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JOURNAL OF LANGUAGE & LITERACY EDUCATION

Teaching and Assessing Early Literacy during COVID-19 and Beyond

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Abstract: The Coronavirus (COVID-19) pandemic challenged the education system across the world by forcing school buildings to close and educators to shift entirely to remote teaching overnight without formal training or practice. The purpose of this paper is to describe primary teachers' (grades K-3) challenges with remote literacy instruction during the COVID-19 pandemic. Technological, Pedagogical Content Knowledge (TPCK; Mishra & Koehler, 2006) framework was used to examine the K-3 teachers' challenges when teaching literacy content remotely and the extent to which these three elements (technology, pedagogy, and content) were altered to specifically meet the professional development needs of teachers teaching in an extraordinary situation such as the COVID-19 pandemic. An open-ended online questionnaire completed by 300 respondents revealed that providing and administering rigorous, high-quality differentiated beginning reading and writing instruction and assessments in both synchronous and asynchronous learning formats was a challenge. Professional development was relegated to a techno-centric approach to planning remote literacy instruction. This article includes suggestions for dealing with primary grade teachers' instructional challenges and professional development needs associated with remote early literacy teaching, including developing collaborative structures such as virtual mentor coaching and virtual professional learning networks for planning and assessing remote early literacy instruction.

Keywords: COVID-19, emergency remote literacy learning, primary education, technological pedagogical content knowledge

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Introduction

Educators and students across the United States have faced sweeping, unprecedented changes to teaching and learning because of the Coronavirus (COVID-19) pandemic, which forced school closures in spring 2020 and many K-12 educators to transition rapidly (or "on the fly") to online, remote instruction with very short notice and potentially very little training (Schleicher, 2020). Coined in 2020 during the COVID-19 pandemic, the term "emergency remote teaching or instruction" is defined as "a temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances" (Hodges et al., 2020, n. p.). Whereas online learning is a planned, established approach to designing educational content and using a collection of instructional strategies for online learners, "emergency remote teaching should be considered a temporary solution to an immediate problem" (Bozkurt & Sharma, 2020, p. ii)—in this case, pandemic-induced educational disruptions.

Although focused on formal education in K-12 schools and higher education, the emerging literature on emergency remote instruction includes planning and teaching recommendations pertinent to adult education (Kaiper-Marquez et al., 2020), with less attention given to remote literacy instruction in the primary grades (K-3). Although primary grade (K-3) teachers often used technologies (e.g., showing pictures or videos) in their traditional, in-person classroom setting (pre-pandemic), they were required to take on additional roles when teaching remotely, which presented an entirely different set of unprecedented challenges (Kim, 2020). Primary grade teachers had to quickly move their literacy content online as well as attempt to navigate around the technology to make teaching possible. The circumstances from school closures were novel, leading to many unanswered questions concerning teacher preparation and professional skills for teaching remotely (Kim, 2020), especially primary grade students. As a result of the pandemic, the traditional delivery of early literacy instruction in brick-and-mortar classrooms needed to be considered with new ways, new skills, and new knowledge that primary grade teachers needed in order to teach literacy remotely.

Of greater concern is the fact that primary teachers' ability to teach literacy remotely was hampered by a variety of circumstances beyond their control, including lack of funding, time, access, training, and support (Kaiper-Marquez, 2020). In order to improve the quality of remote literacy instruction and with limited research literature on education in times of COVID-19, there is a great need to collect data on primary grade teachers' professional development to identify and meet the challenges and needs experienced during emergency remote literacy instruction. Accordingly, the following research questions guided this study:

- What do primary grade (K-3) teachers perceive as the greatest challenges they faced

in remote literacy instruction during the time of the COVID-19 pandemic?

- What type(s) of professional development do primary grade (K-3) teachers feel they need to be able to teach remote literacy instruction effectively?

This study is timely because it will provide much-needed information on how primary grade teachers are ensuring that quality remote literacy learning continues for beginning early readers and writers. This pandemic presents an opportunity and an exercise for local education stakeholders to evaluate emerging instructional challenges during remote literacy teaching and to develop strategies for navigating said challenges during the pandemic and beyond. The conditions of remote teaching fomented this study, which was part of a larger virtual literacy professional development initiative aimed at helping K-3 teachers learn how to teach and assess literacy skills in remote settings.

