

Transforming International Pre-Service Teachers' Pedagogy with Technology in the Era of Multiliteracy

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Abstract

Higher educational institutions in the US witnessed a growing number of international students on campus. This group of students brought with them diverse linguistic, cultural backgrounds that are distinct from the mainstream American teacher candidates. It is necessary, then, for faculty to create experiences for international teacher candidates that support the development of the knowledge and skills for their future roles. The case study examined how an international pre-service teacher from China enrolled in a graduate-level literacy and technology course that aimed to develop the pedagogical and technological knowledge, negotiated her cultural and professional identity in a Caucasian-dominated classroom through coursework and how she used innovative digital tools to support her future ESL students in language and literacy learning. The course artifacts of blog posts, digital storytelling product, unit plan, end-of-course reflections in addition to interview data were analyzed. Results showed that 1) the opportunities of exploring and using technological tools allowed international students' expression of their cultural and sociocultural perspective using culturally-specific images, sound, and language; 2) the course's scaffold and hands-on nature of project-based learning effectively supported international students to develop the knowledge and skills for their future roles by preparing them to create similar opportunities for their students.

Keywords: Case Study, International Student, Literacy Instruction, Teacher Education, Technology Integration

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Introduction

Today's teacher candidates have grown up fully immersed in digital technologies (Prensky, 2001). Born during the digital age, they are skilled users of handheld devices and Internet-connected computers, we might expect them to readily integrate digital tools into their instruction. However, teacher candidates have also grown up in a world of state-mandated, scripted curriculum and standardized assessments that deterred their teachers from integrating emerging technologies into their instruction (Hutchison & Reinking, 2011). Thus, we cannot assume that teacher candidates have the knowledge or the pedagogical skills needed to integrate technology into their instruction without explicit preparation that highlights its powerful potential for instruction. In other words, teacher education courses must prepare candidates to design literacy instruction for a digital world, especially in times of pandemic.

Higher educational institutions in the US witnessed a growing number of international students on campus during the past decades, posing challenges to the teacher education programs. This group of students brought with them diverse linguistic, cultural backgrounds that are distinct from the mainstream American teacher candidates. Inherently, it poses challenges to the teacher education programs in the US how to best prepare them to be day-1 ready classroom teachers. Their status as international students prevent them from engaging in field-based experiences. It is necessary, then, for faculty to create experiences for international teacher candidates that support the development of the knowledge and skills for their future roles.

This exploratory case study examined the effect of a graduate-level literacy and technology course in transforming the pedagogical thinking of a teacher candidate from China relative to integration of technology in literacy instruction. We were interested in understanding how the coursework helped her negotiate her cultural identity in an American teacher education program and how she used innovative digital tools to support her English as Second Language students in language and literacy learning. The following question guided this work: How did an international graduate student enrolled in a teacher education program in the United States define and express her understanding of 21st century literacy instruction?

Theoretical Framework

Multiple related perspectives combining technology and literacy informed this research: Situated Sociocultural Approach (Gee, 2010); Pedagogy of Multiliteracies (New London Group, 1996); TPACK (Mishra & Koehler, 2006); Planning Cycle (Colwell & Hutchison, 2014) all point toward the interactions between literacy and technology in and out of schools and they shape how we analyze our data.

The situated, sociocultural perspective allowed us to examine how this international students' cultural identity framed our participant's perspectives about teaching and learning. The *Pedagogy of Multiliteracies* (New London Group, 1996) was identified as an appropriate and useful lens. It describes the complex nature of teaching the multiple literacies students need to be fully literate in an interdisciplinary, multimodal, and digital world. It allowed us to examine the critical features of Tina's digital storytelling project, including how she expressed her cultural identity through intentional design that "transforms knowledge by producing new constructions and

representations of reality” (New London Group, 1996, p.76). This perspective allowed us to closely examine the ways Tina applied course content to her digital story (Cope & Kalantzis, 2016) as well as how modes were used to communicate a coherent, unified message (Jewitt, 2009).

This research is also framed by the *Technological Pedagogical and Content Knowledge* theoretical framework (TPACK; Mishra & Koehler, 2006; see Figure 1) and the *Technology Integration Planning Cycle for Literacy and Language Arts* (see Figure 2), an instructional planning framework developed by Hutchinson and Woodward (2014). These two frameworks provide theoretical and practical guidance for studying technology integration in the context of literacy education.

