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Pandemic Innovations in Teacher Education: Communities of Practice, Mentoring, and Technology

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Abstract: This study aimed to investigate the transformation of pre-service teaching experience due to virtual or hybrid completion during the 2020–2021 school year and to identify teaching and mentoring innovations that teacher educators should continue to promote. The research involved 14 student teachers and 5 mentor teachers from the United States across elementary, secondary, and pre-K–12 programs who participated in surveys, semi-structured interviews, and focus groups. The results indicated that the integration of technology in student teaching and the shift to virtual or hybrid learning brought about new challenges and opportunities for both student teachers and mentor teachers. The study highlights technology that may continue to be used post-pandemic, the promotion of virtual communities of practice, and ways to quickly integrate and maximize student teachers in the classroom.

Keywords: pandemic innovations; communities of practice; mentor teachers

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1. Pandemic Innovations to Promote Excellence in Teacher Education

As the educational system enters into a third calendar year of pandemic impacts, teachers continue to balance shifting modalities with high-yield pedagogical practices. Early in the pandemic, experienced teachers faced the monumental task of providing virtual instruction for all students. Early data from this time show that there were significant delays in learning for many students [1]. However, these data did not measure teachers' increased ability to provide multimodal instruction. In the spring of 2020 and fall of 2021, school districts across the country expanded their technology resources to accommodate online and hybrid instruction. In some cases, teachers were assigned a teaching modality the week before the school year started. Many teachers used trial and error to integrate technology, content, and pedagogy.

In addition to pedagogy changing in the classroom, teachers' interactions with their communities of practice (CoPs) also shifted [2]. CoPs in this context are defined as grade-level or content teams that met to discuss their teaching practice. Traditional CoPs and grade-level meetings that occurred in person were now online; content curated by one teacher could be presented to an entire grade level through a learning management system (LMS); and teachers who were the only instructor of a specific class in the building formed new CoPs with teachers across the district or state.

With all these changes, it was difficult to predict the role of pre-service student teachers and the ability of a mentor teacher to effectively integrate student teachers into the classroom environment and CoPs. However, student teachers provided expertise in the use of digital tools and LMSs, and they became an extra teacher in the classroom to provide instruction and troubleshoot technology. The traditional balance of expertise shifted with the multimodal instruction; thus the student teacher became a valuable asset to the mentor [2]. Much of this relied on the mindset of the teacher. Some mentor teachers did have extensive knowledge of technology and were able to pass this on to the student teachers. However, others did not have a mindset of being competent with the new technology expectations.

While many schools have resumed operations like those of pre-pandemic times, the aftereffects of the pandemic continue to impact instructional practice; for example, the one-to-one devices that many districts scrambled to acquire are still in students' hands, the last-minute LMS adoptions are still in place, and the idea of using videos, discussion boards, and shared resources is still present in teachers' minds. The purpose of this research was to explore teaching and mentoring innovations that promote excellence in the classroom for post-pandemic times. It will also explain how pre-service teaching experiences were transformed by being multimodal during the 2020–2021 school year.

2. Conceptual Framework

This study was grounded in constructivist principles. Constructivism implies that there are multiple realities and that these realities are constructed by people and their interactions with others [3]. The experiences of the researchers, mentor teachers, and student teachers occurred under similar conditions, but all involved perceived their experiences differently. Each person's previous background knowledge and cultural experiences changed the perceptions of the same events [4]. The pre-service student teachers constructed meaning through their coursework with instructors, their mentee experiences (including work with CoPs), and their experience in working with students. The multifaceted interaction among all stakeholders relied on a constructivist approach to deciding what pandemic innovations should continue to be promoted. Furthermore, constructivism suggests that in the context of virtual or hybrid teaching, teachers and student teachers not only have to adapt to new technologies and teaching knowledge, but these methods may require them to construct new knowledge and understanding at the same time. The current study explored the perspectives of mentor and student teachers, but the questions were proposed by teacher educators using criteria of state licensure evaluation materials.

