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# New Teachers' Perceptions of Their Impact on Student Learning While Developing Knowledge and Skills to Teach Online

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## Abstract

Due to the health pandemic of 2020, teachers have been forced to initiate online teaching delivery models with little preparation just as students and parents have had their routines abruptly altered from in-person schooling to hybrid and fully online instruction (Mecham, et al., 2021). The pandemic brought to light new opportunities for novice teachers to learn how to implement pedagogical strategies using digital tools to support student learning and development in remote settings. As part of a larger case study of 23 novice teachers who graduated from our urban institution, these results focus on new teachers' perceptions of their own development and their impact on student learning while teaching online, during the pandemic. Semi-structured interviews focused on educators' approaches to instruction across 12-18 months of the pandemic. Data were analyzed using NVivo through open coding. Findings help us understand these new teachers' perceptions of their impact on student learning while developing knowledge and skills to teach fully online. Four themes are highlighted in this study as a glimpse into new teachers' perceptions of themselves and their impact during this time. New teachers describe their impact on student learning as their ability to build relationships and trust with learners and their families, to use students' funds of knowledge to engage them in meaningful tasks, to teach with digital tools, modeling and collaborating with learners, and to incorporate various digital tools to monitor progress, assess, and provide feedback online. Novices describe student engagement and motivation as resulting student outcomes due to their abilities to build relationships, tap into students' multiple knowledge bases, and use digital tools to teach and assess student learning. They describe their new knowledge and skills teaching online as unintended outcomes related to their own development and learning.

## Introduction

Due to the health pandemic of 2020, teachers have been forced to initiate online teaching delivery models with little preparation just as students and parents have had their routines abruptly altered from in-person schooling to hybrid and fully online instruction (Mecham, et al., 2021). Despite little to no preparation in their teacher education programs, the pandemic brought to light new opportunities for novice teachers to learn how to implement

pedagogical strategies using digital technology to support student learning and development in remote settings (Martin et al., 2022). Research is in its early stages in helping us understand how teachers, especially novice teachers, engaged remotely with learners and their families, for some the first time in an emergency crisis, implementing online pedagogical tools, platforms, and apps (An et al., 2021). Little research is prevalent on PreK-5$^{th}$ grade online teaching and learning, with more research centering on distance education in virtual academies, in middle and secondary settings, or on higher education online courses (Barbour, 2019; Wagner, 2022). Additionally, there is limited research focusing on teachers' perceptions of their impact on student learning while learning to teach online during a global pandemic.

## Literature Review

The many challenges of the pandemic are highlighted in the literature on K-12 online teaching and learning when teachers were faced with teaching online or in concurrent settings with little to no preparation (Mecham et al., 2021; Ranellucci & Berge, 2020; Trust & Whalen, 2020). Martin et al. (2022) described the pandemic as having an impact on several facets of learner engagement and thus the need for immediate strategies and supports for teachers and learners. For this study, we examined the literature on teachers' perspectives of their impact on student learning and development while developing knowledge and skills to teach online. An et al. (2021) and Wagner (2022) report on teachers' perspectives on the pedagogical strategies and support structures that teachers implemented and found beneficial. For example, six elementary teachers described their abilities to sustain student learning as they utilized online software platforms (e.g., Zoom, Google Meet) to provide synchronous instruction in an effort to build relationships and community in safe spaces for social interactions. These teachers also incorporated multiple forms of media and digital apps to differentiate instruction to engage in teacher-led or student-led instructional activities (Wagner, 2022). However, Le et al. (2022) investigated the interaction patterns of learners and how teachers engaged them online finding that teacher-student interactions and student-content interactions were more prevalent than student-student interactions due to a lack of teacher facilitation of discussion and the dominance of the teacher in Vietnam as the source of knowledge.

An et al. (2021) conducted a mixed methods study, utilizing an online survey and interview data from 107 U.S. teachers and described their approaches similarly using online software platforms, with synchronous instruction preferred over asynchronous, and hands-on learning via digital tools. Additional instructional strategies included project-based learning, especially at the middle and secondary level, and game-based learning. The researchers also noted some differences in the types of tools that teachers used depending on grade level. For example, *Seesaw* was more prevalent with elementary aged learners, while *EdPuzzle, NearPod*, and online assessment tools were the teachers' choice tools with middle and high school students. Other types of software such as the Google Suite were common across grade levels (An et al.). Similarly, in the Zheng et al. (2020) study, high school teachers found online platforms, various types of online software, and multiple digital apps beneficial to teaching and learning online when tied to pedagogical goals, especially to provide flexible, personalized learning opportunities (e.g., project-based assignments) and differentiated instruction for their learners. Considering the future of education in K-12 classrooms and the preparation of new teachers, this study examines novice teachers' perceptions of their own development and their impact on student learning while teaching online, during the

pandemic. Our case study examined the 2020-2021 pandemic teaching experiences of novice teachers who graduated from our programs. The purpose of the study was (a) to understand novice teachers' perceptions of their impact on student learning and development during this emergency shift to online teaching and (b) to describe novice teachers' perceptions of their own development of knowledge and skills during this time.