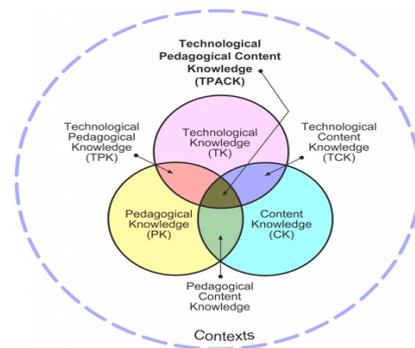


Figure 1: *TPACK Framework*, <http://tpack.org>

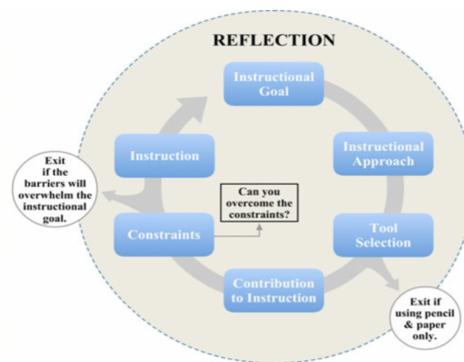


Figure 2: The Technology Integration Planning Cycle for Literacy and Language Arts

The TPACK framework, developed from Shulman’s (1986) notion of Pedagogical Content Knowledge (PCK), describes three bodies of knowledge required for effective teaching: content knowledge (CK), pedagogy knowledge (PK), and technology knowledge (TK; Mishra & Koehler, 2006), and how these combine to create synthesized knowledge domains: technological content knowledge (TCK), pedagogical content knowledge (PCK), technological pedagogical knowledge (TPK), and TPACK. TPACK is a useful lens for examining the ways preservice teacher knowledge developed through participation in a literacy and technology course. The TPACK-influenced *Technology Integration Planning Cycle* (Hutchinson & Woodward, 2014) describes the key elements in a teacher's decision-making process when designing literacy instruction with technology.

Literature Review

Teaching with technology “is complicated, multi-faceted, and a developmental process” (Foulger, Graziano, Schmidt-Crawford, & Slykhuis, 2017, p. 10), yet it offers numerous benefits to learners. Technology offers classroom teachers more opportunities to establish an active and constructive learning environment where students engage in inquiry, explore and construct ideas, and solve problems (Goss et., 2016). However, a persistent challenge for teacher education is preparing technologically skilled teachers who thoughtfully integrate digital tools within standards-based literacy instruction (Harris & Hofer, 2009; Hutchison and Woodward, 2014). The challenge lies in the complex nature of preparing preservice teachers to use technology in their classroom since it must address all the domains of effective teaching – pedagogical knowledge, content knowledge, and technology knowledge (Koehler & Mishra, 2005).

There are ways to address these challenges. Educational technology courses were shown to benefit teacher candidates by providing an overview of the use of technology in teaching and improving the foundation of technology skills (Kay, 2006). Lesson planning is one promising approach for the teacher education classroom (Koehler & Mishra, 2005; Lee & Lee, 2014). Specifically, preservice teachers benefit from many opportunities to apply coursework and to design instruction that integrates digital tools in meaningful ways (Hutchison & Colwell, 2016). Teacher candidates who have not yet obtained substantial teaching experience benefited from support and scaffolds throughout the lesson planning process (Harris & Hofer, 2009).

Although some research showed preservice teachers failed to integrate technology knowledge in classroom practices using these approaches, researchers suggested that it might be the result of teachers' limited design capacity (Polly, Mims, Shepherd, & Inan, 2010).

In addition, teacher education programs must consider their roles in shaping teachers' identities (Beauchamp & Thomas, 2009). Teacher identity is considered as both a result of influences on the teacher and a process of ongoing interaction within teacher development (Oslen, 2008). Identity is multi-dimensional in nature and can be represented in multiple ways. Teachers constantly construct their own ideas of ‘how to be’, ‘how to act’ and ‘how to understand’ their work and their place in society. Through the ongoing negotiation with the experience, it has a dynamic, shifting nature (Sachs, 2005). Wenger (1998) argued that by participating in a community of professionals, a teacher is subject to the influences of this community on identity development. Literature in teaching stresses such ways of conceiving and exploring aspects of identity as examining the role of teacher reflection, using narratives of teachers about themselves and their practice, as well as the discourses in which they engage (Connelly & Clandinin, 1999). Given that teacher identity is at the core of the teaching profession, it is of great necessity to tell the specific stories and consider the needs of transnational students, enrolled in education programs, through their narratives and reflections as ways to examine their growing understanding of their professional identities within changing contexts (Rose & Garner, 2010).