3. Literature Review

The purpose of this research was to explore the lessons learned from the abrupt shift to online learning in the classroom. While there is a plethora of literature on the viability of online learning moving forward, the goal of this research was to explore innovations in teaching and mentoring moving forward. Teachers' experiences with technology dictated the ways they participated in CoP and interacted with their assigned student teachers. Teachers' perspectives in each of these areas were dependent on their school context. For example, technology usage was promoted and limited by what was available in each district. The same constraints for CoP were also true, especially while mentoring. Pre-pandemic processes set the stage for changes during the pandemic.

Teachers' Perspectives and Experiences with Technology

Exploring these innovations requires a deeper look into teachers' use of information and communication technology (ICT) before and during the COVID-19 online learning shift. König et al. [5] found that ICT tools were key in transitioning to online instruction. Their study of 89 early-career teachers in Germany found that teachers who were digitally competent and those who were provided professional development opportunities to increase their digital competency were able to adapt to online teaching. Teachers who were unable to adapt well faced challenges such as low student engagement and participation, lack of access to technology by teachers and students, lack of opportunities to learn new technology, concerns about students' well-being, and no work–life balance. In a mixed-methods study exploring 107 teachers' perceptions regarding teaching online during the pandemic, teachers felt they would be better prepared for future emergencies if they had the following: training in online learning, better access to technology, training in technology for students and teachers, and better plans for communication [6]. However, for many teachers, online learning and the lessons learned are not for "future emergencies".

Recent research findings and anecdotal evidence suggests that schools will continue to invest in ICT, and teachers will be asked to use it effectively. The use of ICT is addressed

extensively in the research. In 2006, Mishra and Koehler introduced the technological pedagogical content knowledge (TPACK) framework. The framework seeks to understand how technology and pedagogical practices interact with the content being taught. Another framework, the Unified Theory of Acceptance and Use of Technology (UTAUT), explains teachers' intentions to use technology for learning. UTAUT looks at performance expectancy, effort expectancy, social influence, and facilitating conditions and their impact on the intention to use a specific technology [7]. Technology competence and usage is an ongoing process that often takes time [8]; teachers during the COVID-19 pandemic were not given a choice of when or how to implement technology that they were comfortable with. Moving forward, many of the acquired technologies, such as LMSs, hardware (laptops, etc.), and software licenses, will continue to be utilized by school districts.

The new role of these technologies must be considered. Determinism proponents, or those who believe the use of technology is unavoidable and directs our processes and society [9], may see the use of new technologies as inevitable, but that does not mean that the new technologies will benefit students. While an LMS, a laptop, or an app may be utilized, its use alone does not ensure learning. An experienced teacher must know when and how to leverage technology to deliver quality instruction. There are other times when a teacher may effectively teach with or without the technology, but their workload would be greatly reduced if technology was utilized [10]. It is also worth noting that many teachers felt that technology was overused during the pandemic, and so many decided to teach without it intentionally to reduce screen time for their students.

4. Communities of Practice during COVID-19 and Online Learning

It is important to consider the use of technology in communities of CoPs. A community of practice (CoP) can be defined as "a group of people who share a passion, a concern or a set of problems regarding a particular topic, and who regularly interact in order to deepen their knowledge and expertise and to learn how to do things better [11]". Wenger [12] posited that to be a community of practice, members must have shared activities and discussions that serve to help and share information with members. Many schools implement CoPs around grade levels or content areas within their buildings. CoPs are highly successful with active participation that is collaborative and embedded within the job [13], but they should also include practices that are grounded in research [14]. CoPs formed during the pandemic may have lacked active engagement around practices grounded in research: the utilization of time generally was not spent adjusting teaching to meet the needs of students, but instead was focused on production and delivery of content in a new format.

