

Digital Teaching Portfolio

Melanie Castrucci

Master's of Science in Education

Elementary Education

Niagara University

2020-2021

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Philosophical Statement

Like teachers, students play a crucial and active role in the education process. Students are responsible for applying themselves to the best of their ability and remaining respectful at all times. Further, students must express to their educators what they need, as best they can. In turn, educators must use the information gathered from students to adapt and diversify instruction, grow professionally, and continually meet the expressed and inherent needs of all students.

Teachers must support students' developmental and academic advancements in a positive and inclusive environment, while encouraging the progression of their unique skills and talents. It is important to ensure all students feel welcome, cared for, capable, and supported. I strive to create a classroom built on respect and the celebration of diversity. To ensure I am always providing the best for my students, I remain dedicated to improvement. I continually seek out science-based, best practice evidence to inform my decisions and courses of action, and regularly seek advice from my colleagues.

I have a keen sense of students 'zone of proximal development' (Vygotsky, 1978) and provide effective scaffolding in the classroom to ensure their skills are developed through interesting activities that allow elements of choice and fun while learning. Although I employ deskwork as needed, I prefer group-work, hands-on, interactive, and student-led learning activities. My typical lessons incorporate a variety of these methods to keep students engaged and interested. Quick with technology, I create relevant STEM projects and utilize a variety of multimedia resources. I believe learning has a greater impact when students explore and make discoveries using their own intellect and physical senses.

Creative and empathetic, I instinctively encourage students to take leaps and pursue alternatives when appropriate. I look for opportunities to catch them doing *good*, and praise them. I provide students with a supportive environment to explore and express their feelings and ideas. Ultimately, I believe the most important thing I can do as an educator is create a safe yet challenging environment for my students and model that which I wish to see from them.

Community Involvement Project

Read Aloud Book Drive

"Reading is the heart of education." ~ Jim Trelease.

Background

The students in Mrs. Crawford's fourth grade class love to read! They never miss an opportunity to pull a book from their desk to read quietly. With this in mind, and knowing the importance of fostering a love of reading, the Teacher Candidate is organizing a "Book Drive" event that will include a "Family Read Aloud Night" at the school. Following the event, books will be donated to two local charities. The Teacher Candidate will contact each charity to make arrangements and invite volunteers to attend the Family Night prior to the event.

Event Details

During the first week of March of 2021, the Teacher Candidate will craft a letter to send home to the families of students of St. David's Public School. The letter will include details of the book drive, our goal of collecting 200 culturally sensitive and respectful books, and an invitation for families to attend the 'Family Read Aloud Night' on the last Friday of the month. Families will be asked to send appropriate books they wish to donate to the school ahead of the Family Read Aloud event. The Teacher Candidate will set up a collection box at the main office so that books may be deposited throughout the month.

An email crafted by the Teacher Candidate will be sent home two weeks later, to remind families of the book drive and Family Read Aloud Night. Hot chocolate, water and popcorn will be provided by the Teacher Candidate during the Family Read Aloud event. During the event, the books attendees choose to enjoy will be read out loud in small groups. The school's gymnasium will be set up beforehand so that groups can gather on spaced out gym mats. The Teacher Candidate, St David's teachers, and at least one volunteer each from Community Care and Gillian's Place will attend the 2.5 hour event (6:30-8pm), welcoming families, thanking them for their participation, and explaining how the event will work. Readers will be encouraged to read aloud with other families and welcome other families to join their Read Aloud. Parents and children will be encouraged to take turns reading. Blank note cards with

each charity's name will be laid out near the exit with a sign encouraging families to share what they love about Read Alouds with the recipients of the donated books.

Following the Family Read Aloud Night, the Teacher Candidate and Mrs. Crawford's class will make additional cards for the two charities to accompany the donation. The students will share something they love about Read Alouds in the hopes of inspiring disadvantaged children and adults to take part in the joy of reading out loud to others. The Teacher Candidate will catalogue all books received and sort them as directed by the two charities. She will deliver the cards and books to Gillian's Place and Community Care on behalf of St David's Public School.