Method

This research used a case study design to examine one international teacher candidate's change of perceptions, skills and TPACK development in planning and implementing technology-integrated literacy lessons as she participated in a technology-based literacy course. The case study, with its rich data and in-depth analysis, can provide important insights (Gerring, 2004) and an opportunity to explore the design of literacy teacher education coursework, especially for international students in teacher education programs.

Educational Context

This study was conducted at a small, private university in the Northeast region of the United States with a small but growing School of Education that offers undergraduate and graduate teacher licensure and graduate degree programs. The study is situated in a required literacy and technology course designed to prepare teacher candidates to teach standards-based literacy instruction that integrates technology, use online tools and information resources to promote students' reading, writing, speaking, listening, and visual communication skills.

The first author, who designed and taught the course, introduced students to the TPACK theoretical framework (Mishra & Koehler, 2006) and the *Technology Integration Planning Cycle for Literacy and Language Arts* (Hutchinson & Woodward, 2014) and designed a series of assignments focusing on technology exploration and integration.

Participants

Tina is a 25-year-old pre-service teacher candidate from China enrolled in the graduate program in Education Technology. Before coming to the U.S., Tina took college education in China and majored in Japanese language and Literature. Tina is fluent in Chinese and Japanese and has strong communication skills in English. Before taking this course, Tina was exposed to limited educational technology theories through another course in her graduate program. Currently she is a second-year full time secondary ESL teacher in an international school in Shanghai, China.

The participant presented in this case study was identified from a larger data set of 26 teacher candidates enrolled in the course. The case was identified because Tina was the only international student from East Asia and her work served as exemplars for future students as identified by project rubrics created by the researcher for her course.

Data Sources

The data sources are multiple-layered, including quantitative and qualitative data. Table 1 shows the data sources for the study that were embedded in the course projects. Quantitative data were collected using the *Survey of Preservice Teachers' Knowledge of Teaching and Technology* (Schmidt et al., 2009), a validated, self-report survey instrument. The survey measures preservice teachers' knowledge across the seven domains of TPACK. It includes eight items specific to demographic data, 59 Likert-scale items that collect self-report data for each of the domains of TPACK, and six open-ended questions that yield qualitative data.

Sources	Description
Blog	Create a 10-week blog about your exploration or application of specific digital tools that promote student learning while addressing literacy skills. Blog entries were collected throughout the 10-week span.
Digital storytelling & reflection	Create a digital story about adhering to the fundamental elements and process of this medium. Write about a reflection on the process of creating a digital story and its potential instructional applications.
Unit plan and reflection	Design a 10-day unit plan with two detailed scripted technology-integrated lesson plans addressing target skills in CCSS. Reflect upon unit plan design and lesson delivery.
End of course reflection	Write a reflective essay in response to the prompt “What does it mean to teach literacy in the 21st century?”
TPACK survey	The <i>Survey of Preservice Teachers’ Knowledge of Teaching and Technology</i> (Schmidt et al., 2009); pre- and post-surveys
Follow-up interview for digital storytelling	2-hour interview to understand the experience and design choices for digital storytelling
Member-check Interview Spring 2020	2-hour interview about current teaching position

Table 1: Description of Coursework-embedded Data Sources

Qualitative data included the following: 1) the digital portfolio artifacts from the course, including the blog posts, digital storytelling project, and her unit plan design (see figure 3) 2) multiple written reflections about course assignments; 3) interviews during and after taking the course. Tina’s blog documented her efforts and curiosity while exploring digital tools that support literacy and learning for English language learners in China. In her blog (see figure 3), Tina discussed how technology can be used to engage students when teaching a foreign language. Tina’s digital storytelling (see figure 4) is an imagined story based on her own life story. It is a story about how a girl named Krystal set her mind on achieving her dream in Shanghai, one of the most developed cities in China. After many failures in her job when she was about to give up, she had an epiphany, guided by a magical star on a night trip in her dream, about how to be upbeat in bad times. Tina’s unit plan focused on a literature study for six-graders. Throughout the unit plan, she used URL, audio-assisted reading, movie clips, digital portfolio, digital graphic organizers to teach the literary devices and help students build background knowledge for deeper comprehension.

