as a highly independent way of learning and has transformed into a more communal experience that mirrors the experience of in person learning (Shearer et al., 2019). Anderson and Dron define three distinct generations of distance learning (2011).

These three generations occur chronologically and in conjunction with both changing technologies and pedagogical approaches.

Anderson and Dron (2011) describe each generation through the pedagogical philosophy, technologies, and roles of learner and teacher for that time. The first generation of distance learning relied on a cognitive behavioral approach and utilized print, TV, and radio technologies to teach content. The teacher's role was as a content creator and central source of knowledge. This learning required a high degree of learner motivation and lacked regular dialogue between the teacher and student. The second generation integrated a constructivist approach to learning. Students created their own knowledge by using audio, visual, and internet communications. They presented their knowledge through demonstrations of synthesis such as essays. The teacher acts as a discussion leader and guide in this model. The dialogue between teacher and student became more frequent through synchronous and asynchronous methods. The most recent and still developing generation of distance education is connectivism. This method relies on the social components of the internet (Web 2.0) as there are multiple ways to connect between learners and content. Students demonstrate learning through this network by connecting, creating, and evaluating. A teacher becomes a co-learner with the students instead of a focal expert. This emerging and dynamic practice leaves space to evaluate the roles of structure, communication, and autonomy of the learner (Anderson & Dron, 2011). These changes reflect not only the advancement of technology but also shifts in the theory of instructional practices.

Community of Inquiry Practice

As the three generations of Distance Education shows, these learning methods have transformed from a highly individual experience to a collaborative one. One theory that was central to this change is the development of the Community of Inquiry through online learning. A Community of Inquiry is the combination of three elements: cognitive, social, and teaching presence (Garrison & Cleveland-Innes, 2005). The cognitive element includes the content that is taught and concepts to be understood. This element includes readings, lectures, informational slides, videos, and educational content. The social component is the interaction between the community members. Synchronous and asynchronous discussions through messages or video conferencing encourage engagement through these interactions. The teaching presence requires the educator to facilitate meaningful learning through assessing, modifying, challenging, and focused questioning (Garrison & Anderson, 2003). The combination of these three elements provides the educational experience which promotes student learning.

The collaborative nature of a community of inquiry must go beyond frequent interaction between members. Interactions between students must be of high quality to produce high levels of learning. Casual interactions and conversations between peers can help create a foundation for community but that is not enough to achieve academic goals. Students must be guided by the teacher to progress from surface level learning to deeper learning (Garrison & Cleveland-Innes, 2010). The teacher's presence is a necessary component of crafting a more rigorous learning experience for students. Teacher presence provides structure which elevates the cognitive processing of the students. While facilitating these interactions, teachers can use strategies such as setting clear

expectations for participation, providing engaging and rigorous questions and modeling answers to help students create meaning. They can encourage, facilitate, and moderate but shouldn't be the center of the conversation. Making space for student discovery and interactions while maintaining high expectations create an online community of inquiry.

Benefits and Challenges of Online Learning

Learning in a collaborative environment using digital tools gives students an opportunity to practice the skills they could need in an increasingly global society. As technology has shaped many facets of daily life from work, trade, medicine, to communication, it's logical that technology should also play a role in education. By 2012 more than one million American students in grades K–12 were enrolled in online courses, making up more than 5% of all students (Harris-Packer & Ségol, 2015). The merging of technology and education is a new frontier and its effectiveness must be understood. Analysing its use reveals how it can be most beneficial to educators and learners.

One of the primary benefits of online education is its accessibility for learners despite their geographical location. It can provide opportunities for students who live in rural areas, small towns, or home school for various reasons. Online learning bridges the gap between locations and can bring students and teachers together from around the world. This learning method can also provide opportunities for students to move at their own pace. Digital tools and the structure of classes allows for students to progress through lessons according to their needs. There can also be more choice for both content and level of instruction (Barbour & Reeves, 2009). This autonomy can help increase motivation and performance. Without traditional classroom distractions students are not only free to work at their own pace, but can receive a more individualized response

because teachers can give students their full attention. Although online learning limits traditional peer interaction this can actually empower some students as they feel less social pressure when they participate (Cavanaugh et al., 2004). Furthermore, in areas where school performance does not meet institutional or personal standards, online learning programs can be offered as a choice to students and families (Harris-Packer & Ségol, 2015).

Effectiveness of online learning

Most research about the effectiveness of online learning focuses on post secondary learners. The U.S. Department of Education (USDOE) reports a lack of rigorous research for K-12 learning and cites a need for further study (2010). The USDOE found students who were enrolled in distance courses performed as well as, or better than, students in traditional courses (USDOE, 2010). The positive effect was greater in courses where there was more online collaboration and teacher leadership, rather than independent work (2010). This supports the course design methods which align with the community of inquiry practice. The positive effect was more noticeable for undergraduate and graduate students, but not for K-12 learners according to the department's report.

The age of online learners is not the only variable to consider when evaluating the effectiveness of digital education. The shift in student populations can also affect the perception of online learning and its success. As the resources and accessibility of digital learning has changed, so too have the students who are eligible to participate. Whereas early online students were typically high achievers or college bound students, these learning opportunities are now appealing to students with more diverse needs. Students

with disabilities, special needs, or health problems may prefer online learning because it can integrate adaptive technologies and flexible pacing to meet student needs (Harris-Packer & Ségol, 2015). Despite the age and needs of the learner, personal characteristics and skills must also be considered. Barbour and Reeves found the characteristics of successful online learners were students who were intrinsically motivated, independent, and are skilled at reading, technology, and time management (Harris-Packer & Ségol, 2015).

The success or usefulness of online learning is measured by the program goals. Programs that seek to replace traditional learning differ from those who seek to enhance learning opportunities. Online learning which seeks to achieve an equivalent experience or outcome provide opportunities where face-to-face instruction is limited by distance, specialization, availability, or other limitations such as the COVID-19 pandemic. Online enhancement activities seek to produce better academic performance and experience for the learner.

The effectiveness of online schools has been measured against in-person schools using state test scores for reading and math. A study from Harris-Packer & Ségol found students in online schools did not perform as well as students who learned in classrooms. In 80% of the states that were studied, online learners were less proficient. This study also found a potential for online schools to improve over time as states who adopted online schools earlier show similar academic performance between online and in person learners. Some online schools performed as well or better than in person schools but the cause is unknown (Harris-Packer & Ségo, 2015). Data and reports of the effectiveness of online learning especially in the K-12 setting are still emerging.