Theoretical Framework

The Technological Pedagogical Content Knowledge (TPACK) model, first introduced by Mishra and Koehler (2006), is used in this study to assess the remote literacy teaching experiences of K-3 educators during the COVID-19 pandemic. In regard to the first domain, Technological Content Knowledge (TCK), Mishra and Koehler (2006) state, "Teachers need to know not just the subject matter they teach, but also the manner in which the subject matter can be changed by the application of technology" (p. 1028). Similarly, regarding the second domain, Technological Pedagogical Knowledge (TPK), Mishra and Koehler state that teachers need knowledge of digital tools and how they can be used for teaching and learning, but also how teaching might change as a result of using technology. This model also considers the interplay and relationship among these

types of knowledge, recognizing that one type of knowledge impacts the others (Espinoza & Neal, 2018). "The employment of TPACK has varied but is particularly prominent in the literature of K-12 in-service teacher development" (Espinoza & Neal, 2018, p. 31). Teachers' experiences from school closures due to COVID-19 restrictions created an authentic experience for teachers to relate and accurately respond to items in the TPACK domains.

During the COVID-19 lockdown, teachers realized how important it was to receive training on the use of these online pedagogical tools and how they have been useful to maintain contact and communication with students (Varea & González-Calvo, 2020), although more is needed for primary grade teachers. Teachers need to have not only an excellent grasp of their given content area but also an appreciation of how remote learning environments affect the content and the pedagogy of what they are attempting to teach. Especially in the primary grades, there is a need to provide teachers with sound technological pedagogical content knowledge (TPACK; Mishra & Koehler, 2006) and professional development in multiliteracies (digital participatory technologies) in order to effectively teach and assess 21st century literacy skills with their beginning readers and writers. Thus, we sought to explore grade K-3 teachers' level of preparedness to teach and assess their literacy content remotely with young learners. In the present study, TPACK serves as a lens to examine the K-3 teachers' challenges when teaching literacy content remotely and the extent to which these three elements (technology, pedagogy, and content) were altered to specifically meet the professional development needs of teachers teaching in an extraordinary situation such as the COVID-19 pandemic.

Literature Review

Teaching Literacy Remotely with Young Readers and Writers

The primary grades are the basis of reading and writing instruction; effectiveness of the skills gained in primary literacy instruction is very significant for the future of students' reading and writing performance and academic achievement (Yelland, 2018). However, given the rapid change from face-to-face learning to remote learning and constantly evolving definition of literacy, there remains a need to support teachers' conceptions and understanding of literacy in the era of the COVID-19 pandemic.

Becoming literate with digital resources and meeting the demands of multimodal (oral, audio, and visual modes of representations) channels of literacy are essential 21st century literacy skills that young learners need to thrive in their current out-of-school contexts (Chamberlain et al., 2020). Although digital learning has long existed, the application was usually only used during learning activities in school (Juwita & Tasu'ah, 2015). Before the pandemic, the focus of early years' literacy programs and pedagogies remained dependent on "print-based" resources (Kim, 2020), which are a stark contrast to the social futures approach inherent to a pedagogy of multiliteracies (Lankshear & Knobel, 2003). The mandated curricula were usually accompanied by sequenced assessments that provided a limited and traditional view of literacy that relied on simple encoding and decoding of print-based texts and reduced literacy solely to a skills-based experience (Yelland, 2018).

> "Assessment can possibly be considered the most challenging part of the transition to remote learning for a teacher used to face-to-face oral or written assessments."

It is especially important for primary grade (K-3) teachers to examine the unique needs of remote learning for their students. Young learners may suffer the most from remote learning challenges as they learn best from effective human interaction, hands-on exploration, stimulating and engaging visual, sensory, and interactive activities such as manipulating letter tiles (Chamberlain et al., 2020). Remote literacy instruction must be appropriate for children's development stage and age; if remote learning is not designed with early childhood in mind, many children will not be able to develop a strong foundation in 21st century literacy (Kim, 2020). It is essential that schools provide more guidance and professional development resources that inform K-3 teachers' TPACK knowledge and broaden their understanding of multiliteracies.

Assessing Literacy Remotely

Assessment can possibly be considered the most challenging part of the transition to remote learning for a teacher used to face-to-face oral or written assessments (König et al., 2020). The sudden shift from face-to-face to remote learning has resulted in adjustments to written, taught, and assessed curriculum due to the constraints related to the availability of resources at home and ability to conduct assessments through remote learning (König et al., 2020). The three aspects of assessment, namely assessing, recording, and reporting, may look different during the COVID-19 pandemic and beyond (Aliyyah et al., 2020).