Impact

Almost as important as teaching children *how* to read, is teaching children to *want* to read. Children who want to read will end up reading more often, and strong literacy skills have been shown to positively impact a person's behavior, academic achievement, health, and economic outcomes (Brodsky, n.d.). It is the hope of all educators that parents read, and read out loud, to their children. The Teacher Candidate hopes the book donation will give more families in need the opportunity to take part in the important lifelong practice of reading – at home, at school, and out loud. Her goal is to inspire children and families in her school and the extended community to experience the joy and lifelong benefits of reading out loud together.

Technology Use and Implementation

Rocks and Minerals in Ancient Civilizations

ISTE Technology Standard

2. Digital Citizen

Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.

- c. demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property

Platform

Jamboard is Google's version of a web-based, interactive multimedia whiteboard that allows for collaboration and full control over the accessibility and initial design of each board. It's easy to monitor student progress in real time, evaluate submissions (formally and informally), and support students in any domain (writing, reading, technological capability, etc.).

Technology Tools

The grade four students in the Teacher Candidate's classroom have been learning about ancient societies in social studies and rocks and minerals in science. For this project, they will collaborate in pairs at home and in the classroom using Jamboard to combine these two areas of study and create a multimedia digital poster on the platform.

Students must choose appropriate media to include on their poster that will educate their peers on at least two kinds of rocks found in the geographical region of the ancient society they have been working on (England, Rome, Egypt, or China), with at least one (safe, guardian/parent-approved) digital source included as a reference they have discovered themselves.

Students will be assessed on their final poster product in Jamboard, the quality of the digital 'sticky note' comments they must leave on two groups' work, overall engagement in the community (e.g. responding to their peers' comments), degree of collaboration, citation of sources, written reflections completed digitally by each student at the end of their Jamboard project (prompted by higher-order thinking sentence starters).

In this case, considering their age, citing their sources will equate to listing the name of the peer who completed the work, listing the work each partner completed for the project, and the name of the resources they used to complete their project (whether digital (required, preferred) or hard copy (acceptable)).

Rationale

After discussing available options with the Associate Teacher, librarian, instructional coach, third-grade teacher, and fifth-grade teacher, the Teacher Candidate decided on Jamboard as the best tool to motivate students to engage with their peers while collaborating in safe and ethical ways in order to successfully complete the assignment. Although there is a computer lab at our school, students have not been allowed access to it since COVID restrictions began. This is unfortunate, since each classroom has only about 5 computers (Chromebooks) and not every student has regular computer access at home.

Although Kahoot, Google Slides, Canva, and Google Meets, came up in conversations in the Teacher Candidate's discussions with her colleagues at the school, Jamboard offered optimal ease of use and optimal student accessibility because students are already set up to use this platform through their Google Classroom at home, and on the computers in the classroom. The students have accounts to access EPIC Books as an online resource as well, which is a digital book platform that has excellent non-fiction texts that can be accessed via reading level, making it highly appropriate for every student who wishes to use it. This also provides a safe platform for students to research their topic for the project. Additionally, when using Jamboard, the Teacher Candidate can monitor student progress in real-time, and display the students' work on the smartboard in the classroom when leading the culminating class discussion for this project.

Reflection

Overall, students could use improvement in adding detail to their work. The Associate Teacher calls this using 'juicy' words. This is something the students have been working on throughout the school year and continue to do so. Perhaps a project dedicated solely to this cause would provide the practice and deep thinking required to really solidify the concept in their minds. As well, many comments students left for their peers were relatively short and did not display the higher-order thinking the Teacher Candidate provided prompts for, and had been describing and attempting to reinforce when providing instruction to the students for this project. The students loved this project. They worked hard on their own time to complete it within the required time period (two weeks start to finish), although each student was given two periods to work on the class Chromebooks during class time. All students received guidance, feedback and support from the Teacher Candidate and Associate Teacher as needed. This was useful for students with IEPs who require support in reading and writing, as much of their work was completed in-class with the Teacher Candidate's support.