Instruction Methods

Online learning can be a diverse and multifaceted experience. The U.S. Department of Education describes the conceptual framework of online learning through the type of learning experience, the synchronicity, and intent as a replacement or enhancement to face-to-face learning (USDOE, 2010). The elements of online learning which provided greater outcomes included combinations of synchronous and asynchronous opportunities with greater teacher involvement (2010). According to the meta-analysis, online learning is as effective as classroom learning and blending in person with online learning had greater learning outcomes than only classroom learning (2010).

COVID-19 and Distance Education

When COVID-19 forced most schools across the country to shift to distance and online learning there was no plan for its implementation. The National Education Technology Plan (U.S. Department of Education (USDOE), 2017) outlines a vision for technology integration in schools to promote "everywhere, all the time learning" (p.4), however it did not address how to immediately support widespread remote learning outside of the classroom. During the rapid shift to distance and online learning in response to the pandemic, traditional practices in school quickly changed. Practices in pedagogy, daily routines, and communication had to change in response to COVID restrictions. In an analysis by Greenhow et. al (2021), findings indicate three main challenges. The first challenge was the lack of synchronous learning between teachers and students. Most learning material was offered online and asynchronous communication methods such as email, online posting, and videos were most frequently

used (Greenhow et al., 2021). Another challenge was lack of student accountability with over a third of teachers surveyed reporting that student work during the pandemic (spring of 2020) wouldn't count towards their final grade. The third obstacle was lack of student engagement with one fifth of teachers reporting students who didn't log in or participate digitally (Goldstein et al., 2021). Lastly, the increase in teacher workload and frequency of technology related communication made work more time consuming, challenging and stressful (Kurtz, 2020). The circumstances of emergency distance learning created a less than ideal circumstance for teachers, students, and families.

Future of online learning

Given the evolution of distance learning and modern day online learning, the structure of education has changed. Frequently the focus of online learning has remained narrow in focus. The approach to online education has been based on replicating in person learning goals and methods. There are other areas of developing interests which focus on individualization and adaptive learning to meet the needs of students.

The future of online education is still developing and some researchers sought to figure out what students want in the future of digital learning. Shearer et al. (2020) studied post secondary online students and faculty through interviews, observations, and metaphorical images representing their desired learning experience. The faculty results showed they wanted to incorporate several multifaceted pedagogical approaches. These approaches included personalized or adaptive learning experience including content, assessment, and experience. A second transformative approach encourages problem solving as a means for learning. This would focus on student experience and provide opportunities for real life problem solving, exploration, and outcomes. The third approach

is a collaborative, constructive and connected learning experience. This encompasses learning that is cross cultural, deep, collaborative and student centered. The needs and wants of students frequently overlapped with faculty. Students value control over their learning with multiple means of support and communication. Flexibility, control, and communication to deepen the learning experience are key components to sculpting a future of online learning (Nilson & Goodson, 2018).

Online learning is relatively new but it has evolved from fundamental needs for widespread and accessible education. Combining focused academic content with a community of peers helps students engage in their learning experience. As more learners turn to online learning the diversity of students will become more apparent. How will this diversity of backgrounds, interests, and needs be addressed? The practice of differentiation can help bridge the gap between the universality of online learning and the specificity of the student.

Differentiation

Despite advances in technology and online learning opportunities, students will continue to have varied needs and learning profiles which affect their experience. Curriculum and standards based pedagogy will still need to be adjusted to meet the needs of students. Through differentiation, students can be better supported to achieve academic success. Differentiated instruction can be described in many ways but it relies on the adjustment of instruction, curriculum, and assessments. The learning experience depends on student performance, readiness, interests, and needs to provide pathways to academic achievement for all learners (Feigal-Hitch, 2021). This approach takes into consideration the specific needs and individuality of each student. Differentiation is not a singular

curriculum or strategy but a belief in the capacity for all students to learn. Engaging students through varied approaches to learning, pacing, support, and complexity are elements of a differentiated classroom (Tomlinson, 2014). Students enter the classroom or any learning environment with different backgrounds, feelings, and experiences. A differentiated classroom is flexible enough to accommodate the diversity of its learners. Through differentiation, the strengths and abilities of all students are respected and honored.

Assessment

Assessment is a key component of differentiation. Using both formative and summative assessments measures student progress frequently. Tomlinson (2014) highlights the importance of this element as "persistent formative assessment guides both teacher and students toward essential goals" (p.14). Teachers utilize data collected to shape further instruction. Formative assessments used throughout units of study can include exit slips, journal entries, conferences, group discussions, homework, pre-tests, surveys and other means to collect information about student understanding. These assessment opportunities can be diverse so students can find ways to demonstrate their knowledge, understanding, and skill. Performance on assessments reveal students' readiness level which is their level of understanding. Teachers utilize this diagnostic information to differentiate instruction. Student success is measured by individual growth and development, not just grade level expectations. Assessing academic progress is a greater indicator of student growth than relying only on grade level benchmarks. Differentiation is responsive and meets students where they are rather than a

preconceived notion of where they should be, therefore assessments are a vital step in determining student readiness (Tomlinson, 2014).

Strategies

Modifications to curriculum can be based on several factors. Student readiness, learning profile, and interests can influence teacher choice for differentiation strategies. Teachers can make informed choices to differentiate through content, process, product, and environment (Tomlinson, 2014). Together all of the elements can help students achieve growth, whether they are below, at, or above grade level or vacillate based on area of study. Differentiation relies on a flexible approach to teaching based on continuous assessment of student needs.

Curriculum

"Quality curriculum requires clear and compelling learning goals used in ways that engage students' minds and lead to understanding" (Tomlinson, 2014). Teachers shape curriculum around the essential knowledge, learning goals, and standards that need to be mastered. The content is what students are supposed to learn frequently connected to grade level standards. Teachers can differentiate curriculum by adjusting content, process, and product.

Content. Determining the content for students in a class is often a combination of external forces and internal needs. Districts and individual schools can develop or purchase curriculum which align with state standards. Between national and state initiatives and local resources teachers might be given a certain content to implement in their classroom. According to Tomlinson, "content is what a student should come to

know (facts), understand (concepts and principles), and be able to do (skills) as a result of a given segment of study (a lesson, a learning experience, a unit)" (2014, chapter two).

Although content is one element, students and teachers are the other elements. Curriculum in a differentiated classroom is relevant to students, authentic, and enhances their understanding of the world (Tomlinson, 2014). Compelling content speaks to students and teachers as it engages learners. When teachers are aware of student interests and individuality they can provide opportunities for students to learn about content that encourages them to be curious and intrinsically motivated. Appealing to student interests increases intrinsic motivation (Tomlinson, 2014). Giving students choice and voice through learning centers or independent study allows them to direct their inquiry. Independent study allows students to gather and use materials to investigate a topic of high interest. Learning centers are a provided source of materials designed to teach, reinforce, or extend student understanding, skills, and knowledge (Cox, 2008). When content interests and engages students, it sets them up to be lifelong learners.