Conducting "traditional" summative assessments, such as high-stakes exams that are relatively limited to paper-and-pencil formats and rely heavily on pre-selected one-answer options (multiple choice or true/false), were limited during COVID-19 school closures (König et al., 2020). Authentic assessment,

on the other hand, which requires students to apply their understandings to real-world tasks or settings, is both sound pedagogy and naturally protects assessment integrity (Wormeli, 2020). Wormeli supports using these more authentic assessments in remote learning contexts because they allow students multiple ways to demonstrate understanding. It is plausible that the recent transition to remote literacy learning may be the new normal and model for instructional delivery; consequently, this has an implication for assessment of student literacy learning practices within a remote learning environment (Padayachee et al., 2018). As such, it is important to examine the extent to which teachers received professional development training and resources to reflect these new realities of assessing literacy remotely.

Professional Development for Teaching and Assessing Literacy Remotely

There is a distinction between the normal, everyday type of effective online instruction and that which teachers were required to do with bare minimum resources and scant time, namely, emergency remote teaching. Teaching online pre-supposes an existing organizational infrastructure. Typical planning, preparation, and development time for a fully online course usually begins six to nine months before the course is delivered. In contrast, the emergency remote teaching required by COVID-19 has often been improvised rapidly, without guaranteed or appropriate infrastructural support (Rapanta et al., 2020). Given the abrupt shift for many schools into some type of remote literacy instruction, it is imperative that teachers receive considerable professional development and institutional support necessary to meet the demands of this type of

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instruction and assessment (Naylor & Nyanjom, 2020; Scherer et al., 2020).

It is therefore necessary to examine the perceptions and needs of K-3 teachers' level of preparedness for remote literacy teaching. Within the TPACK framework, the authors wanted to know the extent to which K-3 teachers were challenged by and identified technological-, pedagogical-, and/or literacy content-related professional development needs with respect to remote literacy teaching during and beyond the COVID-19 pandemic. Albeit beyond the scope of this article, the findings from the study were used to develop a TPACK-based virtual professional development workshop that was responsive to teachers' needs with respect to teaching and assessing literacy remotely.

Methodology

Planning with a Purpose: Using a Needs Assessment Survey Before Launching the TPACK-Based Virtual Professional Development Workshop

This study employed a cross-sectional survey design (Creswell, 2012). The researchers/authors were literacy education faculty members from a private northeastern American institution who offered the free professional development workshop as a recruitment strategy for prospective K-12 educators who were interested in pursuing an advanced teacher certification and/or graduate degree in literacy. This research project began with a pre-workshop needs assessment survey to garner background information about the registrants' experiences during and in the immediate aftermath of the COVID-19 pandemic, specifically, the technological and pedagogical challenges they experienced and professional development needs they identified. In this way, the

Table 1.

Timeline for Professional Development and Data Collection

Time Point and Date	Length	Description of Study Activities	Data Collection
1 - July 2020	15 minutes	Pre-Workshop Needs Assessment Survey	Online Survey (Qualtrics)
2- August 2020	90 minutes	Online Professional Development Workshop	Exit Tickets (Google Forms) Zoom Chat Transcript Researchers' Anecdot Notes
3- August 2020	15 minutes	Post-Workshop Feedback Survey	Online Survey (Qualtrics)

researchers sought to make the online professional literacy learning highly responsive to needs of identified respondents. See Table 1 for a timeline of data collection and professional development experiences. All of the workshop participants (*n*=300) completed the survey, however, this paper is only reporting on the pre-workshop survey (Time Point 1) findings collected from the K-3 teacher respondents since this group comprised the majority of respondents (*n*=226), which indicated a significant need for professional development tailored to the K-3 population. It is also important to note that the design features, content of, and outcomes from the online professional development workshop (Time Points 2 and 3 in Table 1) were beyond the scope of this report.

The online survey was formatted and prepared for distribution via Qualtrics by the institution's graduate admissions team. The survey was distributed using the institution's listserv capabilities (Slate education pipeline), Agile list (an online marketing tool), and the institution's social media platforms (institution's event page, Facebook, Twitter, and Instagram). The email invitation and anonymous survey link was then sent to those who registered for the professional development workshop (see Table 2 for demographic characteristics of respondents). The final sample size was 300 respondents, with 94% residing in the same state in which the study was conducted and 6% residing in two neighbouring states.

The primary data were collected and analysed from a six-item online survey which was comprised of five open-ended questions and one closed-ended demographic question, and was administered prior to the professional development workshop. The pre-professional development workshop survey elicited qualitative demographic information (e.g., current position and grade level) from respondents as well as included the following five open-ended questions aimed at extracting K-3 educators' technological and pedagogical challenges and professional development with respect to remote literacy instruction and assessment:

- "What challenges did you face in the spring of 2020 with regard to remote literacy instruction?"