## Method

As part of a larger study, 23 participants [i.e., 3 Special Education (13%), 3 English Language Arts Education (13%), 5 Social Studies/History Education (22%), 3 Mathematics Education (13%), 3 Elementary Education (13%), 1 Science Education (4%), 2 Music Education (9%), 1 Art Education (4%), and 2 ESOL Education (4%)] were graduates of an urban research institution and had completed teacher preparation programs within the previous two years. The participants self-reported as 6 males (26%) and 17 females (74%), of which are 11 Black (48%), 8 White (35%), 2 Asian (9%), 1 Multiracial (4%), and 1 with no report (4%). Participants taught in teaching positions across a range of grade levels including elementary (6 or 26%), middle level (10 or 43%), and high school (7 or 30%) (see Table 1).

Table 1. Description of Participants' Teaching Position

| ID | Content and Grade Level | Teaching Position |
|---|---|---|
| ID 120 | Special Education (4th grade) | Elementary |
| ID 212 | Elementary (4th grade) | Elementary |
| ID 304 | Elementary (5th grade) | Elementary |
| ID 305 | Special Education (3-5th grade) | Elementary |
| ID 602 | ESOL (Elementary) | Elementary |
| ID 704 | Math, Science (5th grade) | Elementary |
| ID 204 | Language Arts (8th grade) | Middle Level |
| ID 205 | Language Arts (6th grade) | Middle Level |
| ID 311 | Middle Grades Science (8th grade) | Middle Level |
| ID 312 | Mathematics (8th grade) | Middle Level |
| ID 406 | Social Studies (6th grade) | Middle Level |
| ID 407 | Mathematics (Middle grades) | Middle Level |
| ID 702 | Music, Reading (Middle grades) | Middle Level |
| ID 801 | Social Studies (Middle grades) | Middle Level |
| ID 902 | Music, Drama (6th grade) | Middle Level |
| ID 903 | Social Studies (Middle grades) | Middle Level |
| ID 203 | Special Education (9th grade math) | High School |
| ID 206 | History (11th grade) | High School |
| ID 207 | English (10th grade) | High School |
| ID 209 | Geometry (9th grade) | High School |
| ID 211 | Art (High school) | High School |
| ID 313 | History (High School) | High School |
| ID 601 | ESOL (High School) | High School |

Semi-structured, individual phone interviews of 30 – 45 minutes were conducted, recorded, and transcribed in Otter.ai. Data were transcribed using Otter ai and analyzed using NVivo through open coding and axial coding following a constant comparative method (Corbin & Strauss, 2008). The research team coded separately and met to create initial codes. Further consensus among the researchers led to the development of categories and final themes. Themes were divided among members who recoded the entire data set and shared results with the overall team. The data subset for this study examined participants approaches to instruction across the months of the pandemic, instances where they impacted students' learning and development and their perceptions of their students and their own development of knowledge and skills across the year.

## Results

Findings help us understand these new teachers' perceptions of their impact on student learning and development while developing knowledge and skills to teach fully online with little to no preparation in their programs to teach online. Four themes are highlighted in this study as a glimpse into new teachers' perceptions of themselves and their impact during this time (see Figure 1). New teachers describe their impact on student learning as their ability to:

(a) build relationships and trust with learners and their families,

(b) use students' funds of knowledge to engage them in meaningful tasks,

(c) teach with digital tools, modeling and collaborating with learners, and

(d) monitor and assess learning online by incorporating various digital tools to monitor progress, assess using data, and provide feedback.

Novices describe student engagement and motivation as resulting student outcomes due to their abilities to build relationships, tap into students' multiple knowledge bases, and use digital tools to teach and assess student learning. They describe their new knowledge and skills teaching online as unintended outcomes related to their own development and learning.