Process. Differentiating processes can alter the instructional methods for students so they can acquire knowledge at their level. Process is how students make sense of the content. Student activities provide cognitive engagement to internalize the input (Cox. 2008). The process can be altered to meet the readiness level of the students. Best practice utilizes a diverse collection of resources to facilitate individualized learning.Teachers can use different strategies and resources depending on the needs and content being taught. For example, in literacy students can read books that are at their level, listen to audiobooks, or read with a partner or small group. Providing support materials for students to use as needed offer them autonomy and control in their own

learning. Using manipulatives or hands on materials to process and develop understanding of abstract concepts can be helpful in content areas such as math and science. A foundation of differentiated instruction encourages multiple representations of content and process (Tobin & Tippit, 2013). Using a combination of written or spoken words and visuals creates a multimodal presentation of information that appeals to different learner strengths. In addition to modalities, time is another element that can be adjusted to give more time to accomplish a task or explore it in greater depth.

Product. Student product is how they demonstrate their understanding and learning. Projects, essays, demonstrations, are all valuable ways students can show their comprehension. Encouraging students to express learning through writing, verbal expression, and drawing provide multiple outlets for students to demonstrate competency. Creating products alone, with a partner, small group, or teacher support adjusts the complexity of the task.

Learning Environment

The learning environment can play an important role in student success. Teachers work with students to develop "classroom conditions and interactions that set the tone and expectations for learning" (Tomlinson, chapter three). A welcoming and flexible environment is essential for achievement in a differentiated classroom. Teachers can change the physical environment by arranging the classroom layout such as seating arrangements, location of resources, lighting, and use of technology. The environment can also be altered through tone which includes community building, teacher support, routines and procedures. Developing both the physical and emotional environment with students under the guidance of teachers increases the ownership students have in their

learning. Tomlinson outlined several key components of an effective classroom and how students should understand the following: they are welcomed and valued, the teacher will support them, they must work together to ensure growth, it's safe to fail, hard work will lead to progress, and they will have access to what they need to succeed (Tomlinson, chapter two). Providing the right environment that meets student affective and academic needs ensures that students are cognitively and emotionally prepared to learn.

Flexible grouping

Another way to adjust learning opportunities is through flexible grouping. Teachers can utilize the whole class, small group, partner, or individual activities to provide an optimum peer environment. Flexible grouping does not merely alter by size but can also change by academic level. Frequently students are divided into three spectrums, those who are below level, at level, and above level with each group maintaining a unique set of needs. Students who demonstrate a higher degree of readiness on assessments can be grouped together and given higher difficulty tasks. Conversely, students who demonstrate lesser readiness can be given additional support. Teachers can provide review activities and additional materials to help students make meaning of the content. The National Association for Gifted Children (NAGC) supports grouping students according to need. The NAGC cites four reasons for it's support. Grouping helps facilitate the use of differentiated curriculum and instructional strategies based on academic needs, addresses the emotional needs of students, and encourages students of similar ability levels to learn from each other (NAGC, 2009). Students can be regrouped as needed according to their performance in different content areas. It is an appropriate tool for all grades K-12 and can be utilized in all content areas. Grouping based on

ability, also referred to as homogenous grouping, has increased in popularity. In Kindergarten, it's estimated that the use of ability grouping has increased from 41% in 1998 to 79% in 2010 (Kemper Patrick, 2020). The use of grouping has shown some positive results in student performance. One study that focused on primary grade reading found that students who were grouped homogeneously had slightly higher reading growth than those who were not grouped according to level. However, the effectiveness can also depend on initial group placement and amount of time spent with the teacher (Kemper Patrick, 2020). Other studies show grouping can be effective in other grades too. Implementing homogeneous grouping strategies for students in grade 10 showed a significant increase in reading comprehension when compared to a control group (Magableh & Abdullah, 2021).

Despite overall positive correlation between grouping and growth, the practice is difficult to study and has been criticized for its inequity. Multiple studies find that certain groups of students, especially those who are male, low income, and black are placed in lower level reading groups more frequently (Kemper Patrick, 2020). Fiedler et al. addressed other issues associated with the use of homogeneous grouping in the classroom. A primary concern is that grouping by ability is the same as tracking. These practices are distinctly different as tracking is static and permanent while grouping is flexible and there are multiple opportunities to change groups. Therefore students are not relegated to certain groups and have continuous chances to move between levels (Fiedler et al, 2005).

Differentiated instruction has provided means to tailor instruction to a diverse student population. However, there can be challenges in implementing this practice.

Teachers have reported obstacles such as time constraints, assessment challenges, and lack of available resources (Tobin & Tippett, 2013). Support from school administrators and leadership can also impact a teacher's ability to implement differentiated instruction. Positive instructional leadership is shown by principles who set high expectations for students and teachers, are knowledgeable about curriculum and assessments, communicate openly, and provide guidance and support for teachers (Goodard et. al, 2019). In a study by Goodard et. al., instructional leadership proved to be the strongest predictor of schoolwide differentiated instruction despite the demographic makeup of the school (Goodard et al., 2019). Teachers who felt supported were more likely to engage in utilizing differentiated instruction philosophy.

Differentiated Instruction Strategies

Tiered Activities. Assigning tasks based on student readiness, performance, and understanding is the basis for tiered activities. Tiered activities differ for individuals or groups of students. They are optimally suited for students who have not yet mastered learning targets but show a high ability and benefit from greater challenge (Feigal-Hitch, 2021). Depending on the content area students might need more challenging text or numbers. In a classroom setting, all students can be learning the same content but processing through differentiated activities.

Enrichment and Extension Activities. Enrichment or Extension activities should offer more depth and complexity from material within the content area being studied (NAGC, n.d.). Teachers can provide these opportunities and guide students towards making learning choices that benefit their growth and development. Challenges, puzzles, projects, reports, and experiments can all increase the rigor for students as they process

learning and create a product. Requiring high rigor while allowing student choice enriches the learning experience in a differentiated classroom.

Curriculum Compacting. Teachers can modify curriculum by allowing students to skip over elements that have been mastered. "In addition to its use in modifying the curriculum for above-average ability students, curriculum compacting can also benefit any student who displays strengths or high levels of interest in one or more content areas" (ASCD, 1992). Pre-assessments or ongoing formative assessments indicate students who already show understanding of the content. A large segment of curriculum can be repetitive or not challenging enough for some students. Curriculum compacting eliminates barriers for students who don't need this repetition and are ready for new or more rigorous material. A study by ASCD found when teachers compacted approximately half of the material for certain students, they scored equally high or higher than their peers in post-test (ASCD, 1992).