The students also seem to thrive when working in pairs on the Jamboard, especially since COVID restrictions have tightened. As the Teacher Candidate monitored the groups' progress during the two-week period, she could at times see the posters changing before her eyes in real time. The students were able to communicate with each other in the comments section, and as such, this provided a window into their thinking and strong collaborative efforts, while also ensuring accountability for the students.

Needless to say, creating a digital poster would not have been possible without the use of technology such as Jamboard. It has many specific features that enable the students to harness their creativity and self-direct learning in myriad ways. Additionally, being required to submit comments on their peers' posters and write a reflection using higher-order thinking prompts allowed the Teacher Candidate to read the comments and immediately navigate to the digital poster in question to assess the quality of the comments and reflections on the piece of work in question.

The students' work was generally extremely high quality, with only a few pairs falling below what the Associate Teacher and Teacher Candidate would consider below standard. The Teacher Candidate reviewed the submission privately with these students to listen to the challenges they encountered and suggest a number of strategies that may help the students moving forward. These were two points of discussion that the Teacher Candidate addressed with the wide class during the culminating discussion as well, but she felt it was important to address privately with the two groups who did not perform as well.

The Teacher Candidate was impressed with the level of engagement and student involvement. This could be due to the novelty of the project, and it is reasonable to assume that simple repeating the same format again may not render the same results in terms of engagement for this reason. All but two students completed the required comments on their peers work, and all but three students wrote reflections that incorporated the designated high-order thinking prompts to an acceptable level for grade four students.

It is likely that allowing students more control and choices over how they execute the next project would improve engagement and collaboration moving forward, as would a release of COVID restrictions. If students could work together physically in the classroom, sharing a computer, as opposed to collaborating virtually, through their screens at home, they would most certainly benefit from their peers' input in a way that just isn't possible in a virtual setting.

The creativity exhibited in students' posters was phenomenal, and the images (and videos!) they located and added to their posters were very interesting. The students consistently think 'outside the box' and include elements the Teacher and Candidate have yet to imagine.

This is a clear demonstration of higher-order thinking, as students are going beyond the expectations and outline to provide information that they feel is interesting. Students could be asked to come up with their own questions for peers to answer in future assignments, they could be asked to consider alternative perspectives and required to evaluate them, or they could be required to make inferences or solve problems based on their peers' work.

Students' resourcefulness in finding appropriate sources for their work (and providing credit to the source) was outstanding. This in itself causes the Teacher Candidate to learn more and expand her knowledge of technology and how it may be applied in various contexts. Many students chose to take pictures of items at home that related to the ancient civilization or geographical location they had chosen. One student uploaded a video to his Jamboard that allowed other students to take in a mini-lesson on his topic (How the Coliseum was Built in Ancient Rome).

The best way to learn about Technology is to use it as often as possible, experiment with it, and ultimately to not be afraid of it. Today, students are typically more advanced than their teachers in the use of many current technological trends, and teachers must be open to learning from students. Since student-led learning is valuable and fruitful, allowing students to choose their topic of inquiry is likely to provide increased engagement. In the Teacher Candidate's experience, students are 'chomping at the bit' to share their knowledge and display their technical prowess. Teachers can benefit greatly simply by allowing students to take the lead at times and explore (in safe environments) the new and exciting opportunities various technologies present.

Technology Use and Implementation Lesson Plan

Rocks and Minerals in Ancient Civilizations

STANDARDS

ISTE Technology Standard

2. Digital Citizen: Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.

- c. demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property

Social Studies

A1.2 compare aspects of the daily lives of different groups within a few early societies, including at least one First Nation and one Inuit society

A2.4 interpret and analyse information relevant to their investigations, using a variety of tools

A2.5 evaluate evidence and draw conclusions about ways of life and relationships with the environment in a few early societies, including at least one First Nation and one Inuit society, with an emphasis on aspects of the interrelationship between the environment and life in those societies

A3.1 identify the location of some early societies, including at least one First Nation and one Inuit society, on a globe or on print, digital, and/or interactive maps, and demonstrate the ability to extract information on early societies' relationship with the environment from thematic maps

A3.2 demonstrate the ability to extract information on daily life in a few early societies, including at least one First Nation and one Inuit society, from visual evidence

Science

Sustainability and Stewardship

Describe the properties of rocks and minerals determine society's possible uses for them.