- "What challenges do you anticipate facing again this upcoming school year with regards to remote literacy instruction?"

Table 2.

Demographic Characteristics of Survey Respondents

Grade Level Taught	n
Kindergarten-3 Primary	150
4-8 Middle	54
9-12 Secondary	20
ESL	8
Reading Specialist	32
Special Education	26
Literacy Coach	10

Note. Answered by 300 respondents.

- "What supports and/or resources will you need to successfully teach literacy remotely?"

- "What do you hope to learn in this literacy conference?"

- "What training has your district/employer provided related to remote literacy instruction?"

Data Analysis

The open-ended questions were qualitatively analysed. Using the constant comparative data analysis method (Glaser, 1965), the researchers independently reviewed the completed surveys and created initial coding categories, which allowed for emergent themes to develop from the data and provided a means by which large amounts of data were compressed into meaningful units and cluster categories. The open-ended responses were coded using open, axial and selective coding (Strauss & Corbin, 1990). The researchers met subsequently to share individual interpretations and negotiate a shared understanding with any disagreements resolved through discussion until consensus was reached. The researchers independently read through the open-ended responses, grouping data and identifying potential emergent codes (Creswell, 2012). Next, a thematic coding process was developed, coding data by the pedagogical technological challenges and professional development needs identified by the respondents (Creswell, 2012). The researchers examined patterns in the data to create pattern codes that aligned to the TPACK domains (e.g., Providing Differentiated Literacy Instruction Remotely; Technocentric Professional Development). Throughout this process, the researchers provided a check on each other's interpretations to establish trustworthiness of data and inter-rater reliability. As discussed below, interpretations of the themes that emerged were made and illustrative quotes were selected from all of the participants. These findings are mapped back to the research question in the following section below.

Findings

The following section describes the perceived technological pedagogical challenges that primary grade (K-3) teachers experienced while teaching and assessing literacy remotely. In terms of the primary grade teachers' professional development during the COVID-19 pandemic, techno-centric and self-directed professional development for teaching literacy remotely was identified as part of the problem for the survey respondents' perceived lack of preparedness for the abrupt transition to a remote literacy classroom.

Teaching and Assessing Literacy Remotely: Technological Pedagogical Challenges

The K-3 teachers reportedly struggled with teaching and assessing literacy skills, including providing early literacy/phonics instruction, differentiated and individualized guided reading and writing instruction (e.g., conferencing), keeping students engaged during remote literacy instruction, and conducting literacy assessments remotely.

> **"Respondents found it difficult to teach early literacy skills—specifically phonics—in a remote learning environment with an unestablished structure to non-readers."**

Teaching Early Literacy and Phonics from a Distance

The primary grade teacher respondents found it difficult to teach early literacy skills—specifically phonics—in a remote learning environment with an unestablished structure to non-readers, as well as beginning and emergent readers who have not yet mastered foundational reading skills. One respondent commented, "It was hard to engage our youngest learners who don't have experience with technology and cannot read yet." The following comment highlights the struggle that a primary teacher respondent experienced when providing

school-based literacy instruction remotely to her primary grade students who demonstrated a basic level of technology knowledge, "I thought it was like wrangling cats during Zoom meetings with my 1st grade students." Without in-person guidance from a teacher and with the physical constraints of technological tools, it was seemingly difficult for teachers to recreate certain tactile-kinaesthetic experiences that they believed were integral to learning to read. One respondent shared, "It got better when we got eBooks I could project on the Zoom screen, but then the students lost the 'tactile' . . . harder to mark passages to flip back to, annotate, etc."

Keeping Students Engaged in Remote Literacy Learning

The primary grade (K-3) teacher respondents reportedly found it very challenging to keep their younger students engaged and connected during synchronous and asynchronous reading and writing instruction. One early childhood teacher respondent struggled with finding "fun and engaging activities to teach reading online to young readers and develop their reading identities." The teacher respondents noticed that their roles shifted to more of a facilitator or moderator due to less control of the remote learning environment. This was in stark contrast to their pedagogical patterns in the brick-and-mortar classroom which were more prescriptive and teacher-directed. One respondent noted, "I found it difficult to keep my students engaged and accounted for . . . I felt as if my reading instruction online didn't have me involved as much as I would have liked." In particular, one participant faced challenges "maintaining student engagement and attention while reading on a screen for an

extended period of time and discussing online materials with enthusiasm."