Teachers follow a process to effectively compact curriculum. The first step is identifying the learning goals or targets for the unit they are teaching. Then they identify students who demonstrate understanding or mastery of the content based on assessment data. Finally, teachers must determine if enrichment or acceleration is a better fit (Renzulli & Reis, 1992). If a student is accelerated, they will move onto the next unit of study or skill. Enrichment keeps students focused on the area of content but utilizes different materials and activities that require higher level thinking skills (Renzulli & Reis, 1992). Students who are ready to move to accelerated or enrichment activities benefit from conferencing with their teacher and clarifying their learning goals together. Using tools such as the *Individual Educational Programming Guide* developed by Joseph

Renzulli provides a guided framework. This document, also known as *The Compactor,* is divided into three sections: curriculum areas to be considered for compacting, procedures for compacting basic material, acceleration and/or enrichment activities (Renzulli & Reis, n.d). Planning the supplemental learning activities and pacing for students who demonstrate a need for compacting is another method for differentiation.

Rigor and Difficulty. Rigor in a differentiated classroom is not just an added task, but is embedded in the curriculum and pedagogy (Blackburn & Williamson, 2013). Rigor is relevant to the needs of the student and the degree can be adjusted according to need. "Rigor as it applies to education is not easily defined; school leaders must work deliberately to build consensus and a vision of rigorous classrooms among faculty members" (Williamson & Blackburn, 2009). The North Carolina State Consultant for Academically or Intellectually Gifted (AIG), worked to develop a rubric that defines rigor through curriculum, instruction, and assessments. Rigorous curriculum extends beyond standard content through universal concepts and complex themes and multiple perspectives. Instruction should include rigorous texts, complex questions and dialogue, along with in depth analysis. Assessments are frequent and students reflect on their growth (Matusevich & Hargett, 2009). Academic rigor builds upon knowledge, interests, strengths, and goals.

Differentiation has become a common practice in the classroom. Purposefully recognizing student differences to help make connections to their learning makes learning meaningful to students. Meeting learners where they are academically provides a pathway to growth. This philosophy must now transition from in the classroom to online

instruction. The next section will explore how differentiation can be combined with the evolution of online learning.

Online learning and differentiation

Online learning can take many forms depending on the needs and strengths of the student and teacher. Additionally, the growing availability of learning online attracts an increasingly diverse range of learners. Implementing differentiated instruction in an online platform is a developing practice. Milman notes, "teaching using a differentiated instruction approach can be challenging, especially when attention to the instructional design process is lacking" (2020, p. 74). Offering student choice in this digital environment is a pathway to integrate differentiated instruction online.

Milman suggests several ways to differentiate online by using Tomlinson's foundation of altering content, process, and product. Gathering resources online harnesses the power of the internet. To adjust the content students can access information through videos, PDFs, and podcasts (Milman, 2020). This accounts for their learning profiles and preferred learning modalities of input. Input methods from diverse resources can also adjust for readiness level. Resources that review basic concepts can be provided whereas more complex content can be substituted for students needing additional rigor. Giving students time to work through the content and tasks provides flexible pacing (Westman, 2020). When students are given opportunities to process, tasks and grouping can be altered similarly to in person instruction. Students can work individually or in groups asynchronously or synchronously via video conferencing. Students with greater foundational knowledge can work on tasks that engage in higher order thinking. Teachers can assign targeted practice and utilize skill-based graphic organizers (Westman, 2020).

These tasks can use resources from home to make learning hands on and relevant to the world around them. Differentiating products online allows students to use technology to demonstrate their knowledge. Creating websites, digital presentations, videos and podcasts lets students use their strengths and interests. Feedback can be given by the teacher in response to tasks to help students understand a skill or concept or in response to a process which helps correct misconceptions (Westman, 2020). Encouraging self evaluation through prompts develops self awareness and student directed learning.

Digital Interactions

Technology can limit traditional interactions and communication but it can also provide alternate means for interaction. "Synchronous and/or asynchronous online discussions are the core components in the online learning environment" (Tu & Curry, 2008). Students can be offered choices on how they would like to respond and participate in conversations. Message boards, video conferencing, asynchronous videos, and messages all provide ways for students to share understanding and develop communication skills and build relationships with peers.

The social component of online learning is an important one to consider. Social interactions and peer relationships can have an effect on the perceived level of stress students experience in a learning environment. Emotional tensions can arise when collaborating with peers which can reduce student concentration and ability to learn. Some levels of stress can actually be beneficial when learning but stress which is too high or distracting has a negative impact. Cognitive load theory developed by Sweller postulates that techniques can harness cognitive effort by reducing extraneous information (Lazarevic & Bentz, 2021), A small study of post secondary students found

that online learning students experienced less negative stress than in person students. In particular they reported less stress from the following situations: finding time to study, accessing learning materials, social stress, and expectations from family and friends (Lazarevic & Bentz, 2021). Although the stress factors might differ by age, it can provide a less stressful environment for students whose stress level is higher with in-person learning.

Personalization through Technological Innovation

With the increasing prevalence of technology in many communities, access to quality educational resources has also expanded. Using technology and mobile devices for education, socialization, and entertainment has blurred the lines between these realms. There are concerns that these distractions have infiltrated students' personal learning environments (PLEs) and negatively impacted academic performance (Bidarra & Sousa, 2020). PLE is a combination of resources to be used by self directed or autonomous learners (van Harmelen, 2008). While traditional learning resources include other people, physical materials (printed readings, physical models, writing tools, etc), and computational materials (applications, programs, internet) a "PLE focuses on the computer and digital part of a learning ecosystem" (van Harmelen, p.35, 2008). PLEs and differentiation have several elements in common. Primarily they both offer resources and means to adapt the learning experience to meet the needs, interests, and modalities of the student. The social aspect of PLEs was studied by van Harmelen to assess the effectiveness of social engagement as an element of digital learning. Findings indicated that students benefit more from a centralized communication platform which is teacher led and self directed (van Harmelen, 2008). This study focused on post secondary

students but provides a template for online learning with younger students as well. Providing more teacher directed guidance and communication opportunities beyond text are ways to differentiate the social learning experience for young learners.

Adaptive e-Learning

Differentiating instruction has traditionally been the responsibility of the teacher. With new advances in software and applications, some computer programs are now able to adjust the level of instruction or activity to best fit the needs, goals, and abilities of the learner. Factors that inform most adaptive e-learning systems are student knowledge level and learning style. An adaptive system takes in data to make adjustments and recommendations based on student characteristics. "The Adaptation Model aims to generate a suitable learning path in order to enhance learning. It uses the information stored in the Learner Model and the Content Model to provide the appropriate recommendation" (Fazazi et al., 2021, p.3). The design of these programs use different models and combinations to automatically adjust its user experience.