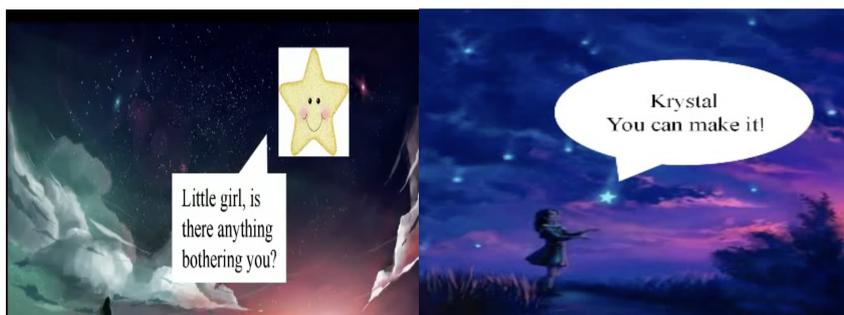


Figure 3: Screenshots for Tina’s artifact of digital storytelling



Figure 4: Screenshots for Tina's artifact of blog posts

Data Analysis

The study has both the qualitative and quantitative data. The survey data were analyzed for evidence of change from pretest to posttest, which measured preservice teachers' knowledge across the seven domains of TPACK. Unit plan measured the participant's level of technology of integration (TPACK) with a range of score from 1-4 for each domain with 4 indicating the highest level of TPACK knowledge in application while 1 indicating the lowest level of TPACK knowledge.

Tina's other coursework artifacts including blog entries, digital storytelling product, and multiple reflections on course, lesson implementation, and interviews were coded and analyzed using qualitative methods. All qualitative data were coded with the TPACK domains and guided by multiliteracies framework. The coding process started with both researchers coding independently. An open-coding method was used for the first rounds of data analysis. Data were read multiple times by both researchers to identify codes emerging from the data. Independently-derived codes were discussed and themes identified. Next, both researchers independently coded and analyzed additional reflections using the established codes. To support this work, a codebook was created and was used by both researchers. Following this round of coding, the researchers met again to determine inter-coder reliability and discuss emerging themes. The coding was compared and all disagreements were discussed until consensus was reached and emerging themes were confirmed. This iterative process continued until all data were coded and themes were affirmed. By using a constant comparative approach, coders agreed by consensus to achieve 100% inter-coder reliability.

Findings

Data analysis yielded three important findings: Tina's participation in the course resulted in moderate increase in reported TPACK knowledge and emerging skill in TPACK application due to the limited access to field experience, an expanded understanding of literacy and instructional technology and the improved self-efficacy through finding her voice through using multimodality.

A moderate increase of TPACK knowledge.

From the pre and the post of TPACK surveys, Tina showed moderate increase of knowledge in several domains of TPACK, such as Technological Knowledge (TK, from 2.83 to 3.5), Technological Content Knowledge (TCK, from 3.00 to 3.50), Technological Pedagogical Knowledge (TPK, from 3.22 to 3.33) and TPACK (from 2.5 to 2.75). However, the reported data did not show any increase in her Content Knowledge (CK, 3.0), Pedagogical Knowledge (PK, 3.29) and Pedagogical content knowledge (PCK, 4). The domains of TPACK related to technology development

showed growth but not in the pedagogical and content knowledge domains. In comparison to this self-reported data, Tina's unit plan showed that she presented emerging but rather limited skills in applying TPACK knowledge when designing lessons. Unit plan measures showed her level of technology of integration (TPACK) with a range of score between 1-2.5 for the four domains, indicating an emerging but limited application of TPACK.

In her unit plan, Tina integrated appropriate digital tools in her literature study on *Gone with the Wind*. These included websites, audio-assisted reading, movie clips, and digital graphic organizers. However, most were used for presentation purposes rather than tools to extend and deepen students' thinking. Her unit plan reflection and interview analysis suggested that her status as a teacher candidate and her limited field-experience interfered with her ability to develop the pedagogical knowledge needed to design pedagogically-sound, standards-based, and technology integrated instruction.

In contrast, qualitative analysis of Tina's multiple artifacts showed that Tina expanded her understanding of "texts", the role of technology in instruction, and improved efficacy with technology use along with a renewed expression for her cultural and professional identities as an international student when English language proficiency was a potential obstacle for her identity as a teacher-to-be.

Expanded understanding of literacy and instructional technology.