Navigating the Transition to Online Writing Instruction during COVID-19

Respondents indicated they struggled with and sought additional support in engaging students in a remote writing process while maintaining a rigorous classroom culture of writing and collaboration. Survey respondents wanted to continue the writing workshop, conduct writing conferences, and share each other's writing samples remotely. For instance, one respondent shared, "I will be trying to stay as much as possible to a normal writer's workshop. The days when my students are present, I will confer with them in person. I do want to explore ways to have my students share their work remotely." Furthermore, according to the following survey respondent, allocating time for individual writing conferences was difficult. One teacher respondent explained, "I met with students one on one to conference about their ideas and writing using Loom and Google Suite options, but making time for that was challenging."

Differentiating Literacy Instruction Remotely

Small group, individualized literacy instruction was identified as one of the biggest pedagogical challenges during remote learning. Participants indicated struggles with providing small group and individualized instruction geared to students' needs, as well as with supporting non-readers and students with a home language other than English. As one participant mentioned, "The reading support lessons were generic and not specific to students' needs." One teacher respondent found it difficult to scaffold literacy instruction for students with disabilities, English Learners (ELs), and non-readers who have "difficulty reading and navigating different websites." Teachers of ELs reportedly struggled with communicating literacy expectations with families of

their ELs. The following English as a Second Language (ESL) teacher struggled with providing ESL instruction remotely; she chalked up the problem to the lack of social cues in online teaching. A teacher respondent commented on the challenge of decreased social cues when she remarked, "Giving directions to ELs and getting everyone on the right page and in the right spot in the paragraph was just so much harder without the social cues of being able to see what the person next to them was doing." According to one primary grade teacher, it was very challenging to get her students to "complete work independently during synchronous classes without assistance during the allotted time frame." Similarly, another respondent lamented, "it was difficult to provide small group (guided reading) instruction and ensure that my students were reading on appropriate levels and making reading growth over the year."

Conducting Literacy Assessments Remotely

Literacy assessment was another area that respondents declared a major challenge in a remote setting. Participants wondered how they might "observe and manage students' reading skill development remotely." The following respondent reportedly found it difficult to administer formative assessments and gauge students' understanding and progress, stating "I was not sure how to assess in a virtual setting (one on one versus groups of students) and how to gain understanding of what they are learning and gaining from the online lessons." Of the different types of assessments, the most challenging to administer remotely included such diagnostic and formative assessments as fluency assessments (e.g., running records), and writing assessments. A few respondents were primarily concerned about the amount of adult support provided during these assessments, and thus questioned the authenticity, fidelity, validity, and accuracy of virtual assessment results, asking "How do I know if students actually did the work?" The following first grade teacher

respondent noted, "a lot of my children's writing was written by the parents, and I didn't know what was the students' authentic work . . . I just really didn't know what to do." Many school districts were not comfortable issuing grades for remote work due to equity and academic integrity issues. Consequently, the teacher respondents were unable or not allowed to conduct any type of assessment with their students.

Transitioning from a Print to a Digital Classroom: Access to Digital Literacy Resources

In terms of technology, teachers craved more support with the transition from teaching with print-based resources to digital ones. For example, one teacher noted, "I don't know how to implement programs like Wilson Reading System remotely as they are designed for in-person instruction." A lack of access to digital literacy resources was noted by respondents. Teachers reportedly did not have knowledge of or access to appropriate and diverse digital reading resources, "In terms of subject matter, authors, and subjects...we only used RAZ Kids, but it is criticized for stereotyping." Similarly, the following respondent shared that she lacked ready access to high-quality, research-aligned digital books to read during remote reading sessions, "I had a hard time figuring out how to read a quality picture book that kept kids' attention...this wasn't an issue for listening books, but the huge number of quality picture books that ground our reading, writing, and social studies were not possible to use or use well." One participant conveyed a concern with educational equity, citing both a lack of access to and familiarity with apps that could bridge the gap for some students. Respondents also noted technological issues such as "unreliable Internet access, hotspots, and Chromebooks." Teachers also wanted assistance on deciding which assignments could be completed synchronously or asynchronously, citing a need to support in "figuring out what students might do on their own versus what

we should do together online." Teachers wanted to ensure that they were using technology with purpose, not as substitution, while still maintaining academic rigor and ensuring student learning outcomes are met, "I want to make sure that I am continuing good practice and staying true to the reading and writing workshop teachings."