Although digital models and algorithms can now adjust to meet student demands, ultimately the responsibility will continue to be on teachers to help meet the needs of their students. Teachers, students, and the learning environment they create together will provide the foundation for exploration whether it's in person or online. Technology is evolving to become a more intuitive tool. Harnessing its power has become a necessary life skill for students to learn as we continue into the 21st century.

Summary

Online learning has evolved over time from distance learning that was implemented out of necessity. Technology has allowed digital learning to become more

personalized to meet student needs. Despite these advancements, teachers still need to utilize differentiation strategies to meet students where they are academically. By differentiating the process, product, and environment teachers can adjust their teaching based on student progress. The following chapter will describe how these elements can be combined for differentiated online learning.

In the following chapters there will be information about how to develop curriculum and resources using the information from investigating the research question: How can digital teachers utilize differentiation strategies to best meet the needs of their learners in an online environment? Developing a fourth grade curriculum and gathering resources is the focus of my research. My goal is to find or create resources that support fourth grade online learning for the first literacy unit. Through this process, I will be able to share these specific resources and also a template for planning and developing for other units of study.

CHAPTER THREE

Project Description

Introduction

   This chapter will describe the project which investigates the question: How can digital teachers utilize differentiation strategies to best meet the needs of their learners in an online environment. Using the foundational philosophies and beliefs of differentiation with the best practices of online learning, I will seek to combine these elements to elevate the digital learning experience for my students. As the demand and use of digital learning increases, so will the diversity of needs and expectations of students. This chapter will describe the project, audience, timeline, and assessment to evaluate its effectiveness.

Project Description

   This project will combine online learning and differentiation for the purposes of improving the learning experience for students and increasing their academic growth. These two goals will direct the course of this project. Utilizing resources and methods specific to digital learning and beneficial to online learning will support traditional learning methods. I will add onto the district curriculum and gather resources for the first literacy unit which focuses on both reading and writing. I also see potential to create a professional development resource if I develop frequently used strategies and techniques which could benefit other online teachers.

   The following are resources to support student online learning, including apps and resources available for general learning and specific ones for literacy and math.

- Zoom: live synchronous whole group and small group learning, breakout rooms for student collaboration

- Schoology: primary learning platform for assignments including: quizzes, self recordings both audio or visual, turning in assignments, message center, and community discussion threads for asynchronous communication

- Notability- marking and completing assignments in PDF form

- Google Drive: students have full access to all Google drive components including slides, docs, forms, and jamboard

- Literacy Applications

    - Epic!: Digital library

    - Digital leveled text sets (provided by the district)

    - Book Creator - students can create, publish, and share their own books

I will utilize these resources to plan a curriculum which differentiates lessons and activities for my students. In addition to these resources, I will also use strategies to differentiate the content, process, product, and learning environment for my students. According to Tomlinson, "teachers who differentiate provide specific alternatives for individuals to learn as deeply as possible and as quickly as possible, without assuming one student's road map for learning is identical to anyone else's" (Tomlinson, 2014). Once I get to know my students, their needs and learning styles, I can better adjust to the lesson instruction, activities, and assessments. I recently learned in my class I will have students who are identified as Gifted and Talented, Special Education, and English Language Learners. Their diverse needs will be addressed through differentiation.

The strategies I plan to implement are described in detail in chapter two. These include ability grouping, curriculum compacting, tiered activities, and integrating multiple modalities for instruction. I will also focus on building a community of inquiry

as it is a vital element to creating the inviting and supportive environment deemed necessary by Tomlinson.

Below is a sample of how the differentiation techniques will be documented. I will make note of the way a lesson is differentiated and how technology was integrated. Observations and notes will be made as a way to promote reflection and opportunities for improvement.

Table A

Planning and Resource Grid

Fourth Grade Standard:

	Below grade level	At grade level	Above grade level
Content - Synchronous			
Content - Asynchronous			
Share - Synchronous			
Share - Asynchronous			
Product (Technology Project)			

Literature

This project will integrate the differentiation philosophy advocated by Carol Anne Tomlinson. Her work in differentiation was developed for in person learning. It highlights the importance of content, process, product, and learning environment.

The online learning component is based on Garrison's community of inquiry (CoI) framework. The framework involves three presences: teaching, social, and cognitive where the learning experience is a combination of all three. The teaching

presence includes the direct instruction, the facilitation of the class and activities, as well as the class design and organization. It's the teacher's responsibility to provide meaningful feedback to students through either synchronous or asynchronous means. Offering opportunities through instruction and learning is another part of this presence. Social presence is the relationship between members of the learning community including the students and teachers as well as the communication amongst all parties. Cognitive presence is the ability of students to make meaning and connections to their learning through discourse and reflection.

Setting Audience

The project will be done in a fourth grade online classroom. This is a new K-12 online school provided through Minnesota Public School District 196. The school was started as a response to COVID-19 pandemic and the desire to retain students within the district. There are plans for this to be a permanent school option for all students in the district. Other local districts have already developed an online school and district leaders predict it will be a continued need. The school is K-12 but is divided into primary (grades K-2), intermediate (grades 3-5), middle school (grades 6-8), and high school (grades 9-12). Total enrollment is 468 students, 200 in elementary level. Enrollment by federal ethnicity is as follows: 30% Asian, 20% Black or African American, 10% Hispanic/Latino, 23% White, 10% two or more races, and 8% not reported. Other enrollment information includes 18% English Language Learners and 13% Special Education students. In the intermediate level, there are two fourth grade classes, two third, and one fifth. There are (currently) 25 fourth grade students enrolled in my class,

however enrollment is expected to fluctuate in response to evolving needs and COVID concerns.

Timeline

I will plan and develop pre and post assessments for the first community unit during our teacher workshop time during the week of August 23rd. The first literacy unit focuses on community. It is a six week unit from September 8, 2021 through October 22nd, 2021. The English Language Arts standards for this unit align with the 2020 Minnesota ELA standards (commissioner approved draft). These standards focus on reading, writing, speaking, and exchanging ideas.

All literacy units will utilize a pre-test at the beginning of the unit and post-test at the end. There will also be district reading assessment days September 1-2 (before the start of school). Students will be grouped at the beginning of each unit based on the pre-assessment data beginning the first two weeks from September 6-17. Students will also complete the fall MAP test which gives additional data about student academic level. MAP (Measures of Academic Progress) tests are usually given in the fall for fourth grade students. This data will also inform student grouping and student needs. The groups will remain flexible depending on the needs and progress of students. During the unit of study students will engage in whole group and small group activities which can be differentiated. Post assessments for the first literacy unit will be completed by October 22nd. Additional resources can be added for future literacy units and instructions.