In Ulla and Perales' [15] research on the role of teachers' online CoPs during the pandemic, findings from interviews with teachers revealed that the focus of the CoP was on supporting each other and helping each other find solutions to online teaching issues. Teachers in the study were concerned with the lack of student interaction, time for assessment and feedback, and student engagement; however, these items were not supported in the online CoP. A CoP is useful in supporting a teacher's professional development, but a CoP may also promote a sense of belonging [16]. The current research study explored how CoPs were utilized during the pandemic for planning but also how student teachers were quickly integrated into these groups by their mentor teachers.

5. Mentoring Student Teachers

In addition to teachers' complex task of transforming instruction for an online environment during a global pandemic, there were teachers who also mentored a student teacher. Traditional constructivist approaches that included participatory models of professional development for teachers [17] were also used with student teachers. Interns in the current study were included in CoPs while lesson planning and navigating online learning. A key experience in the development of teachers is the student teaching experience [18]. While there are guidelines that most universities follow regarding the amount of experience that a teacher must have to be a mentor teacher, there is little research on whether this experience

guarantees a quality experience for the student teacher. Matsko et al. [19] analyzed survey data across 44 institutions of higher education and found that the individual mentor teacher mattered and that student teachers felt better prepared when their mentor modeled effective instruction, gave frequent and appropriate feedback, was collaborative, and balanced the student teacher's autonomy with encouragement.

The mentor/student teacher experience can be further enhanced with strategic mentorship pairings. Jones et al. [20] found that successful student teacher/mentor relationships were based on personality, access to community, shared values, and interest in growth, as well as the ability to successfully resolve conflicts. In their interviews with three pre-service teachers, the data also showed that feelings of belonging and the mentor delegating responsibility while providing continuous feedback was important. Similarly, Perry et al. [21] found that student teachers were able to plan and implement appropriate practices if given the space and feedback.

6. Gaps in the Literature

While online teaching may no longer be seen as "emergency teaching", many of the lessons and innovations from teaching during the pandemic will carry forward. School systems will continue the use of implementing new ICT and LMSs [5] regardless of the mode of teaching. Many teachers may find that technology usage will reduce their workload [12]. The use of online CoPs may continue to help bring teachers and student teachers together. While the goal of the CoPs should be finding research-based solutions [14], the CoPs will continue to provide support and solutions to issues surrounding ICT [15]. The integration of student teachers who are proficient in ICT and LMSs into these CoPs may provide much needed expertise to teachers lacking these skills. In return, the student teachers may receive vital opportunities for collaboration and feedback with their mentors [19].

7. Materials and Methods

In this study, we considered two research questions: (1) How was the pre-service teaching experience transformed by being completed virtually or hybrid during the 2020–2021 school year, and (2) what teaching and mentoring innovations should teacher educators continue to promote? To answer the first research question, survey questions, interviews, and focus groups were used. The interview and focus group data were used to formulate findings for the second research question.

8. Participants and Context

In our educator preparation program (EPP) set in the Eastern United States, elementary licensure students in their final year of coursework complete courses and attend a part-time student teaching experience two days each week during the fall; and secondary licensure students complete coursework and a month-long, full-time student teaching experience. In the spring, the elementary and secondary pre-service teachers complete a full-time, semester-long student teaching experience. The student teachers are placed with highly qualified mentor teachers in their area of licensure. In the fall, the mentor teacher includes the pre-service teachers in observations, planning, classroom management, grading, and implementing lessons; however, the mentor does not release complete control of the classroom. In the spring, the pre-service teachers gradually increase their responsibilities until they are fully responsible for all aspects of the classroom.

During the 2020–2021 school year, the researchers invited student teachers and mentor teachers across elementary, secondary, and pre-K–12 programs to participate in this study; 14 student teachers and 5 mentor teachers agreed to participate in the study and completed the survey in October and December. Out of those participants, seven student teachers and five mentor teachers completed semi-structured interviews in December. In May, five student teachers and three mentor teachers participated in focus groups. All the participants' districts started instruction virtually, but two of the districts moved to a hybrid model during the second quarter (with options for fully virtual instruction).