Professional Development during COVID-19 Transition to Remote Learning

As described below, the primary grade teacher respondents reported a lack of adequate preparation time, institutional support, and professional development with respect to teaching literacy remotely during the COVID-19 pandemic.

Techno-Centric and Self-Directed Professional Development for Teaching Literacy Online

One of the greatest challenges intimated by respondents was techno-centric literacy professional development. Data revealed a large focus placed on professional development in technological knowledge but a much lesser focus on integrating technology into literacy pedagogy and content. As the following two respondents reported, "We have been provided lots of resources but not trained on how to implement them virtually," and "nothing (was) specifically tailored to literacy with examples."

According to a large number of respondents, training was focused primarily on sharing professional development videos and self-paced technology training on using learning management systems (e.g., Canvas, Blackboard, Schoology, Google Classroom), specific tools and apps (e.g., Nearpod, BrainPop, Kami, SeeSaw, Flipgrid) as well as video conferencing and recording tools (e.g., Zoom, Panapto, Screencastify, Google Teams). Other participants mentioned training on online language arts curriculum programs and materials such as Journeys, Reading A-Z, McGraw Hill Literacy, Savvas Learning

Company (formerly Pearson K12 Learning). According to one participant, "Suggestions of trainings to attend and videos to watch were shared by the school district, but none were provided by them," which forced most participants to resort to self-directed professional development through such social media platforms as Facebook groups, YouTube, and Twitter. The following teacher respondent enrolled in summer session courses to expand her TPACK knowledge for developing competency for remote teaching, "I had to complete a 20-hour online course that taught us to be curators of content rather than deliverers of information . . . the course focuses more on effective assessment methods to use online which has helped me become more comfortable designing and delivering content that is effective."

Lack of Virtual Coaching and Collaboration

Participants reported a lack of and need for mentorship and support from their colleagues, as well as a lack of opportunities for listening, sharing, and asking questions as they navigate this new world of remote literacy assessment and instruction. While a few participants shared their attempts at self-directed learning through self-paced technology training, online courses, websites, and social media, the majority of participants sought a supportive community committed to helping other educators with questions and resources. The respondents also expressed a need to connect more with their colleagues and create their own collaborative networks where they could work in small pods, and share the workload and resources. Additional needs included the following, "more modelling and demonstration lessons on how to actually use the technology tools, support from my grade level team and literacy specialists, and gathering ideas from other teachers that I can easily apply this school year while doing virtual learning." The notion of reverse mentoring emerged in the survey responses as the

following respondent noted, "I will ask questions of our younger, tech-savvy teachers."

Learning through Trial and Error: Limited Time for Practice and Application

Participants lamented that they had very little time to practice using and applying the technology tools provided to teach and assess literacy. Participants revealed some knowledge of technology tools, effective pedagogy, and the literacy areas they needed to teach, but were not given enough time to blend all three of these areas and apply them to remote instruction. Some participants also indicated that they needed time for trial and error to explore these technology tools at their own pace, "I want to explore on my own, re-watch the videos, teach myself, practice, and then try to model it with others," and "I want to spend time researching these tools and getting more familiar with them." The following participant reported craving "more training sessions and webinars throughout the coming months with specific examples of implementation." The K-3 teacher respondents also requested a frequent or monthly check-in, in order to "see what additional questions we have as we start teaching."

Discussion

The COVID-19 pandemic lockdown forced many K-3 educators to learn to teach and assess literacy in a new way. As evidenced in this study, the K-3 teacher respondents acknowledged the lack of guidance on how exactly to teach and assess literacy in a remote environment. They reported a lack of adequate preparation time, institutional support, and professional development with respect to teaching literacy remotely during the COVID-19 pandemic. Specifically, the K-3 teachers reportedly struggled with teaching and assessing literacy skills including providing early literacy/phonics instruction, differentiated and individualized guided reading and

writing instruction, keeping students engaged during remote literacy instruction, and conducting literacy assessments remotely.

Although the teachers in this study presented an appropriate knowledge of the subject matter (CK), teaching strategies (PK), and technology (TK) before the COVID-19 outbreak, their TPACK during remote literacy instruction was not salient.

Respondents expressed a very techno-centric professional development approach which focused on the technology tools (TK) that can be used for remote instruction in general. The professional learning did not involve a demonstration of literacy concepts and practices with technology (TCK) or how to use pedagogical approaches in remote literacy learning (TPACK). Much of the early advice and support for non-expert online teachers has focused on the technological tools available in each institution and is considered adequate to support the switch (Carrillo & Flores, 2020). However, this 'tools-based' approach does not provide pedagogical strategies for how, when, and why to use each of the tools (Carillo & Flores, 2020). Similarly, many non-expert online teachers opt to focus on the materials and resources they would use anyway to teach their course content, independent of its format being face-to-face or online (Rapanta et al., 2020). Again, this 'materials-based' approach is only half-complete, given that it pays insufficient attention to contextualisation.