(Overall expectations 1 and 2)

2.5 use appropriate science and technology vocabulary, including *hardness, colour, lustre, and texture*, in oral and written communication

2.6 use a variety of forms (*e.g., oral, written, graphic, multimedia*) to communicate with different audiences and for a variety of purposes

Objectives

Using the information they have learned in class *and* gathered through independent research on a variety of digital sources, students will create a multimedia digital poster that displays at least 5 facts about the daily lives of individuals in one of four ancient civilizations (England, Rome, Egypt or China) of their choosing as well 2 facts about the rocks and/or minerals found in the relevant geographical region of that civilization with minimal errors.

Learning Targets

I can conduct research online in a safe way using appropriate sources. I can cite the sources I have used to complete my assignment.

I can credit the work of my peers when talking about them.

I can create a high-quality multimedia digital poster using Jamboard.

I can engage with my peers online, providing comments and responding to them. I can write a reflection that include higher order thinking skills.

Modifications

Students with writing and reading IEPs will receive additional support in the classroom in order to create their Jamboard poster. This will include typing the required components for them, assisting with obtaining information from safe online sources, and helping them to cite their sources.

Preparation

The Teacher Candidate has prepared the Jamboard slides each student will use, has labelled them according to the pairs who are working together, and has outlined all project requirements within the Jamboard for easy access by the students.

Prior Knowledge

Students will require the knowledge they have gained thus far in the classroom while learning about Ancient Civilizations (England, Rome, Egypt, and China). They will also require a preliminary understanding of how to use computers and collaborative platforms, which they have had experience with during online learning.

Setting the Stage: Anticipatory Set

The grade four students in the Teacher Candidate's classroom have been learning about ancient societies in social studies throughout the school year, and have just recently begun to explore rocks and minerals in science. The Teacher Candidate will conduct a short, guided discussion about how Ancient Civilizations used rocks and minerals in their daily lives. She will include a video about life in Ancient Greece (not one of the student options) in order to explore the topic without giving away information the student may use for their project, and engage the class in a 'minds on' discussion where they share things they know, have learned, and wonder and a result of the video.

Main Lesson: Project Description

For this project, students will work in pairs, virtually from home as well as in the classroom, to combine these two areas of study and create a digital poster using Jamboard. The Teacher Candidate will introduce students to the Jamboard workspace they will be using for this project. She will outline the expectations and answer all questions related to the successful execution of this project. She will monitor the student work as it is progressing throughout the two-week period, and will support small groups of students in-class on the Chromebooks daily.

The poster must educate their peers on at least 5 facts about daily life in the ancient civilization they have chosen and at least 2 kinds of rocks found in that geographical region. It has also been a recent focus of study to reference the source of pictures and information we are using in the classroom, in order to model sound academic integrity. When we explore our math photos during 'minds on', for example, the Teacher Candidate always provides the source of the photo and verbally acknowledges the source.

After completing their digital posters, students will virtually 'visit' at least two of their peers' posters, leave a thoughtful 'sticky note' comments on each of them, and finally, write an individual reflection that covers the three higher-order thinking prompts on a private slide in their Google Classroom for the Candidate Teacher's viewing only. The three prompts will be:

- My evaluation of (Peer's name)'s assignment has taught me...,
- When I analyze (Peer's name)'s work, I...,
- (Peer's name)'s assignment has inspired me to create....

In order to satisfy the ISTE component, students must provide a list of titles for all of the books and multimedia digital resources (pictures, videos, articles, digital books, etc.) they have researched for this project. They are required to include at least one (safe, parent/guardian-approved) digital source from the internet. As well, they will reference their peers' digital Jamboard work when writing their high-order thinking reflections.

Assessment

Students will be assessed on their final poster product in Jamboard, the quality of the digital 'sticky note' comments they must leave on two groups' work, overall engagement in the community (e.g. responding to their peers' comments), degree of collaboration, citation of sources, written reflections completed digitally by each student at the end of their Jamboard project (prompted by higher-order thinking sentence starters). In this case, considering their age, citing their sources will equate to listing the name of the peer who completed the work,

listing the work each partner completed for the project, and the name of the resources they used to complete their project (whether digital (required, preferred) or hard copy (acceptable)).