9. Data Instruments and Collection

Data included in this study came from interviews and focus groups. All potential participants were emailed a description of the study as well as a consent form that had been reviewed by the universities 'review board. All participants that consented, including student teachers and mentor teachers, were asked to complete surveys from a larger research study in October at the beginning of the part-time student teaching and again in December at the end of the part-time student teaching. A subset of those participants participated in semi-structured interviews immediately after completing the surveys. In the spring, after the full-time student teaching, focus groups formed from the interview participants were conducted with student teachers and mentor teachers separately. The following sections describe each data source.

9.1. Surveys

The participants responded to Likert-scaled items, demographic questions, and open-ended questions; for the purpose of these research questions, only the qualitative item responses were analyzed. The open-ended questions regarded the integration of technology, student teacher and student learning experiences, and the relationship of the student teacher and the mentor teacher. Survey responses were collected in October during part-time student teaching, in December at the completion of the part-time student teaching, and again after the completion of the full-time student teaching in May.

9.2. Semi-Structured Interviews

The semi-structured interview questions explored the student teacher and mentor experiences in depth. The questions centered around the student teacher/mentor relationship, the use of technology during the student teaching experience, and planning and delivery of instruction. For example, student teachers were asked to describe their expectations and concerns about a virtual student teaching experience, their first interactions with mentor teachers, the types of planning they were involved with, the relationships built with students, their ways of differentiating instruction for students, their use of technology, their use of assessments, and their overall experiences. Mentor teachers were interviewed with a complementary semi-structured interview, but the focus was on the student teacher. For example, instead of asking how the mentor teacher integrated technology in the classroom, the interview asked how they perceived the student teacher's integration of technology in the classroom. The semi-structured interviews took place in December after the student teachers and mentor teachers completed the part-time internship.

9.3. Focus Groups

Questions for two focus groups (one for interns and one for mentors) were developed based on responses from the surveys and interview questions. Interns were asked to describe the following: (1) initial feelings of the student teaching experience compared to actual experience; (2) development of their relationship with the mentor teacher; (3) the planning process; (4) technology issues; (5) communication with students and families; (6) assessment and differentiation; (7) concerns and excitement for first-year teaching; and (8) their most successful teaching experience. The questions for the mentor focus group mirrored these questions from the mentor's perspective. For example, the question regarding concerns and excitement for the first-year teacher was changed to, "Do you have any concerns as the student teacher moves into their first year of teaching?"

10. Data Analysis

The open-ended questions on the surveys, interviews, and focus group data were coded using constant comparative analysis [22]. Initial coding of the survey data and interviews was completed by two separate researchers. Each researcher coded the data independently. After coding, the researchers compared codes and decided on the coding frame to be used [23]. Two interviews were then coded using the coding frame to ensure

intercoder reliability (ICR), which was 80% after common terminology was agreed upon. The researchers used ICR to ensure interpretation of terminology used by participants; moreover, it was used to claim reliability of the data analysis. Thick description and use of the participants' own words were used to enhance trustworthiness, and frequency counts [24] (where applicable) were used to validate the initial ICR.

In the second round of coding, all initial codes were transferred to a data crosswalk in a shared drive. In total, there were 48 separate codes. The researchers divided these codes into themes. For example, the code "communication" was divided into two different themes: "mentor" and "student teacher". While this created more codes, the data for mentor communication were much different than the data from student teacher communication. The crosswalk separated mentor and student teacher data as well as technology usage, classroom strategies, student outcomes, etc. For example, the theme "mentor" included the following codes: "communication", "ownership", "mindset", "growth", "confidence", "expectations", and "priorities". The researchers divided the themes and codes, and each analyzed all pieces of data separately on the code crosswalk. The crosswalk included the source, the quote and context, and any additional notes from the researcher.