Finding time to determine which apps and tools are of the highest quality and most-suited to their literacy instruction also posed another challenge for the K-3 teachers. Especially due to the rapid transition to remote learning, in many cases, there was very limited time for schools to provide online materials, technical infrastructures, and the necessary pedagogical support for remote literacy teaching (Bao, 2020). Respondents in this study

pointed to a need for time to practice and apply what they were learning about technology integration through "trial and error" with the technological tools. Findings also showed that respondents wanted more training sessions as well as frequent check-ins to evaluate their experiences and results with remote literacy instruction.

The research questions concerned the perceived challenges K-3 teachers faced in this unknown situation and professional development they felt they needed to ensure future successful mastery of said challenges – at least as long as the pandemic lasts and schools are detained from returning to normal. The design and implementation of online literacy teaching and assessment practices requires careful consideration and professional development, so teachers and students are empowered to effectively engage with and learn literacy (König et al., 2020). Respondents craved a more structured and collaborative approach to professional development. The TPACK framework could be used as a way to frame professional learning locally and to examine the contextual factors that may affect remote literacy teaching and learning. This study recommends more collaborative virtual professional development sessions using TPACK. These findings substantiate previous research calling for professional development that guides teachers in the planning and implementation of purposeful technology use and video lessons in cycles of learning. Teachers can have opportunities to improve literacy instruction throughout the instructional cycle, including reflecting on the effects of this technology use, as well as refining their literacy, pedagogical and technological knowledge as they teach remotely (Christ et al., 2019). This professional development must be specifically geared to teachers' unique educational contexts, addressing their literacy curricula, learning management tools, and available technological resources (Beschorner & Woodward, 2019).

Limitations

Some limitations of this study need to be noted here. Obtaining a large sample that would best represent a specialized group of literacy professionals was a difficult task. Of the 300 survey respondents, almost half (48%) were primary K-3 teachers. As a result, these findings cannot be generalized to teachers in other grade levels (e.g., middle/high school and postsecondary) where English language arts is being taught. The issues noted above make it difficult to determine whether the survey responses would be the same among teachers with different levels of TPACK or in a school with different circumstances. All the data were also self-reported; therefore, readers should interpret them with caution as the results are limited in generalizability. Nevertheless, the large sample size gives the researchers confidence in the results.

Implications

The findings from this study can be used to inform local response efforts and schools' preparedness strategies for future pandemics. The findings can be used by the educational community to stimulate discussion about how place-based or local knowledges could be fostered with teachers in their respective settings.

Teacher-led direct and explicit instruction in phonics is still important in remote learning environments. Short video demonstrations (e.g., using Screencastify) could be incorporated to create videos of teacher modelling. Visuals are also integral for helping children remember specific phoneme-grapheme relationships. Whiteboard extensions such as Jamboard (using sticky note feature to create letter tiles) could be used for live small group instruction as a way for K-3 teachers to model using the kind of manipulatives they would normally use in their brick-and-mortar classroom modelling. Within lockdown, there should still be an opportunity for children to engage in multimodal creative expression and to exercise agency over their writing, potentially a positive outcome of this unprecedented time (Chamberlain et al., 2020). The production and consumption of multimodal texts that communicate information not only through the linguistic mode, but also through interactive visuals, photos, drawings, graphics, and video, are important in a remote learning environment that is flexible, inclusive, accessible, and student-centered (Kim, 2020). Despite the many challenges K-3 teachers faced, Christ et al. (2019) noted increased student engagement and greater levels of understanding when online instruction is based on students' needs and levels and within students' zone of proximal development (Vygotsky, 1978) and when students are offered opportunities for differentiated instruction and collaborative learning. Thus, remote literacy instruction should provide students with ample opportunities to document their learning in a variety of ways independently and collaboratively as well as enact multiliteracies that they will need to thrive in the 21st century (Chamberlain et al., 2020).

"Teachers' support for students, including through monitoring their learning processes, is what makes teaching effective."