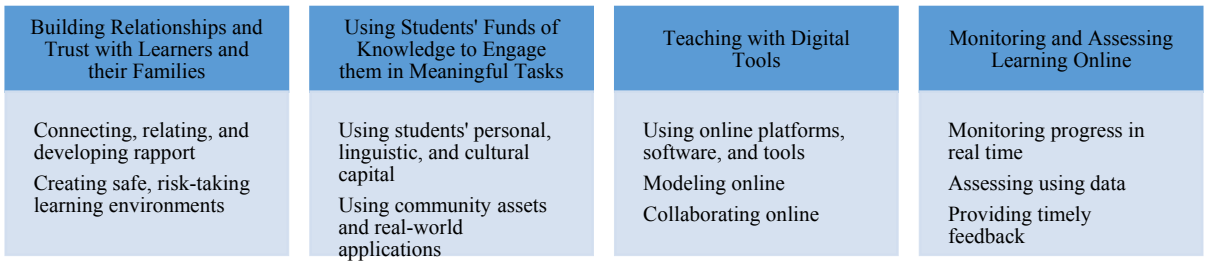


Figure 1. Novice Teachers' Perceptions of Their Impact on Students

### Building Relationships and Trust with Learners and their Families

New teachers highlighted their perceptions of their effectiveness at having an impact on student learning and development as their ability to develop strong relationships with their learners and families. They shared how getting to know their students, developing rapport, and connecting and relating with students was important for engagement and success. They encouraged a lot of exploration and experimentation in the digital environment

and created safe spaces where their students felt comfortable taking risks and learning from mistakes. Teachers indicated that ongoing communication with students and their parents was a key to student learning.

*Connecting, Relating, and Developing Rapport*

Two special education teachers, one elementary and one high school, described their abilities to impact student learning and development by connecting, relating, and developing rapport with their learners and their families. The first teacher explained how breakout rooms were used to get to know students, while the second teacher discussed how connecting and developing rapport breaks down barriers:

> Yeah, I think, with the students who did participate online…we in mostly with my co teacher in the agenda setting, we were able to develop strong relationships with fellow students. You know we got to know them, and they got to know us, and we are able to create, you know, fun and engaging lessons and pull them in breakout rooms and in small groups and whatnot. (ID 305)

> They don't mind listening to you and taking advice from them so once you can connect with a student it is easy to teach so powerful…you know, teach them life or anything, so I think that connection that rapport…I think this is the first piece of you know, breaking down that barrier. (ID 203)

An elementary special education teacher and a middle grades music teacher both recognized that *parents are their main supports* for successfully engaging their learners in online settings and for follow up on their assignments. They commented,

> But being in constant contact with the parents, because they're the ones who are responsible for getting the kids up and having them in front of their Chromebook or whatever device that the student uses. And that's what we prided ourselves on that communication with both the parent and the student. (ID 120)

> Really a lot of it is attributed to family support. And, and I would have students that would turn in everything on time, and we'd be fully engaged and would be at every class, and, and those, those students were obviously more successful; you attend class and you're going to be more successful; you participate in class you're going to be more successful. (ID 902)

Two more teachers at the high school and middle school level explained how establishing trust in an environment where students know you care about them and what they have to say is important for their development and academic success as noted in their comments:

> So being able to be relatable and has helped me as an educator, because I think, first, I'm one of the most important things, as an educator, you have to build relationships. Before you can teach a student who has the have that environment or feel like they can trust you and feel like you care about them. So, before you can even get into their mind and student development as far as academics, you have to make sure that you are setting the tone as far as relationships. (ID 206)

> And also inject all these opportunities for them to have a say and have a voice. Most kids like typing in the chat. If I was like, unmute they'd be like, No, but like type in the chat, they're like yeah I can do that.

> So we got to the point where I just had to like kind of accept that we're going to spend more time than I think we should typing in the chat and talking about our weekends, and, you know, asking silly questions in it, even if it's just a one silly question before class gets started, but just trying to get them engaged from the start. I found to be really important. (ID 702)

All these teachers acknowledged the value and necessity in building relationships and trust with their learners and families to support student learning and development.

*Creating Safe, Risk-Taking Environments*

In addition to building relationships, the novice teachers described how they created safe, risk-taking spaces for their learners to experiment and try out new things. Students were allowed to share anonymously, if desired, when further support was needed due to a lack of understanding. These art and social studies teachers also described how their learners felt free to make mistakes to learn more and could seek further support, saying,

> Well, I always like to tell my students that they're supposed to make mistakes. If they don't make mistakes, then what, you know, what's the point of me being there to help them because that means they're perfect, and no one's perfect. I encourage a lot of experimentation. I tell them, you know, nothing's you sometimes you're supposed to fail. And that's, that's the way to learn is through failure. (ID 211)

> There were several every day that they, they come in, I'll give them an index card and let them write yet. And then for my online kids out, I would have them do a Google form and it was anonymous. And they could write down any questions, comments, or concerns that they have. About one of them would be about material about content that I was teaching. And another one would be about anything that they just needed to ask me or whatever. And it could be anonymous, they also could put their name on there. And so, then the next day or at the end of class, I would kind of go over it. So being able to, to create, like a safe place where they know they won't get caught out. And they don't understand material. And being able to do the same thing with my digital kids just virtually. (ID 801)

In addition to building relationships and trust with learners and their families, a first step to ensuring for student development and learning, the novice teachers recognized the importance of tapping into their students' funds of knowledge to engage them in meaningful and relevant tasks, connecting their personal, linguistic, and cultural experiences to their academic learning in real-world contexts.