11. Results

The purpose of this article was to show how virtual teaching during the pandemic changed the student teacher and mentor experience but also produced innovations in teaching and mentoring that may be beneficial regardless of the mode of teaching. The following three themes emerged and will be presented below: innovative uses of technology, planning and the use of communities of practice, and effective mentoring in the virtual and hybrid environment.

12. Innovative Uses of Technology

12.1. Technology in the Virtual Environment

The greatest change from traditional school to a virtual environment was the incorporation of technology. The student teachers in this study were proficient with the use of the LMS used by the local school districts—one that was entirely new for the mentors—due to their usage during their years of undergraduate course work at the university. Student teachers at the secondary or pre-K through 12 level also took at least one course on the integration of technology in the classroom. The mentor teachers in this study had varying experience levels with technology. This section will discuss technology in regard to what student teachers and mentors intend to keep using as well as cautions for future instruction.

12.2. Challenges and Frustrations with Technology

There were often frustrations with technology. A student teacher, Gayle, said, "I honestly still don't really know what to do in certain situations". She was not alone in her frustration with technology. Another student teacher, Paisley, taught music virtually. Normally, students would be together playing together and turning the pages quickly, but a student having to stop and move the mouse to click an arrow meant the student was now six measures behind. Despite this frustration, Gayle continued to use the software from virtual instruction once her students were face to face in the classroom.

12.3. Benefits of Technology for Data Collection and Assessment

Although using technology was sometimes slower than traditional methods, student teachers and mentors recognized uses of technology that were beneficial for their students. The two major innovations and uses for technology that mentors and student teachers should keep are using technology for data collection as well as using technology for conducting formative assessments and immediate feedback. While providing immediate feedback is not novel, most teachers in the study had not used a chat feature to provide feedback. Teachers recognized that student engagement in the process increased due to the immediate nature of the feedback.

Many of the digital applications used in the classroom, such as polls, forms, and multiple-choice questions, provided the teachers with electronic data that could be quickly analyzed. Intern Paisley shared, "Like in the slides with questions, it would collect student data for us and we could break it down if we had questions on it. Then we could see their [the students'] specific responses to those questions". She continued to share that she was able to use the data to plan for next steps of instruction.

12.4. Immediate Feedback and Adjustments

Not only did the technology provide data reports, but it also provided valuable information on how long it was taking students to answer and complete assessments. Mentor Tina was able to moderate tests; she said, "Both of us [myself and the intern] can kind of be on there to see who is working and who is having trouble". The rapid data collection not only assisted teachers' ability to quickly plan next steps for instruction, but it also provided opportunities for real-time feedback.

Intern Maya explained how she used this immediate feedback while moderating a chat during instruction:

"I asked for a scale of one to five, how did you feel about that? I was able to see and differentiate in the moment. I could check their responses live as they were coming in. And then, if I saw that they weren't understanding or something, I could adjust. I was able to do real time, in the moment adjustments and differentiation that way. I'd be like, okay, we are not getting this, let's back up and talk about it".

Mentor Tina not only provided students with immediate feedback through chat, but also was able to give real time feedback to her student teacher. She said, "Things that in person I might attempt to like flash a note or whisper, I could now just send a text or a private chat, and [the student teacher] could get immediate feedback too".

While choosing and implementing technology during the pandemic took a large amount of time, mentors and student teachers realized that technology saved time in assessment and data collection. The real-time data reports were used as formative assessments that allowed for quick adjustments during instruction. The data and technology also provided opportunities for students to receive immediate feedback from teachers.

13. Planning and Use of Communities of Practice

Planning within and outside of CoPs became an essential part of teachers' days during the pandemic. While many of the school districts had previously established CoPs and grade-level planning groups, the focus of these CoPs during the pandemic was different. There was greater collaboration between pre-service teaching, and this collaboration was at a rapid pace rather than a gradual pace.