Assessment

There will be multiple measures for assessing the effectiveness of this project. As previously stated, the goals of this project is to improve the learning experience and

academic achievement for each student. To measure academic growth I will compare pre and post assessment data. I will track progress along the way through formative assessments. The philosophy of differentiation values the progress of each student rather than solely measuring against fixed grade level expectation (Tomlinson, 2014).

In addition to academic growth, student experience will also be measured. I will make observations related to engagement and assess elements such as level of participation and student work completion. I will also check in with students through a brief survey of their learning experience at least once a week. Measuring student growth and attitudes towards their learning experience will provide information to evaluate the success of this project.

Summary

The development of this project depends on the needs of my students. Using differentiation in a virtual environment is an emerging area of study and implementation. Improving student learning experience and academic growth through the practice of differentiation and the use of technology can help produce more successful online learning for students in the future.

The following chapter will examine the connections between my project and the literature review. I will highlight the major findings and implications for further research and improvements for differentiated online learning. Technological innovation deserves our attention as its power can be harnessed to make learning meaningful to all students.

CHAPTER FOUR

Conclusion

Project Approach and Outline

Differentiation is a broad term used to describe the many ways in which teachers adjust instruction, practice, and the setting students experience while learning. I kept these elements in mind when developing a project that addresses the question: how can teachers utilize differentiation in online learning? Building on the classroom differentiation work of Tomlinson combined with the online learning practices which have been developed in recent years, I created resources to facilitate digital differentiation. For the purpose of this project I focused my attention on the method of content delivery (synchronous or asynchronous), student readiness level (below grade level, at grade level, and above grade level), and technology based practice opportunities.

Table A

Planning and Resource Grid

MN Standard:

	Below grade level	At grade level	Above grade level
Content - Synchronous			
Content - Asynchronous			
Share - Synchronous			
Share - Asynchronous			
Project - Technology			

I originally intended to provide differentiation to accompany each of the individual lessons provided by my district. I realized this was not the optimum approach once I began developing the curriculum and resource collection. It became difficult to plan as the variation in student readiness level and available technology resources created significant overlap with multiple lessons. As a result, I realigned my planning with the Minnesota State Standards emphasized for each unit by my district. The resources are layered to support students who need extra support and those who need enrichment.

Resources and Rubrics

For each standard used in the planned units, I created Table A with resources and a rubric to guide student inquiry. Utilizing the Understanding by Design (UbD) process (Wiggins & McTighe, 2011) I focused on the end objectives while planning. I used the standards to form rubrics on a scale of 1-4. For the purposes of alignment with our district grading system I connected each score to reflect the relative level of mastery achieved. The district scoring can be described as follows: A 3 is a score that reflects grade level mastery ("Proficient"). A 2 score ("Developing") means the student missed some elements and is making progress towards mastery. A 1 score ("Limited") indicates a student is not making significant progress towards grade level skills. A 4 score ("Exemplary") is earned when students demonstrate skill and knowledge beyond grade level (District 196, n.d.).

The standard based rubrics are shared with students and help students understand their learning goals. This scale of 1-4 aligns with our district scoring system. For example, for each standard I created a rubric which describes what each score looks like (see Table B).

Table B

Rubric Example

1	2	3	4
Description of student performance for **Limited** proficiency	Description of student performance for **Developing** proficiency	Description of **Proficient** student performance	Description of **Exemplary** student performance beyond grade level

Project Elements

I gathered resources to support students and teachers based on these standards and the associated rubric. I considered multiple means to organize the resources and information for each standard. The chart shown in the above table is a general format used to provide the varied methods of differentiation so teachers can use what is needed. I will describe the purpose of each section of the chart in the following paragraphs.

Content - Synchronous and Asynchronous

Methods of content delivery can vary greatly across the online learning spectrum. Using synchronous methods requires a live video conference platform such as Zoom or Google Meet. The 196Online school I work at uses live synchronous daily instruction time for morning meeting, math, and literacy for grades K-5. Middle and high school grades have a different schedule that does not require daily synchronous learning for each content area. This curriculum was developed for fourth grade and I included activities that support live interactive instruction. These activities can build on or replace some of the daily lessons provided by my district for each unit. The synchronous content can be used for demonstration purposes by the teacher or explored by students in small groups.

My goal is to keep both synchronous and asynchronous methods of content delivery flexible for teacher use and discretion. For this reason, I've also included content that could be delivered asynchronously to meet the needs of students and teachers. These asynchronous methods deliver content but do not require live video conferencing. This was relevant to my needs as Zoom time is limited per the design of our online learning program. Another benefit of asynchronous content delivery methods is it provides flexibility for students and families. This aligns with our virtual school philosophy - "Flexible. Equitable. Personalized" (196 Online Program, 2021)

A significant barrier I encountered while creating a collection of resources is the cost. Subscription services and their cost pose a barrier to access a number of education materials and is significantly noticeable when gathering asynchronous resources. These resources are typically created by education companies and require a subscription cost for a class or an entire school. Prices can range from a few dollars a month to thousands of dollars a year. Resources for these programs can include pre-recorded resources led by an instructor. These resources can also create personalized learning programs which adjust practice opportunities based on student performance on digital activities. I included only free resources (or noted when payment is required) to ensure the accessibility of this project.

Share - Synchronous and Asynchronous

Utilizing content either synchronously or asynchronous is only one part of the learning process. The work of Garrison, Anderson, and Cleveland-Innes describes how social interactions are a vital element to online learning through a community of inquiry. In addition to academic content, students connect and form a social connection to each

other in order to establish a learning community. I provided both synchronous and asynchronous opportunities for students to share and interact. The share and interaction portion of the project provides just part of the overall interaction students can have with each other and the teacher during the day. For example, morning meetings for grades K-5 is designed to provide time for students to share and get to know each other. The shared opportunities for this project are aligned with state standards and are designed to promote student interaction based on content and allow students to make academic and personal connections to their learning and each other.

The asynchronous activities primarily use various platforms which utilize written responses or audio and video recorded responses. These discussions are prompted by questions related to the standard or content. These types of message board interactions utilize technology but are moderated by the teacher to promote engagement and ensure quality and rigor. The benefit of this type of interaction is the flexibility it provides for students and teachers. Students can respond at their own pace and can engage with students based on their thinking and connections.