**Using Students' Funds of Knowledge to Engage Them in Meaningful Tasks**

Novice teachers described their ability to impact student learning and development, often referring to culturally responsive pedagogy (Lawrence, 2020), by using students' personal, linguistic, and cultural capital to engage them in learning experiences. They incorporated video games, music, slang, and what was popular among their learners to hook them into learning. Additionally, they used local community events, places, and activities as they planned for instruction. Furthermore, they pulled in current real-world events to provide additional application of content knowledge and skills.

*Using Students' Personal, Linguistic, and Cultural Capital*

Using their students' funds of knowledge (González et al., 2005) to engage them in meaningful tasks, teachers shared how they used their students' personal interests, linguistic and cultural capital. Some of them commented about using slang, music, such as Hip Hop, and figurative language saying, "I try to use music a lot because I do know that the students that I teach, they love music and figurative language you know everything is in music, it's just the whole (ID 203)." Another commented,

> …you know incorporate using, using terms, hip hop terms in my in my lessons, trying to get them to connect with the listener. You know, I know, video games, music is the main way to get to them…And you know just be, just be culturally relevant about what was popular with them; you know even sometimes the slang that I kind of taught like sometimes try to make sure. (ID 203)

Here a middle level teacher highlighted the use of figurative language to connect to students personally:

> So, I teach Physical Science, which is like half physics and half chemistry. And so, in the second semester, we, we were talking about the periodic table and atoms, how they bond together and all that, and I found that adding personification to the atoms that I was describing helped my kids understand them, a lot. (ID 311)

A music middle level and ESOL high school teacher described impact on student learning and development as effective teaching online using culturally relevant materials that represented different cultures and groups as noted:

> I'd say that culturally responsive pedagogy is a high priority for me regardless of whether I'm in person or online. And I'm make a real point to make sure that we sing repertoire that represents different cultures, different languages that the composers and the arrangers are a diverse group of people that we have. Immigrants, minorities, women, you know so that so that there is a lot, represented. I would say, I would say really. I'm lucky that I have a nice library, and I was still able to have a diverse, a diverse set of literature for them. (ID 902)

> I would say that's one of the ways in which it was different because you still have a lot of access to good multicultural materials online. For example, we did a unit on face challenges and workers' rights. Leading up to play by Chinese Day in March. And so, so I was able to share a lot of resources, I had some physical resources, which came with my phone, and then upload. And then of course there are articles which are really access online songs even on YouTube videos. So, I would say, culturally responsive resources are much more readily available online than offline were much more accessible. And so, I didn't feel like there was much of a drop off or any drop off at all that, compared to what I was doing in person. (ID 601)

Connecting to personal histories was also a method used by these novice teachers as described by this high school art teacher:

> It's so, so for some kids, they have trouble coming up with ideas for some kids that they really use their own background, their own personal history, to create engaging and incredibly interesting pieces of work. You know, I had a student who was, who considers himself a Latin X. And she wanted to write specifically, a booklet about all the Latin artists that are sort of looked over, you know, perfectly was

> amazing, she did a ton of research, I ended up going library, getting books for her, and bringing them to class and the books, she loved the book so much, she asked me to take them home to her parents. So, I do try to, I try to make sure that the students are bringing in their own opinions are understanding that their personal history, and also their own aesthetics, valuable in their ability to create things. (ID 211)

*Using Community Assets and Real-World Applications*

Novice teachers also shared how they *used their students' community assets and real-world applications* to engage their students in local and global events. Two teachers, language arts and history, commented:

> Unfortunately, there were a lot of different types of events that was taking place throughout the whole course of this year, so we use all of those events to actually use as a lesson which had kids actually engaged so they were learning about the stuff that was going on in their community, they learned about what's going on in the world. And, you know, bringing it to the classroom so that they know that they are important. (ID 205)

> Let's talk about the current event let's talk, let's talk about what's going on in society because this is a social studies class, so we can kind of, you know, dive in and digest this whole incident and see how can we improve as, you know, citizens of America, you know, So that was pretty cool, being that it was something that caught us off guard, but we as educators, we had to have that conversation. (ID 206)

Two more teachers, middle level and high school social studies/history alluded to the events of the election year and the racial strife occurring in the U.S. and their abilities to impact student learning in meaningful discussion and activity. They explained the following:

> Then when they got really political because of the election year. The kids were really vocal about their thoughts, and you know and if we would have, they would have debates. And so that would be awesome in the beginning and then when I was transitioned to social studies, we had to learn, like sixth grade so they learned about the governance systems in Europe and in Canada and in Latin America, so when they were learning about different government systems. They were actually coming like comparing it to ours and then coming up with what they thought the perfect government was like, we should have…and so I want to say like I made eye contact with them being like kind of like global citizens because they started being like, okay, so when I grow up I want to live here because I like how they do that there, or when I grow up, they can vote at 16. I think you know and or they care about the environment, so definitely watching the news, definitely, social studies, and having them, knowing what was going on in present time that real applications. (ID 406)