13.1. Reimagining Teaching in the Online Environment

Several important changes occurred during the time that students were in the virtual environment. First, the focus of meetings was not just refining what was taught the previous year but instead reimagining how it could be taught in the online environment. This shift, as will be detailed below, became an entry point for tech-savvy student teachers. Second, many CoPs expanded beyond the traditional school walls. Secondary teachers met in larger groups; arts teachers collaborated across the district, and materials were created at the district level instead of the school level. At the same time, the student teachers were also included in the CoPs as equals.

13.2. Overcoming Time Constraints

Time is often a prominent obstacle to planning within a community of practice. During the pandemic, teachers were tasked with reformatting their lessons. Many teachers were in the habit of team planning in person, but many CoPs centered their planning on the use of a shared drive. This not only allowed the participants to plan and communicate during a scheduled planning time but also helped them share ideas on their own time.

13.3. Collaborative Lesson Planning

Teachers were no longer dividing lesson planning and sharing it—they were creating it together. The student teacher Paisley said, "We had all our lesson plans on a shared Google Drive. That way we could both [mentor and intern] look at them at the same time". Student teacher Gayle explained, "We communicated through Google slides where she was creating a slide, and I was typing her a note on the slide at the same time". Many of the meetings during the pandemic were virtual, but everyone was still able to work as a team to plan. In addition, the traditional lesson plans were no longer documents with instructions and content that would be covered: the plans became the slide decks that would be used for instruction.

13.4. Integration of Tech-Savvy Student Teachers

Andy, a student teacher that was confident in the use of these technologies, quickly integrated into the CoP. He shared, "They basically had me helping them make slide decks, present to the kids, and it was like 100%. I was involved the whole time". The student teachers and mentor teachers felt like they were able to make more time for planning.

Another student teacher, Maya, felt that the benefits of the virtual CoP expanded her ability to attend. "One of the benefits of virtual, they [the entire arts department] actually were able to make it every single week. It was super integral to my experience, I'm really glad that I had that because that wouldn't normally be a situation with a CoP in a high school setting". The virtual format also allowed mentor teachers and student teachers to participate across schools within the same district. In schools where a teacher was the only instructor for a subject, the teacher did not have the support of a CoP before COVID-19, but during the pandemic these teachers created virtual CoPs with teachers and student teachers within the same district.

Opportunities for virtual CoPs within and across schools should be considered for future practice. The teachers benefited from the in-depth planning and increased collaboration. The student teachers were able to quickly integrate and provide technology expertise. Teachers that previously felt alone reached out to create CoPs within the district. The practice of district-wide CoPs and the sharing of created materials should continue beyond the pandemic. These shared experiences create a sense of community. As mentor Shelby stated, "The rest of the team, it became a sense of community, because we were all together".

14. Effective Mentoring in the Virtual and Hybrid Environment

Mentoring students in the virtual and hybrid environment was very different from a traditional student teaching model. Mentor teachers were concerned with time constraints and monitoring the student teacher's progress. However, results showed that student teachers received a substantial amount of one-on-one time and direct communication from their mentors.

14.1. Time Constraints and Intentional Communication

As previously shown in the results for planning and the use of CoPs, student teachers were quickly integrated into the school community. Mentors in this study were concerned with the amount of time they had to mentor their student teachers. The COVID-19 pandemic was a stressful time, and teachers' main concern was figuring out how to teach online. This was quite evident in comments from student teachers when asked about first meeting their mentor teachers. Student teacher Kelly stated, "I knew she was overwhelmed with everything going digital, but she was so welcoming and she gave me her phone number too". This was similar for one student teacher, Andy, who said:

"[My mentor teacher] been in the game for a really long time so like technology, new technology to her, it's like very foreign, very crazy and you could tell when we were sitting in meetings that she was like I don't know what's going on at all, and I was like this, this is gonna be fun. Oh, she definitely was petrified".