Synchronous activities which promote sharing and collaboration can feel more similar to the in person learning experience. Through video conferencing, students can use their voice to share as well as "chat" features for written responses. Another common feature of virtual meetings allows for "breakout rooms" to divide the class into smaller groups. One challenge of this strategy is monitoring multiple rooms at once. Synchronous sharing provides more immediate feedback and interaction.

The discussion prompts for synchronous learning can be the same as discussion prompts for asynchronous learning. While the shared opportunities for synchronous

learning can be conversation based, the asynchronous element of the chart highlights the platforms that could be used for interaction.

Student Academic Readiness Level

In addition to the asynchronous and synchronous methods of instruction delivery and student sharing, I also provided resources to support students below grade level, at grade level, and above grade level. Providing differentiated materials for students to support their academic needs helps teachers meet them where they are in their learning journey. I used formal and informal assessments to identify students who needed additional support and enrichment. Depending on how these resources are integrated by the teacher, this product allows for a high degree of student choice. As students find a task or concept to be too challenging or not challenging enough, they can select other resources or engage in a different activity to demonstrate their learning.

The combined elements of this project provide one way to organize the resources along synchronous or asynchronous content and sharing options as well as academic grade level readiness. This could be adapted depending on the needs of students in any class. There are many possible ways to adjust and build on this project which depend on future needs and goals.

Future

There are endless ways to differentiate to meet the needs of students and plan supports for students. The method I used can be especially valuable to online teaching and learning because it takes into account the unique circumstance and opportunities learning online can present. The planning grid can be used for any grade or content area and provides a foundation to build future plans and resources. Taking into account

academic level and method of interaction (synchronous/asynchronous) organizes the scope of differentiation. Although this resource's original purpose is for online learning, I can also see it being used for in-person learning.

As teachers continue to incorporate technology and even use a flipped classroom approach, these resources could be integrated for in person learning too. For the purposes of this project I utilized different instruction videos, adjusted scaffolds and supports or requirements, and offered opportunities for students to engage in learning that meets their needs. Because the scope of student needs and technology resources are so vast, it is important to also recognize the limitations of this particular project and areas for improvement.

Limitations and Improvements

One of the challenges of this project was imagining how it could be most beneficial for educators with a wide range of learners and keeping in mind the accessibility students and teachers have to technology resources across learning platforms. For this reason I utilized resources that are free (to some extent) and accessible to various platforms. To achieve this end, I used a Google Docs page and linked the document to various resources. This could also be organized in a webpage but having a single document would be easier to view while planning. Organizing the varied resources and combining them in a way that works for me and my students might not make sense for other classes. Although this is one way to present the project and learnings, there might be other ways that are more accessible or formats that are easier to use for teachers. Organizing the resources became a learning opportunity as my project evolved from a more rigid daily plan to a collection style of resources to be used by educators to meet the

needs of students. Maintaining flexibility and personalization while maintaining a standards aligned approach was a challenge. I would predict that this will be a challenge for educators as the availability of resources increases in the future.

Further research and project development could delve deeper into the specific needs of students. I choose to divide my differentiation along the lines of asynchronous and synchronous content delivery and student readiness based on grade level. However there are many other aspects of differentiation and student needs that deserve attention. Some further areas of study could include students who have disabilities and prefer alternative accessibility to resources, students who are English Language Learners, or need greater support below or above grade level. While keeping in mind the possible future improvements of this project, it's also valuable to examine the current implications.

Implications

There are many implications from this project which I see affecting my current teaching position. The primary factor is the collaborative nature of this collection which can be used, shared, and built upon by other teachers. Sharing this document with others can help enhance its usability and relevance. Access to technology and resources will build and evolve beyond what is currently used in this project. I believe there will continue to be a proliferation of online resources including videos, databases, and subscriptions available to support teachers and learners. This project can also be a helpful tool in planning and deciding how to allocate funds. Areas that don't have adequate resources for differentiation could be eligible for subscription services to supplement areas of need. Teachers can plan on working to build additional curriculum to areas where

there needs to be more support and save time by using resources that are already available.

I shared this project with another online teacher who has access to edit and add onto this document. This is another benefit of using the Google Docs format; it is easy to share and add collaboratively. I will share this project with other grades and district curriculum leads. My project can be used as a template when planning methods to best support the diverse learners we have in our program.

Conclusion

The primary benefit I see with this project is organizing and annotating the resources in a way that is streamlined and useful for teachers and students. Utilizing technology in an efficient manner will change as practices, strategies, and resources continue to improve. Online learning can become a more accessible and beneficial part of our collective learning journey.

Although online learning has been a necessity for many in recent months due to the pandemic, in the future it may become a preferred choice for students and their families. It also has possibilities for in-person learning as technology becomes an increasingly embedded element in classrooms. Technology can be a valuable asset to reach students as educators seek to provide a personalized learning experience to support student needs. In many ways education is both a catalyst and a reflection of our changing time. The mission of teachers has remained fundamentally the same: to help our students reach their full potential. The art of teaching relies on the professional judgement of teachers to find the means to reach our students and help make pathways for their discovery. With this continued challenge and obligation in mind, we can rely on our

knowledge and tools available to us. While adjusting to the accessibility of technology and the internet, we find ourselves at a new frontier of learning - for both students and teachers. The change and potential can feel overwhelming at times. Carol Ann Tomlinson (2014) noted this connection between the continued responsibility and evolution of the education profession and writes:

> "It is a paradox of teaching that no two days are alike; yet, if we are not careful, all the days can take on a deadening sameness. We are wise to remember that we have every opportunity to transform ourselves and our practice, just as we have every opportunity to stagnate and remain much the same teachers we were when we began" (Chapter 11).

Recognizing the power and potential of technology while still respecting the pedagogy of the educator are necessary elements for students to receive differentiated instruction in online learning. Harnessing the power of available technology resources while building a learning community can provide multiple pathways for student learning and success.

REFERENCE

Anderson, T., & Dron, J. (2011). Three generations of distance education pedagogy.

  The International Review of Research in Open and Distributed Learning,

  12(3), 80-97. https://doi.org/10.19173/irrodl.v12i3.890

ASCD, "Using Curriculum Compacting To Challenge the Above-Average" (October 1,

  1992).https://www.ascd.org/el/articles/using-curriculum-compacting-to-challenge-

  the-above-average

Bidarra, J., & Sousa, N. (2020). Implementing Mobile Learning within Personal Learning

  Environments: A Study of Two Online Courses. *International Review of Research*

  in Open and Distributed Learning, *21*(4), 181–198.