Reflection

Please see Technology Integration Project, PART B.

Informal Assessment Report

LEARNING OBJECTIVE	ASSESSMENT & RATIONALE
<p>LESSON 1 Given the step-by-step directions on chart paper, students can follow the directions to correctly identify the median in 8 given data sets, represented by a predetermined set of math manipulatives on their desk with up to three errors.</p> <p>(Note: For this data set there will always be an odd number of items, requiring no division.)</p> <p><i>Student-friendly language (Learning Goal):</i> <i>I can follow the correct steps, in order, to find the median of a set of numbered items on my desk.</i></p>	<p>OBSERVATION The Teacher Candidate observed how students worked with the manipulatives on their desks in order to find the median of the set. Were they following every step of the process in order to reach the correct answer? If they were not arriving at the correct answer, which step(s) did they miss? Why was their understanding incomplete? What was missing and how could they be supported in closing that gap?</p> <p>Steps</p> <ol style="list-style-type: none"> 1. Put all items in order from lowest to highest. 2. Count the number of items. 3. Determine the middle-most item. 4. Designate the middle most item visually on the desk (e.g. raise it up or down from the line of items). <p>Rationale If students were able to follow the directions provided in class in order to correctly identify the median of various data sets, this would demonstrate their understanding of the steps and the process involved in correctly identifying the median. If students were unable to successfully carry out any of these steps, the Teacher Candidate had an opportunity to determine which step(s) were missed by each student (through individual or group dialogue) and she could address this gap before moving on to further instruction.</p> <p>Students who failed to apply to steps successfully the majority of the time (<5 correct) were given additional opportunities to practice finding the mean via homework questions on the Google Classroom. The Teacher Candidate took each answer up as a class, and had students give a 'thumbs up/down' for each question they got correct or not to further inform her instruction.</p>
<p>LESSON 2 Given step-by-step directions on chart paper, students can follow the directions in order</p>	<p>WORKSHEET It was clear based on the results from the observation in Lesson 1 that students required additional practice and support in successfully identifying the median when working with various data sets. The Teacher</p>