During the course, Tina demonstrated her growing understanding of how technology can be used to support literacy learning. In her blog posts, Tina reflected on many digital tools she explored as she completed course assignments and how this exploration helped her understand that the same piece of information can be presented in a variety of ways, forms, and media. She recognized that multimodal digital texts were important to integrate into literacy instruction centered on meaning-making and semiotic interpretation. She pointed to other benefits of multimodal texts, such as increasing learner motivation and promoting collaboration and creativity among students. Tina remarked:

Text in modern days should go beyond the traditional printed word to include images, videos, audio recordings, and texts that include a combination of these modes...Multimodal is a term meaning a text that uses multiple modes, like writing, images, audio, visual, color, etc., to create meaning. Students are exposed to multimodal texts often in their out-of-school experiences with technology - videos, social media posts, and other communication means include multiple modes of meaning that must be interpreted and understood. These texts should be addressed in the classroom as well.

Other than having a better understanding of literacy, her reflections and interview data revealed her more nuanced understanding of technology use in the classroom. Although she reported skepticism and low levels of self-efficacy about using technology in instruction at the beginning of the course, Tina's post-course reflection suggested she felt prepared to integrate digital tools and teach digital literacies through modeling effective and responsible technology use in the classroom.

Before this class, I [had] no confidence in successfully integrate technology into my future classroom and have no clue concerning how to integrate it. But now, I can

confidently say I will use technology as a powerful tool to engage and motivate my students. Through the learning of this whole semester, I learned a lot about "what technology to implement" "how to implement". The knowledge I learned in this class and the experience I have gained through hands-on activities give me a lot of inspirations about how to design my language class, how to interact positively with my students and how to carry out objective assessment by the aid of technology....Also, this class provides me great opportunities to explore the technology by myself. If not for this class, I would not be interested in exploring the various functions of the technologies and make full use of it for my instruction since as I mentioned at the beginning, unlike most of the "after 90s", I am very bad at technology and I was definitely not confident in using it. This class ignited my passion for technology and now I think it is so cool for me to probe into the "fascinating world" of the technology. Although I have made many mistakes when I use the technologies for my assignments and presentations for this class, I learned from the mistakes I have made. Now I am fully prepared to probe deeper into potentials of technologies because after the learning and practicing of the whole semester and guidance by our professor I am really excited to use the technology in the literacy classroom.

Meanwhile, Tina realized that technology use in the classroom was not for the sake of using technology, but to serve instruction. For Tina, the key is how to use it effectively. She remarked,

“technology is a tool. Whether it can benefit students or not depends on how we use it and how we guide students.”

More importantly, she viewed technology not only as a tool for enhancing learning, *but* as a means for social justice. On her blog, Tina wrote “Technology should serve as equalizer rather than a divider.” For Tina, technology is both a tool that facilitates differentiated instruction and has great potential to close the digital divide beyond the classroom if the teacher used it effectively.

Although Tina recognized the potential of technology to level the field for all the learners, she also acknowledged the challenges associated with technology integration, such as the need to abide by regulations concerning student safety and privacy as well as the need to remain abreast of the ever-changing digital tools available for the classroom. She commented:

Technology is helpful in promoting collaboration, facilitating struggling learners, differentiating lessons, and increasing motivation. However, with so much variety can come confusion and uncertainty about which tools to use for any given lesson. Since so many of them are relatively new, a teacher may find herself overwhelmed with the choice and with a desire to revert back to the days of "paper and pencil" just for the sake of staying within their comfort zone.

In addition, Tina stressed the importance of external factors that impact the effective application of digital tools within literacy instruction. Interview data revealed that Tina’s current teaching practices aligned with her reflections during the course, in which she stressed the importance of easy access to technology, school support, and teacher autonomy in technology use. She remarked:

[My] current school...is equipped with advanced technology... and my principal actually pushed me to think out of the box to use technology by asking me to serve as a team leader among my colleagues. He even asked me to work on the help desk team so I can help troubleshoot the technology issues in the classroom. Although it is not my areas of expertise and I felt very stressed sometimes, I do feel it pushed me to stay tuned in the field of instructional technology.

Improved self-efficacy through finding her voice through using multimodality.