Andy went on to explain that he still had confidence in her. "She was very flustered, but even though she was flustered, she showed me within the first week that she cares so much about her kids that she will do anything and everything". The mentor teachers were very honest with the student teachers, and the mentors provided multiple ways for student teachers to communicate with them.

Some of the student teachers and teachers went to the building to plan and teach, but even in the building, many were segregated in separate classes or rooms in the school such as the library. Student teachers reported that their mentors communicated in person, by phone, text, Facetime, and email. One student teacher stated, "So much of it, especially at the beginning, was virtual or hybrid. We had to communicate more than I think maybe we would have ordinarily". The time constraints that mentors faced may have pushed them into open and honest communication with their student teachers. Online collaboration also opened the door for student teachers to have a variety of methods to naturally communicate with their mentors (in-person, email, phone, and text). Communication also happened in real time during teaching through text and chat features online.

14.2. Building Relationships

Many mentor and student teacher relationships developed quickly because of the required collaboration and coordination to teach online. Even though one mentor teacher, Kyle, felt that he wasn't providing the same support to his current student teacher as he had to previous student teachers, he also commented, "I checked in on him a lot . . . They're people, they need to be treated as people". Kyle may have been more cognizant of how his student teacher was feeling because he was also feeling the stress of teaching virtual for the first time. Another student teacher echoed how important this became. When asked about the most helpful advice she received from her mentor, Paisley said, "So it wasn't necessarily specific to music. It was just like me as a person, as a teacher, like you've got it! You can do it! Like fake it until you make it almost [laughter]".

Relationships were not only built on the care and advice from mentors. Relationships were also built by mentors relying on student teachers for their expertise. Intern Kelly shared, "I ended up teaching my mentor teacher different ways to utilize Google". Intern Andy's expertise in technology not only helped him build a relationship with his mentor teacher, but also rapport with the entire grade level. Andy explained:

"They found out that they were going to be using Canvas and I was like, oh! I just used Canvas all through college, like yeah I've used it through the student view, but I know how to navigate it, so I could probably help you with the teacher stuff, so they really threw me in with that. Any new technology that they learned on, I always was like sitting in on the meetings and listening to it and I picked up on it really quickly, so they were really thankful about that and then".

The mentor and the other teachers at that grade level relied on Andy's expertise. This not only provided him with valuable teaching experience, but it also increased his overall confidence.

One student teacher reported not having a strong mentor. The student teacher did not criticize her mentor's teaching, but often did not feel like she was given anything to do. Intern Gayle said, "Everything then and still now was just a big question mark of like what do, what are your expectations for me in terms of logistics, like when do you want me to be in the classroom? What should I bring with me? What is this day going to be like? There weren't a lot of answers". Overall, this was not the experience of most of the student teachers. Overall, effective mentoring was built on the mentor teacher's trust and reliance on the student teacher to perform when needed and on effective communication. While neither of these concepts are new, recommendations for intentional communication and shared access to planning should continue, which will allow student teachers to also share their expertise immediately.

15. Discussion

The COVID-19 pandemic forced many educators to quickly adapt to new ways of teaching, planning, and mentoring. While some of these changes may have been temporary, others may be valuable innovations that will continue to benefit students, teachers, and student teachers in the future. The findings highlighted some of the key innovations that emerged during the pandemic, including new uses of the LMS with student-facing platforms, the increased use of CoPs to facilitate collaboration and lesson planning, and the importance of intentional communication and shared access to resources in mentoring student teachers. These innovations have the potential to benefit students, help teachers with their workloads, and increase communication and outcomes for student teachers.

16. Innovative Uses of Technology to Continue

While many school systems previously used some type of LMS, many districts invested in systems with higher capabilities to engage with students. Many systems in the past were utilized to communicate grades and absences with families but did not engage students on a daily basis. The systems that include a platform that is student-facing will continue to be integral to school systems. These systems not only provide organization to in person instruction but also allow an organized means of sharing materials, assignments, grades, and feedback with students outside of the classroom. The use of a consistent LMS across schools within a district is beneficial to students, families, teachers, and the administration.