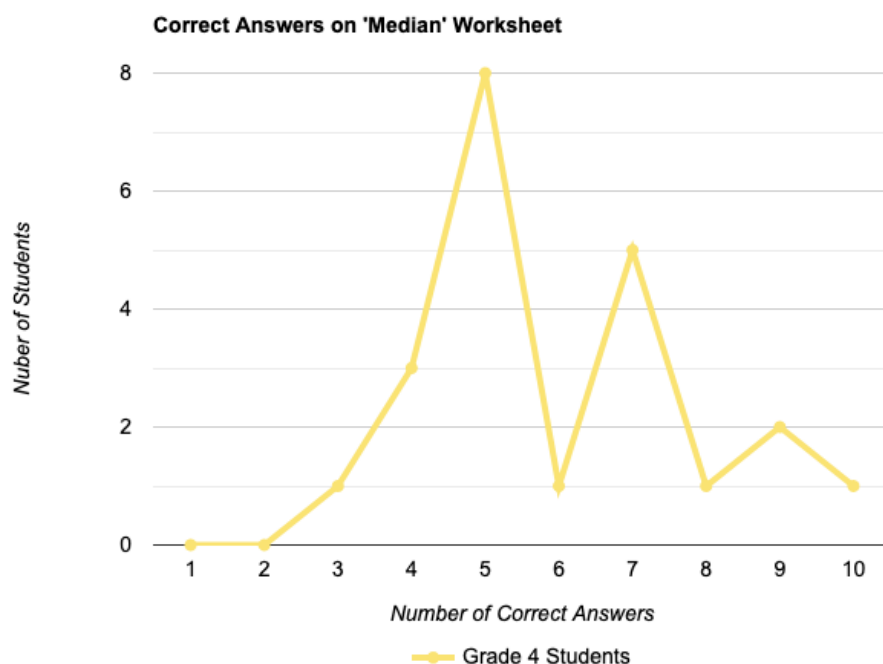
<p>to correctly identify the median in 10 given data sets on a worksheet with up to three errors.</p> <p>(Note: Some questions will have an even number of items, requiring students to apply the 'add then divide-by-two' rule for finding the median.)</p> <p><i>Student-friendly language (Learning Goal):</i> <i>I can follow the correct steps to find the median of each data set on my worksheet.</i></p>	<p>Candidate decided to assess a worksheet that she created in order to determine the number of questions each student could answer correctly. She then provided written feedback on the students' worksheet to remind them of any steps they missed, identify specific areas where they did well, or needed improvement when finding the median using the specified steps from Lesson 1. The total number of questions answered correctly was tallied for each student. If the majority of students had scored at least 7/10, the lesson would have been considered a success as per the learning objective, but this was not the case. As such, two additional lessons and hands-on learning opportunities were implemented as described in question #3 below.</p> <p>Rationale</p> <p>The worksheet gave students a second opportunity to work with data sets and practice applying their knowledge of the correct steps. The Teacher Candidate was able to accurately assess the students' ability to apply the steps provided in order to correctly identify the median.</p> <p>Students who still required additional support (those who were not successfully identifying the correct median most of the time (<6)), worked with the Teacher Candidate one-on-one to facilitate a better understanding and work through the knowledge gaps in order to help them successfully apply the steps and correctly identify the median the majority of the time. Students who were achieving a high rate of success and could explicitly show their work (i.e. demonstrated a strong understanding of the steps) were given an opportunity to mentor their peers one-on-one if both students found this desirable.</p>
<p>LESSON 3</p> <p>From memory, students can apply the step-by-step directions in order to determine the median of 12 simple data sets presented on the whiteboard with up to 3 errors.</p> <p><i>Student-friendly language (Learning Goal):</i> <i>I can find the median of a data set in my head or using a scrap piece of paper during</i></p>	<p>KAHOOT!</p> <p>The Teacher Candidate developed a variety of data sets that tested the students' ability to correctly identify the median in a limited amount of time when presented on the whiteboard during a game of Kahoot!. The sets advanced, slowly, from very simple (20,10,30) to slightly more complex (2, 6, 3, 8, 9). Simplicity was key here, as the students were being asked to work from their memory of the appropriate steps and within a time limit for each question.</p> <p>The Teacher Candidate reviewed the built-in software analytics to determine the scores of each student, as well as the measures of central tendency for the class data set in order to determine if further instruction was required for determining the median, or whether we are ready to move on to mean. It was clear that the majority of students were capable and meeting the curriculum expectations at this time. The 3 students who</p>

<p><i>the class Kahoot! game with only a few errors.</i></p>	<p>struggled with more than half the questions are the students who possess IEPs and have modified expectations, which they met.</p> <p>Rationale</p> <p>Students must understand the steps and be able to correctly apply them from memory in order to identify the median of each data set. They were given the option to use a piece of paper if they needed to jot things down during the game, though many students had already demonstrated the ability to complete these procedures mentally.</p> <p>The Teacher Candidate reviewed the software analytics data to determine how successful each student was for each question and throughout the overall game. This ensured that the Teacher Candidate was able to adequately prepare the students for their test on this unit by providing additional opportunities for direct instruction, one-on-one mentoring (teacher and/or peer) and additional practice activities (hands-on activities, worksheets and google classroom questions) prior to the culminating unit test. This ensured students had every opportunity to fulfill the requirements of the learning goals, curriculum expectations, and their personal goals for this learning segment.</p>
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Learning Objectives: Reflection