> So, this year, one of my other colleagues that went to [XXX] and graduated as well, from the MAT program [name]. We both started an organization a grassroots organization in [name] County, just basically seeking equity across the board at the district office, as well as in throughout the school district. And so, what was very interesting was, I was able to kind of show my students what was going on in their, in their hometown. So, for them to really understand, you know, why it's important to vote. Why is it important to be politically responsible and knowing what's going on in your society? (ID 313)

An elementary education teacher used problem-based learning to provide a real-life application experience for learners using community food trucks and menu design related to concepts of budgeting, marketing, and economics. The teacher explained:

> Coincidentally, it happened like on the last quarter, and we did a PBL project. So, the problem-based learning, so we did a food truck activity, where the students had to come up with a menu design, they had to come up with a price for it, their own local, and they had to come up with a design for a food truck, and this aligned with my social science lessons through finishing up with economics. And so they were learning about budgeting we've talked about consumers and marketing and competition… I was able to give the students a project and this is actually where they learned the most because they would actually apply like math back to math because they had to add subtract decimals, and they had to make connections with economics… they were able to make real life applications to, to what they see every day [because] we talked about like how restaurants now sell chicken sandwiches, because chicken sandwiches, got really popular. (ID 304)

Elementary, middle level, and high school teachers described many ways that they were able to build relationships with students and their families and use their students' funds of knowledge to engage them in meaningful tasks. They also became well versed in teaching online developing their own familiarity and comfort using online platforms, software, and tools to teach remotely.

**Teaching with Digital Tools**

Teaching in the digital world brought about new and unexpected learning experiences for both the novice teachers and their students. Teachers reported their surprise that they were able to model well online using digital tools and apps that they had discovered mostly through trial and error. They realized that they could show students how to do something and even collaborate to help them revise or try another strategy online. Furthermore, they acknowledged that there were new ways for students to interact with not only the teacher but also other students online. They described some of the online platforms, software, and digital tools that they used to model and collaborate online to create teacher-student and student-student interactions.

*Using Online Platforms, Software, and Tools*

Novice teachers referred to their new knowledge and skills teaching and impacting student learning by experimenting with various digital tools, platforms, and software and digital technology to model and create collaborative learning environments for their learners. One high school special education teacher explains,

> But I will say it pushed me out of my comfort zone; I blew down development. I learned some new technology platforms that we can use, even when the students come back, because especially in special education you have to make sure that you have different stations may be hands-on one may enjoy or using technology in the classrooms is now a one stop shop. You have to offer different strategies and different platforms for students to excel and be great. As far as development, they're learning. (ID 206)

Another teacher found a free software program to support student learning in her art class:

> And then of course, getting materials to kids. I rearranged the entire way all my projects are done. So that it's something we can do from home, and I teach the digital art classes that require software that kids can't buy. So, I had to improvise, I had to find for example to do half of the work that software they could buy to do and then another free software that did the other half or something. So, these are things that I've had to change. (ID 211)

An ESOL teacher discussed online platforms and helpful digital tools to support instruction:

> And then starting when they had their Chromebooks. I gave a lot of instruction in terms of how to use a lot of the online resources that they were expecting to use like G Suite stuff. And I still continue to make use of some other online resources like Quizlet for making flashcards for our class under other classes. And then also continuing to develop their ability to use NGC, apps and programs for their assignments, and also Google Classroom was our sort of learning management system that we use… (ID 601)

*Teacher Modeling*

In addition to becoming comfortable teaching with online platforms, teachers acknowledged their new abilities to use digital tools to model instructional strategies online and support student learning. An elementary mathematics teacher explained her use of digital mathematics manipulatives to model and guide student understanding of fractions:

> Oh, I want to say a lot of my impact really came in the subject of math. And I know that's a really hard one more time, I felt like doing other subjects were a little bit more difficult over doing hybrid, but math was a constant because of technology. So, I was able to like, you know, math is really important when you have to use manipulatives with younger students…more hands on things, but because we can't do hands on, and because we can't physically give students manipulatives, I was able to find those manipulatives digitally online, where students can still have that physical movement and actually see what was being done. So, for instance, we were focused really heavy on fractions. This year is a fourth grade so obviously, when fractions isn't easy, so when you're normally teaching that you want to use fraction bars or fraction circles, and when we're hybrid, or when we are online completely, that's really hard to have that per student. So being able to have this virtual fraction strips or fraction bars or fraction circles really helped my students see. (ID 212)

Both the following art and elementary teachers provided additional examples of modeling to physically show students what they need to see as well as collaborate with them to support their understanding:

> They're virtual, they're fully virtual. So, so I found a bunch of different programs online that did a bunch of different things. And one of them I found was, was great because it was, it was created as a sort of design collaborative program. So, if the students create an account with it, and then they share that account with me, I can actually go into the program while they're in it, and move stuff around and physically shows, you know, like how, maybe if a student was in person, and I wouldn't be drawing over their drawing to show them where they made their mistakes. In this case, it was a virtual setting where I can collaborate virtually. So, So, this, this helps a lot of my students understand very technical things… (ID 211)

> And so, when we would do math, I would model it for them. And then I would give it to them for them to do themselves or whiteboard. And as they were working, I could see what they were doing. And it showed me how different students what steps they took to get to the answer. So, students could just do the math, they got it. Some students would use different techniques of how to do math, like a different, different adding techniques or multiple or multiple, repeated addition, things like that I was seeing they're working the problem out in the way that they feel would get them to the answer. And that was probably one of the best parts about being in my small group was using the whiteboard. Because I can actively see the students working and it was kind of like being in the classroom again, because I was in the classroom, I could see them working on their paper. (ID 602)

Screensharing became commonplace during synchronous instruction as a way to guide students so that they could see what they should be doing as modeled on the teacher's screen. One teacher indicated,

> So when they're supposed to be working on projects, what I like to do is I like to screen share the same project they're working on except my version of it. And so it's become a thing where we're learning from each other. (ID 211)

*Teacher-Student and Student-Student Collaboration*

Not only were teachers able to model for learners to guide instruction; but also, the novice teachers explained how they were able to use digital tools to collaborate, creating not only teacher-student interactions but also student-student interactions online. Two middle level mathematics and elementary teachers provided examples:

> We did like a gallery walk. And this one was nice because my digital students did it on Jamboard and my in-person students did it [on] chart paper, and I liked it because they were. We learned about center and spread. And then they were responding on sticky notes and then responding to the responses. So that was nice because I could see their thinking. The first time is that I could listen to their conversation about other students' responses, and some of them are sorting them by like correct and incorrect responses or like moving the sticky notes around to show. Like what, what responses really were the best. (ID 312)

Using Nearpod, a digital platform, to teach reading, the elementary teacher explained how her students interacted in concurrent settings:

> So, in that way with doing that I was able to have all my students and the students in the classroom work together. So, if I wanted to do partner work, because of social distancing, I would pair an online student with a student in the classroom. It went really well. That's when I would notice a lot of the students, a lot of the online students were way more engaged, but they were able to talk to the people that were in the classroom, instead of just talking to the people that are just online with them. (ID 212)

Additionally, an ESOL elementary teacher explained how students interacted with the mathematics content on Google slides by annotating:

> So, I had my, I had different number sense activities for each day. And then I had actual problems that related to the whatever we were learning that week or those, those couple of weeks. So, we went over

> adding three-digit numbers place value, some, some a little bit of geometry, partitioning, we're kind of getting them to think about equal groups, because that's coming in third grade. And that's where I really had to, I use a Google, Google Slides for that. And I really had to learn how to put things on the slide so that the students can interact with the material. (ID 602)

Not only did novice teachers become adept at teaching with digital tools; but also, they found the digital world to be a place that was surprisingly conducive to monitoring and assessing student learning online as will be discussed next.

**Monitoring and Assessing with Digital Tools**

New teachers described their impact on student learning and development related to assessment recognizing that they incorporated various digital tools to monitor student progress in real time, to assess using data, and to provide timely feedback. Assessing student learning by providing timely, actionable feedback beyond grades was an unexpected outcome for teachers who noticed an increase in student motivation and engagement in learning.

*Monitoring Progress in Real Time*

Teachers described how they monitored progress in real time by being able to watch and see what students were doing as they were working online. A middle level and elementary teacher explained their use of digital tools such as Amplified, whiteboard, and Edpuzzle to watch, listen for, and see student responses:

> So, it's like, we have to do writing the platform called Amplified, where it was basically like an app like everybody like logging into it and then we go through it together and you could monitor their work. But in doing that they had to write a lot, and they would really see their writing and then I could go on the Google Doc and make those immediate corrections [like you] were in person. (ID 406)

> We use this platform a lot called whiteboard, and whiteboard, you can set up a class as a teacher, and then you send a link out to the students, they click the link, and they set up their own whiteboard. And then from there as the teacher you can see what they're doing with their work on whiteboard. So, I did that a lot with my fourth-grade math group that I did that I had a small group with. (ID 602)

> It was towards the end of virtual, but I used it so much, I started to use it more with a lot of my classes. It's called Edpuzzle. Edpuzzle is a platform where you can basically people can take people can make videos, or they can take you to videos, and have different points in the video where they stop. And the program asks the question, and the students have to answer. And then it goes with the video, it goes with the lesson that you're teaching. (ID 602)

Another teacher teaching in special education described a digital assessment tool to see students' interactions and responses on formative assessments saying, "Use this program called Go Formative is kind of like your, your slacker in home-based teaching program where I can see if you're interacting (ID 203)."