Although technologies and resources are necessary ingredients for remote teaching, teachers' support for students, including through monitoring their learning processes, is what makes teaching effective (Rapanta et al., 2020). Diagnosing student needs and aptitudes is necessary to make appropriate pre-instructional decisions (König et al., 2020). However, the findings of this study demonstrated a major knowledge gap in teachers' ability to assess and teach literacy skills, especially to learners who are emergent readers or ESL students, as few teachers had

professional development in this area of digital competence.

During remote instruction, primary grade teachers should provide feedback in the form of commentary, placing importance on student growth, rather than giving feedback through the more punitive act of grading. Grading during this time would be an inaccurate representation of a students' knowledge due to potential equity and academic integrity issues (König et al., 2020). Teachers might feel more comfortable with the idea of incorporating authentic literacy assessments (Pace et al., 2020). Some examples of online authentic literacy assessments include discussion forums, individual or collaborative projects, portfolios, peer- and self-assessments, blogs, wikis, simulations, voice recordings, and formative video quizzes (Pace et al., 2020).

Parental involvement is a key component of emergency remote teaching for children who need assistance navigating online (Kim, 2020). In order to guide students effectively through literacy assessments at home, teachers have to establish and strengthen e-communication (e.g., weekly parent-teacher conferences) with students and their parents. Teachers should view parental assistance as a resource for early literacy learning rather than an impedance to accurate assessment (Kim, 2020).

Findings of this study overwhelmingly support Belo et al.'s (2016) assertion that there must be a match between technology tools and specific content areas and/or curriculum. Successfully incorporating specific literacy instructional methodologies in a virtual environment presented difficulty for teachers. Respondents wanted to learn how to use technology to support reading and writing workshops, writing

> **"Specifically, teachers need support with intentional planning for technology integration, particularly as modes of instruction continue to change."**

conferences, guided and shared reading, and collaborative learning. Likewise, the TPACK (Mishra & Koehler, 2006) framework underscores the need for an emphasis not just on one aspect of technological, pedagogical, or content knowledge, but rather on the interplay of these areas. Findings of the current study pointed to respondents' desire to grow in their knowledge of the interchange of TPACK specifically within their literacy instruction and assessment. For example, respondents did not just want to know about technology tools like Flipgrid or Jamboard, but specifically how to use these tools to teach and assess literacy.

Participants in this study demonstrated a strong desire to obtain guidance and support at all stages in the instructional cycle. In the future, professional development should adhere to Espinoza and Neal's (2018) assertion that, in order to "prepare educators for changing learning environments, professional development programs and spaces must provide opportunities for faculty to plan, apply, and reflect on individualized experiences related to integrating technology in authentic contexts" (p. 38). The findings from this paper clearly demonstrate teachers' need for support as they navigate the new normal of teaching literacy remotely. Specifically, teachers need support with intentional planning for technology integration, particularly as modes of instruction continue to change. Some teachers who began the school year in a fully remote learning may have to transition to a hybrid or in-person learning setting.

Furthermore, in recognizing the need for professional development that addresses teachers' specific contexts (Beschorner & Woodward, 2019), each teacher's or school's unique student population must

be considered. When examining their students' needs, respondents requested support for the specific students they teach every day, including students with disabilities, non-readers, students reading below grade level, and ELs who rely on social cues when trying to comprehend instructions. With respect to the latter group, there is a greater need for teachers to find effective two-way communication tools (e.g., TalkingPoints) for ELs and their families. These findings clearly illustrate that students are an integral part of context and effective professional development should target teachers' distinctive situations and students.

Moreover, findings advocate for more professional communities and networks for teachers as they navigate this new learning world. These findings reinforce prior research that emphasizes the need for professional communities where teachers receive the varied types of support necessary for remote instruction (Scherer et al., 2020). The analyses also pointed to the resourcefulness of teachers during rapid change; this finding emphasizes the fact that support does not always need to be an expert outsider. Rather, as shown in this paper, teachers just need space and time to explore and adapt their remote literacy instructional and assessment practices alongside other teaching professionals in the field. This support for teachers might come from discussion and collaboration with instructional, literacy coaches, or teachers in their buildings, or perhaps even through partnerships with universities where participants are offered one credit or professional development hours to complete instructional technology courses that are subject-specific.

Conclusion

The education world has most likely been permanently altered from this COVID-19 experience. Although far from the ideal, the reality of our current global pandemic forces teachers and schools to think and learn literacy in new ways. Therefore, it is imperative that educators rethink how we use technology to teach specific content areas and that we develop and provide professional development opportunities specifically geared to the context and needs of teachers. The findings from this study can inform future professional development and provide professional learning recommendations and resources for teaching and assessing literacy remotely beyond the pandemic.

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