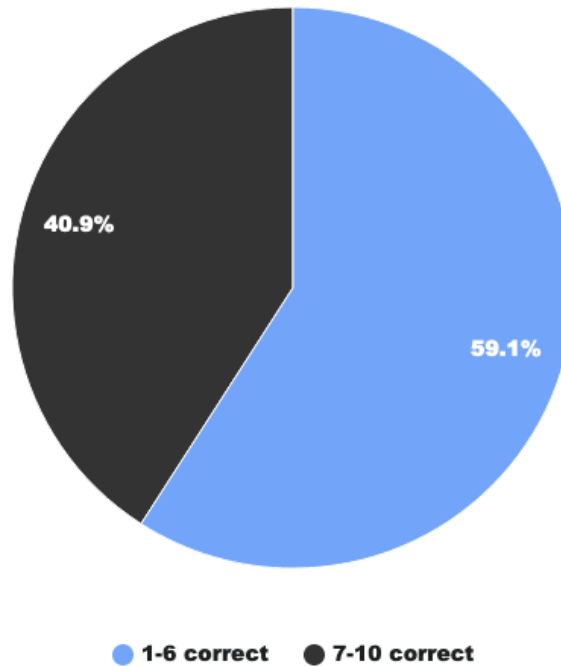
The worksheet distributed and complete by students in Lesson two indicated that students were not carefully following the first step of the directions. More than half of the class consistently failed to put the data set in order from lowest to highest every time, and instead simply selected the middle term from the data set. Even students who typically score high in math were missing this simple first step; they would circle the middle number regardless of whether the numerals were in order or not. This demonstrated a number of things to me: first, the students were missing an understanding of why putting the numerals in order first was an essential step. Next, it indicated that they are missing a complete understanding of what they are trying to identify when seeking the 'median' of any given data set. Although they knew they must identify the 'middle-most' number, they did not understand that circling the middle-most number, without first putting the data set in order from lowest to highest, was not providing them with an accurate measure of the median, an important measure of central tendency they must master according to the grade four curriculum expectations.

On average, the students scored 60% on this worksheet, meaning they did not meet the learning objective as outlined for this lesson. Additionally, the mode for the students' scores was 5, with 8 students scoring only 5 out of ten possible points. It was clear to me that despite the Associate Teacher's assurance that the students would understand median, as they learned it in grade 3 (albeit online), they indeed required additional instruction and practice with this concept and its application as demonstrated by the results. The steps taken as a result of this outcome will be discussed in the subsequent prompt.



Graph displaying the distribution of scores for the Lesson 2 worksheet.

Viewed another way (below), it is clear that the majority of students did not apply the steps correctly, and did not meet the learning objective as specified for Lesson 2, even after practising the step-by-step directions in-class during Lesson 1, and completing additional questions at home for homework:



The majority of students (59.1%) did not achieve the learning objective for Lesson 2 by achieving at least 7 out of 10 correct answers.

Additional lessons were introduced to the learning segment in order to address the students' needs as indicated by the data gathered from the informal assessment. These measures are discussed in the following prompt.

Data: Reflection

The results of the worksheet demonstrated to me that students required additional instruction, support, and practice with the concept of median and the application of the correct procedure to determine this measure in any given data set. By contrast, the students mastered mode, and scored over 80% on average, during the lessons on that topic (which preceded this segment).

Therefore, after Lesson 2, two additional lessons were introduced prior to the originally planned Lesson 3. The first began with a more in-depth discussion of the concept of median, including how it may apply in their daily lives. The class then headed outdoors to measure the circumference of ten trees in the schoolyard playground, and recording their measurements.

They returned to the classroom to complete their exercise and find the median of the data set. In the next lesson, the students took turns measuring the heights of one peer until all students' (22) heights had been recorded. They then worked in pairs to determine the median for this data set. Providing students with hands-on experience when compiling data helps them gain a deeper understanding of the concepts involved, and improves their motivation to determine the correct answers.

Instead of simply choosing to reinforce the steps to finding the median and giving additional practice questions, I wanted to help students understand why they needed to follow these specific steps in order to accurately identify the median. Rote deskwork fails to provide a rich and diversified learning environment that benefits the skills and abilities of all students, including those with IEPs.

Following these activities, the class engaged in open dialogue to order several of their data sets together and identify the median as a class. Students were engaged and actively participating in the discussion and finding the correct answers. We then watched a video that demonstrated verbally, visually, and with repeated examples how to find the median, and paused the video to review questions for each step. This also allowed the students time to work through the examples on their own before the video gave them the answer.