*Assessing Using Data*

Using data from formative assessments was perceived by these novice teachers as instrumental in guiding their students' learning and development. Two middle level education teachers described how they used data from formative assessments to assess learning and plan for instruction:

> There are several times this year where I would put them into groups based on their responses to some formative assessment, and those, those I think were my favorite lessons, because I would pull my small groups and work with them on, you know, whatever they misunderstood and then leave the rest of the kids or maybe split them into two different groups to have them go off on their own, like they could log off and work on the activity independently or stay on and be in a different breakout group so those I think were my best days when I really saw student growth. (ID 312)

> I mean, we did, they took a writing score assessment early in the year. So, then I took the results from that and use that to divide them up into groups, and then was able to provide, like different targeted learning for each level based on those scores. So that was a good opportunity to use the data positively, to go back and inform those groupings. (ID 204)

A high school history teacher described the importance of formative assessment to learn what students need, saying,

> I found it in the Avid strategy book, to ask for student feedback, what works for you, you know, just kind of like, yes or no question. But it helped me understand what my students need. Because, you know, I just asked for that student feedback. Sure. I activated that in my classroom, and at first I wasn't doing that, I was kind of assuming. But when I asked what do, what, what will work for you, or what do you need help, and help me. (ID 206)

*Providing Timely Feedback*

Overwhelming, teachers described how they were able to successfully provide timely feedback online to their surprise much better than in person. An unexpected outcome they highlighted was their ability to motivate student learning through feedback rather than grades. Several teachers provided examples of their experiences. One middle level teacher explained that feedback can be specific and given quickly, noting:

> I found that the online teaching allows me to give more specific feedback quickly. So, I have enjoyed that aspect of it. Because I can, I can type a message to a student way faster than I can hear them ask question and respond verbally. And I can get to them in order of importance. See, like, who's actually struggling? And who's asking, you know, questions that they could reasonably find the answer to. So, it's a lot quicker to feel those responses and give appropriate feedback in online environments than it is in person. There's a lot less distractions online as well. (ID 204)

An art high school and music middle level teacher discussed how the online platform allowed for personalized comments, and for students these constructive remarks made them eager to turn in work and the teacher ccould see their progression. They commented, saying,

> Well, I think I think with an online platform, being able to give written feedback, like, you know, paragraphs of feedback, for every single assignment was, was something that I wouldn't have done in person, you know, in person, I tend to give a lot of verbal feedback. And then I'm just like, Oh, yeah, they're gonna totally remember what I told them to do. But I think having written feedback was a huge one. And having it on an online platform where they could go and see like, comments from me on their in progress, or the rough drafts or something like that is very beneficial to their own development. (ID 211)

> It's just so we use Microsoft Teams, and through all the different counties use different platforms out there. But on Microsoft Teams, you could even write a little comment. As you're giving them back grades, and I felt it was kind of naked to just give back a grade. So, I found myself giving comments for every single student. And then I got overwhelmed. But I was like, I started this I can't stop. So, once they started to expect this, I realized, they're, they're more eager to turn in work, because they know I'm going to give them feedback. You know, why? Why would they just, it's funny, these kids are not motivated by grades. They're motivated by constructive comments. (ID 211)

> But, but they were singing, and one of the great things about that is that I was able to give them personalized feedback, which is something that I have not done before because if everyone's in the classroom, you give basically feedback as a group… that was really gratifying for me especially when I would hear progression throughout the year, you know, again, students that really were working on their vocal technique, the way that I was teaching them, and you know I would I would give them specific feedback. (ID 902)

Even at the elementary level, a math/science teacher found that instant feedback was gratifying for learners. This teacher used a digital, Live Worksheet as a tool, saying,

> And then as far as the worksheets, I found this resource called Live worksheets, and that was great because not only do they have premade, I can make them the worksheets myself; it graded them for me. [They] see their grade right away when they got in, like, instantly because that you know that instant feedback is very important so that was a great resource to use that. (ID 704)

Teachers provided examples of their excitement when they realized that they could monitor and assess student learning in real time, including the provision of timely feedback. Data were used for formative assessment purposes, and teachers reported that digital technologies were effective in helping them use assessments to plan for instruction as well as to assess student learning and provide next steps for individual learners. Individual learners were motivated to use the feedback and to turn in assignments.