Bojan Lazarevic & David Bentz (2021) Student Perception of Stress in Online and

  Face-to-Face Learning: The Exploration of Stress Determinants, American

  Journal of Distance Education, 35:1, 2-15, DOI:10.1080/08923647.2020.1748491

Cavanaugh, C., K. J. Gillan, J. Kromrey, M. Hess, and R. Blomeyer. 2004. *The*

  effects of distance education on K–12 student outcomes: A meta-analysis.

  http://www.ncrel.org/tech/distance/index.html

Cox, S. G. (2008). Differentiated Instruction in the Elementary Classroom. *Education*

  Digest, *73*(9), 52–54.

Ewing, John. (2020, December). *The Ridiculousness of Learning Loss*. Forbes.

  https://www.forbes.com/sites/johnewing/2021/12/28/the-ridiculousness-of-learnin

  g-loss/?sh=1bd530c77c32

Fazazi, H., Qbadou, M., Elgarej, M. & Mansouri, K. (2021). Design of an Adaptive

e-Learning System based on Multi-Agent Approach and Reinforcement Learning. Engineering, *Technology & Applied Science Research.* 11(1).

Fiedler, E. D., Lange, R. E., & Winebrenner, S. (2002). In search of reality: Unraveling the myths about tracking, ability grouping, and the gifted. Roeper Review, 24, 108-111.

Foss, Katherine. (2020, October). *Remote learning isn't new: Radio instruction in the 1937 polio epidemic*. The Conversation. https://theconversation.com/remote-learning-isnt-new-radio-instruction-in-the-19 37-polio-epidemic-143797

Garcia, Emma & Weiss, Elaine. (2020) COVID-19 and Student Performance, Equity, and U.S. Education Policy: Lessons from Pre-Pandemic Research to Inform Relief, Recovery, and Rebuilding

Garrison, D. R., & Anderson, T. (2003). E-Learning in the 21st century: A framework for research and practice. London: Routledge/Falmer. doi:10.4324/9780203166093

Garrison, D. Randy & Cleveland-Innes, Martha (2005) Facilitating Cognitive Presence in Online Learning: Interaction Is Not Enough, The American Journal of Distance Education, 19:3, 133-148, DOI: 10.1207/s15389286ajde1903_2

Goddard, Y. L., Goddard, R. D., Bailes, L. P., & Nichols, R. (2019). From School Leadership to Differentiated Instruction: A Pathway to Student Learning in Schools. *Elementary School Journal*, *120*(2), 197–219. https://doi-org.ezproxy.hamline.edu/10.1086/705827

Feigal-Hitch, S. Differentiation: Instructional Models & Strategies in Gifted Education. [Class Handout]. Hamline University

Harris-Packer, P., Segol, G., (2015). *An Empirical Evaluation of Distance Learning's Effectiveness in the K-12 Setting.* American Journal of Distance Education, v29 n1 p4-17 2015

Kemper Patrick, S. (2020). Homogeneous Grouping in Early Elementary Reading Instruction: The Challenge of Identifying Appropriate Comparisons and Examining Differential Associations between Grouping and Reading Growth. *Elementary School Journal*, *120*(4), 611–635.

Lazarevic, B., & Bentz, D. (2021) Student Perception of Stress in Online and Face-to-Face Learning: The Exploration of Stress Determinants. American Journal of Distance Education, 35:1, 2-15. DOI:10.1080/08923647.2020.1748491

Magableh, I. S. I., & Abdullah, A. (2021). The Impact of Differentiated Instruction on Students' Reading Comprehension Attainment in Mixed-Ability Classrooms. *Interchange (0826-4805)*, *52*(2), 255–272. https://doi-org.ezproxy.hamline.edu/10.1007/s10780-021-09427-3

Milman, N. B. (2020). Differentiating Instruction in Online Environments. *Distance Learning*, *17*(4), 73–75.

Matusevich, M., & Hargett, M. (2009). The Nonnegotiables of Academic Rigor. *Gifted Child Today.* 32(4). 44-52

National Association for Gifted Children (NAGC), "Position Statement: Grouping", 2009

National Association for Gifted Children (NAGC), "Glossary of Terms", n.d.

Park, H., & Shea, P. (2020). A Review of Ten-Year Research through Co-Citation Analysis:Online Learning, Distance Learning, and Blended Learning. *Online Learning*, *24*(2), 225–244.

Renzulli, J., Reis, S.. (n.d.). Enrichment Clusters: A Practical Approach for Developing
Investigative Learning Skills.

https://gifted.uconn.edu/schoolwide-enrichment-model/semart/

Shearer, R. L., Aldemir, T., Hitchcock, J., Resig, J., Driver, J., & Kohler, M. (2020). What
students want: A vision of a future online learning experience grounded in
distance education theory. *Null, 34*(1), 36-52.

https://doi.org/10.1080/08923647.2019.1706019

Soland, J., Kuhfeld, M., Tarasawa, B., Johnson, A., Ruzek, E., & Liu, J. (2020, May). *The
impact of COVID-19 on student achievement and what it may mean for educators.*
Brookings Institute.

https://www.brookings.edu/blog/brown-center-chalkboard/2020/05/27/the-impact-
of-covid-19-on-student-achievement-and-what-it-may-mean-for-educators/

The World Bank Edtech Team (2020, June). *How countries are using edtech (including
online learning, radio, television, texting) to support access to remote learning
during the COVID-19 pandemic*. The World Bank.

https://www.worldbank.org/en/topic/edutech/brief/how-countries-are-using-edtec
h-to-support-remote-learning-during-the-covid-19-pandemic

Tomlinson, Carol Anne (2014), The Differentiated Classroom: Responding to the needs
of all Learners, 2nd Edition. Tomlinson, Carol Anne & Demirsky, Susan (2000),
Leadership for Differentiating Schools & Classrooms

Tobin, R., & Tippett, C. (2014). Possibilities and Potential Barriers: Learning to Plan for

Differentiated Instruction in Elementary Science. *International Journal of Science & Mathematics Education*, *12*(2), 423–443. https://doi-org.ezproxy.hamline.edu/10.1007/s10763-013-9414-z

UNICEF (2020, September). *Education and COVID-19.* UNICEF https://data.unicef.org/topic/education/covid-19/

van Harmelen, M. (2008) Design trajectories: four experiments in PLE implementation, Interactive Learning Environments, 16:1, 35-46, DOI: 10.1080/10494820701772686

Westman, L. (2020). Why we need Differentiation now more than ever. https://www.ascd.org/el/articles/why-we-need-differentation-now-more-than-ever

Wiggins, G., & McTighe, J. (2011). *The Understanding by Design guide to creating high-quality units*. Alexandria, VA: ASCD.

Williamson, R., & Blackburn, B. (2009). Adding Rigor. *Principal Leadership.* 60-62