Following the video, the class discussed learning errors, how they arrived at the wrong answer, and how they could correct these errors. The Teacher Candidate also asked students with a strong comprehension of the topic to come up and demonstrate how they arrived at the answer, and their thinking behind their steps.

In order to provide additional practice for the few students who were still having some trouble finding the median with even data sets, I provided additional one-on-one support during reading time, and this helped them develop personal strategies that appeared to work well for each of them when attempting these calculations independently.

Assessment: Reflection

I felt that the worksheet provided excellent data to inform both on-the-spot and subsequent instruction. I had a strong indication of which students, and how many students,

required additional instruction in order to successfully find the median when working independently. As I was reviewing the worksheet, it was instantly clear to me when, and if, students were putting the data set in numerical order from lowest to highest before selecting the median, because they are required to show their work at all times. Even when they did not show their work, I had an 'instant' or 'at-a-glance' indication of which students were performing the steps in order, and which were not.

Additionally, when finding the median between two numbers (adding the two terms and then dividing the answer by two) it was again very clear which students were able to grasp the concept based on who showed the appropriate steps in their work. Here, it was not essential that the students found the correct numeral representing the median of the data, because dividing by 2 is not the focus. Instead, if they showed that they were adding the two middle-most terms together and then attempted to divide by two, that would be considered a sound understanding of the appropriate concepts required to be successful for this lesson. (Division follows measures of central tendency on the calendar the Associate Teacher was following, and as such, we also had an indication of which students were already fairly competent to extremely competent in the basic skills required for division!)

Assessment: Alternatives

There are near limitless options for informal assessment, but we are significantly impacted by Covid restrictions this year. When I researched appropriate tools for informal assessment to be used with grade four students in math, I came across an excellent resource that lists dozens of informal assessments that are highly useful during math lessons, and can be easily adjusted and readily applied for any grade level (Moersch, 2015).

For these lessons in particular, using exit tickets may have allowed me to push a little deeper when probing the students' understanding of the concept and application of this measure of central tendency. On the exit ticket, I could have asked students to create 3 of their own data sets, and then record the median for each set. This would have allowed students to both demonstrate their knowledge the degree they felt comfortable and challenge themselves to the degree they felt comfortable. For example, if the data sets on the worksheet were too

challenging, students could have created simpler data sets for themselves and created a path to success that the worksheets were unable to detect. This would also allow me an opportunity to have them write down any questions or comments they are not comfortable sharing out-loud in class, which can be a valuable tool for shy or nervous students.

Another alternative would have been to utilize a checklist, where every step required to find the median of a data set was included as an individual metric, along with utilizing the 'add then divide' step when appropriate, to find the correct answer. I could have asked each student to come to my desk individually, and perform the calculations for a small number of data sets that varied in terms of their difficulty. I would then have a very clear indication, for every single student, exactly which skill(s) they were consistently practicing successfully, and which needed further instruction. Further, it would provide an opportunity to work with each student 'right then and there' after they completed the question set to address any shortcomings or acknowledge exceptional skill, ability, and/or performance. I would also have a detailed informal assessment for each student that could be used for report cards, if needed, and could assist the students with coming up with effective strategies where needed for these calculations.

Hand signals and 'no hands up' are other tools that I often use and appreciate during math lessons. I used 'thumbs up/down' as a supplemental technique during all of the lessons above. I enjoy the instant feedback and information this method of informal assessment provides me, as I know whether I need to keep going with explanations, examples, and/or discussion, or whether we can move on to the next part of the lesson. I also know which students I'll need to touch base with for one-on-one instruction at a later time, if they are one of the few who are not giving 'thumbs up' when the rest of the class is. I also frequently use 'no hands up' during my lessons because it has many benefits for me and the students; it removes the pressure from students to quickly shoot their hand in the air to be the first to answer, and it likewise relieves the pressure from students who rarely put up their hands. I like giving students the opportunity to really think through a question, and think more deeply about the concepts or skills we're working on without feeling the need to 'perform', show off, or share their thoughts out loud.

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