Within an LMS, the findings indicated that teachers may benefit from the continued practice of electronic data collection. As Chao [7] posited, the use of any technology should be tied to a specific intent. When districts choose technology, they should first understand how they want to use it. Teachers in the current study used an LMS to collect data. The data collected from students may include polls, forms, and formative and summative assessments. The benefits to collecting data electronically from students includes the ability to analyze student data easily and quickly. This finding also supports research that found the use of technology may significantly reduce teacher workload [10]. When a teacher or student teacher analyzes data in real time, they can quickly evaluate student mastery and make quick decisions regarding changes in instruction. Remediation and reteaching can happen quickly and in a targeted manner.

In addition to being able to adjust instruction to meet the needs of students based on this quick data analysis, students also benefit from immediate feedback. When assignments are graded online, students and families can view the feedback before future assignments are due. Students can use quality feedback to deepen their own learning. Families may also be able to help support students better by having real-time knowledge of how their student is doing.

17. Innovations in Communities of Practice

CoPs utilized shared drives and lesson planning to a greater extent than previous years. These shared drives and lesson plan allowed teachers to not only plan together efficiently but to continue sharing and revising based on each other's experiences after instruction. The shared content also helped to quickly integrate student teachers into the curriculum-building process by allowing them to have access to the entire team.

Teachers who were previously wihout a CoP due to time and schedule constraints or because they did not have any shared courses with teachers in the same building were able to join a community in a virtual environment. One of the most significant innovations was creating CoPs across the district for these teachers. This increased participation in CoPs is important because it allows teachers to feel supported [15] and may reduce the feelings of isolation during teaching [16].

18. Innovations in Mentoring Pre-Service Student Teachers

Mentoring student teachers effectively requires a strong relationship built on trust and the understanding of an experienced teacher. While there are many aspects that may

improve the experience of the student teacher, intentional communication and immediate shared access to team planning and discussions became very evident during the pandemic.

Student teachers felt most involved and supported in the classroom when they had frequent and intentional communication with their mentor teacher. These findings support Matsko et al.'s. [19] research that found an effective mentor should be collaborative and share frequent feedback. Intentional communication can be defined as communication that was planned and had a direct purpose. For example, the mentor teacher and student teacher set aside days and times each week designed for planning, collaboration, and feedback.

Immediate access to shared resources was one of the quickest ways to integrate a student teacher into the classroom. The student teachers that were given immediate access to shared drives were able to plan their own lesson plans that aligned with what other teachers on the team were doing, but they were also able to share their expertise with the team and help to create materials. Student teachers are often highly knowledgeable in using new technology. Mentor teachers should utilize their expertise and give them space [21], which will not only build their confidence but also ease their own workload.

19. Conclusions

While the pandemic quickly brought about innovative teaching, planning, and mentoring, many teachers and school districts will tend to revert to prior practice. This research briefly highlights innovations that arose during the pandemic that will continue to benefit students, teachers, and student teachers in the future. Most schools are now utilizing an LMS to facilitate the communication of materials to students and families. Teachers should be provided with access to online data analysis within the LMS and professional development in learning how to do so. In this way, students may benefit from frequent feedback, and teachers will have the ability to make informed instructional decisions.

It is also our recommendation that districts continue to provide virtual forums for facilitating CoPs within their schools as well as across schools within the same districts. The sharing of materials may result in better lesson plans and provide consistency in instruction across the district. The actual CoP may also improve teacher morale by providing the feelings of connection and support for teachers.

Finally, the mentor and student teacher relationship may be enhanced by asking mentor teachers and districts to provide the student teacher with login information to access all technology and electronic resources that are currently available to teachers. In addition, mentor teachers should be asked to set aside dedicated time with student teachers for planning, collaboration, and feedback.

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