Novice teachers shared their perceptions of their impact on student learning and development that were in some ways aligned to their program preparation and in other ways learned on the job during the pandemic where online and concurrent teaching became the norm. Building relationships and trust with their learners and families as well as using students' funds of knowledge to engage them in meaningful tasks were areas of focus in their programs which had a social justice mission. These teachers were prepared to plan, teach, and assess in settings that were

primarily in person. While they had many hours of clinical experience, primarily in yearlong student teaching placements, including preparation to use technology for student learning, they were not prepared to teach in online or in concurrent settings. The teachers highlighted several unexpected outcomes as they were learning alongside their students. They relied more heavily on parents and families as supportive partners. They were able to model and collaborate, interacting and creating safe spaces for students to interact with each other online. Assessing and providing timely feedback online beyond grades proved to increase student motivation and engagement as did facilitating courageous conversations related to community and real-world events.

## Discussion

These study results are enlightening and shed a positive slant on our teachers' perceptions of their impact on student learning as they were developing knowledge and skills as learners themselves during the abrupt switch to teach online. Most teachers exuded some confidence teaching online as expressed by their positive perceptions of their contributions to student learning and their developing knowledge and skills to teach online, a similar finding in self-efficacy studies for online teaching (Dolighan et al., 2021) and others (An et al., 2021; Mecham et al., 2021; Wagner, 2022). Teachers were able to make connections and build relationships with a community of learners using online platforms and software, engaging students in synchronous instruction including breakout rooms. Additionally, they brought in parents online to support their launch of activities and to engage students in learning. Unexpectedly, their view of parents shifted from outsiders to insiders who were truly partners in teaching and learning as also noted in the literature (Mecham et al., 2021, Wagner, 2022). Our graduates, like other teachers, were able to use learner-centered approaches such as problem-based learning, collaborative online learning involving teacher-student (Le et al., 2022) and student-student interactions, hands-on manipulative activities with learners, and online discussions (An et al., 2021, Wagner, 2022). Confirming the literature, our teachers observed unexpected outcomes (i.e., motivated and engaged students) while teaching online (An et al., 2021). These results were corroborated in this study when teachers incorporated students' funds of knowledge in activities involving real-world applications and provided timely feedback requiring student responses online. As also noted by Sahlberg (2021), students were engaged in learning when their learning experiences were in authentic contexts and were self-directed.

This study provides evidence from a range of teachers across the elementary, middle, and high school levels, including special areas art, music, and ESOL, where new teachers described their use of multiple digital tools and platforms to support student learning. Findings provide further evidence of the impact elementary teachers have on young learners in grades 3rd-5th, as also noted in Wagner's (2022) study. Use of song, video, annotated Google documents, and multimodal forms of media are some of the ways that students engaged with these new teachers in synchronous online settings. Using a variety of digital technologies, teachers were able to be flexible in meeting the needs of their learners in ways that they may not have discovered had it not been for this shift in modality to online instruction. Additionally, most teachers in our study used digital tools and apps to differentiate instruction and assessment via modeling and feedback. Similarly, teachers who adapted instruction online were successful in meeting the needs of individual learners (Mecham et al., 2021).

## Conclusion and Recommendations

The purpose of this study was to understand new teachers' perceptions of their impact on student learning and development during the pandemic, in the spring of 2021, after they had begun teaching online in their first or second year of teaching. These findings add to and confirm the literature that teachers are reporting more positive perceptions of teaching online at all levels, even in the elementary grades (An et al., 2021, Mecham et al., 2021, Wagner, 2022). Future research is needed on teachers' perceptions of their effectiveness teaching online across grade levels, elementary, middle level, and high school. While this study provided a sample of participants who were teaching across grade level ranges, the smaller number of participants within the grade ranges may be a limitation of this study. The perceptions of the new teachers in this study regarding their impact on student learning while developing their own knowledge and skills to teach online provide recommendations for school leaders, teacher educators, and current teachers. School leaders may consider offering differentiated professional learning for teachers on the use of digital technologies, while teacher educators should prepare new teachers to use digital technologies to teach online (An, et al., 2021; Hall, & Trespalacios, 2019). While teachers have experienced challenges teaching online, there is much to learn from their positive experiences and approaches to teaching and learning. Communication with parents as true partners is key as is using various digital tools in both online and face-to-face environments. Incorporating more opportunities using digital tools for real-world student applications during instruction as well as timely feedback is important for student engagement and motivation as self-directed learners. Waite and Arnett (2020) provide additional examples of programs showing impact on student learning when educators integrated new resources, incorporating technology, and implemented new instructional processes. Resources alone did not prove to be beneficial, but rather the combination of the resources and the instructional processes employed by teachers helped to close equity gaps in learning. As noted by Sahlberg (2021), when teachers provide opportunities for learners to engage in authentic learning online, students may become self-directed and reach their fullest potential. Schools may become more equitable when positive outcomes are identified and capitalized on with support for teachers and their autonomy to ensure for the success of all learners.

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