Digital portfolios that include authentic learning activities such as blogs and digital storytelling allowed Tina to explore and express her cultural identity and provided opportunities to do cross-cultural comparisons in instructional practices with technology use. The symbols in her digital portfolio showcased her cultural identity. Throughout the digital storytelling, she heavily used Chinese and Japanese images and music. The symbolism and animations that are typical of oriental in their features. These venues for self-expression allowed her to communicate her culture and her identity to her peers. At the beginning of the class, Tina was very concerned about her English. The class required students to engage in discussion, something Tina was unfamiliar with given her educational background outside the U.S. Her lack of confidence in her English made her feel inferior in class and she reported feeling nervous in class. The chance for her to express herself in online writing, communicate with her peers through online tools and design her digital storytelling not only allowed her peers to better understand her, but also gave her an edge of what she does. Through these open-ended course work, Tina showed a shift in the sense of self-efficacy and a growing comfort level with digital tools in the classroom, recognized its affordances and challenges in instruction, especially the cultural context of teaching in China where teachers take on the role of “sage on the stage” and students passively participate during classroom instruction. Tina explained:

Traditional teaching mode in China is dominated by teachers, from the teaching content, teaching strategies, teaching methods to teaching steps, students can only passively participate in the process. If we can use technology like blogging, students can gain the most up-to-date learning resources. Teachers can tailor teaching content, methods, and goals when they get a better picture of students' levels and interests. As teachers, we should create a cooperative learning environment for our students, it is a great platform student-student interaction, teacher-student interaction. Teachers can also use the technology to organize teaching activities. Compared to American students, Chinese students are more conservative and quieter in class. They are more likely to pretend to understand the lesson instead of speak aloud and raise questions, so it is very difficult for teachers in China to grasp every student's problem about the lesson quickly and conduct targeted guidance in class. Learning difficulties and conducting targeted guidance. I think Chinese classrooms can definitely try to make good use of the blogging strategies to carry out education effectively.

Overall, Tina demonstrated TPACK growth, increasing self-efficacy for using technology in the classroom, and understanding of the importance of technology integration in the literacy classroom through hands-on experiences that created space for self-exploration and expression of her cultural and professional identity.

Conclusions

The case study examined how an international pre-service teacher from China enrolled in a graduate-level literacy and technology course that aimed to develop the pedagogical and technological knowledge, negotiated her cultural identity in a Caucasian-dominated classroom through coursework and how she used innovative digital tools to support her future students of English in China for language and literacy learning. Our findings showed that Tina benefited from course readings and supported experiences (Colwell & Hutchison, 2015) that allowed her to “try out” digital storytelling and to reflect on her course experiences in her blog. Tina also expressed her sociocultural perspective and her identity as an international student in her blog and in her digital story (Vasudevan, Schultz, & Bateman, 2010). Given the low levels of technology integration in many literacy classrooms (Hutchison & Reinking, 2011), teacher educators must create opportunities for candidates to explore digital tools and texts. This is especially important for international students, who may not have regular opportunities to engage in field-based experiences. Assignments such as the digital storytelling project and the blog allowed international students for transformation into inspiring teachers: shifting perspectives, increasing self-efficacy, plan for technology-integrated instruction in purposeful and intentional ways.

Our study suggests ways for practical application. First and foremost, teacher education courses must prepare candidates to design literacy instruction for a digital world. The sentiment about fear to use technology in the classroom at the beginning of Tina’s blog underlies the idea that teacher preparation programs and professional developments in schools should focus on how to properly integrate technology into all types of instruction. Since digital resources are constantly changing, it is up to teacher educators and administrations to keep up instead of letting the teachers and teachers-to-be fall behind or feel like they don't have the proper knowledge and tools needed to meet their learning objectives. Second, transformation takes intentional and purposeful course design, scaffold and a lot of hands-on practice. The intentional course design in technology-integrated literacy instruction supported pre-service teachers in understanding relationships among technology, content and pedagogy. When designing the course, projects with hands-on experience, a more structured and scaffolded guidance, are needed to establish a good community of practice for developing knowledge and skills in effective technology integration in classroom instruction. Opportunities of exploring and using technological tools also allowed international students like Tina in expressing their cultural and sociocultural perspective using culturally-specific images, sound, and language. The course’s scaffold and hands-on nature of project-based learning also effectively supported international students to develop the knowledge and skills for their future roles by preparing them to create similar opportunities for their students.

It is important to note that although this study had rich data for analysis, it had inherent limitations due to the nature of case study. Future research efforts may focus on examining if and how a larger sample of international students matriculating in teacher education programs apply coursework into their teaching in their home countries. In addition, there is evidence pointing to the need for multidimensional assessment of pre-service teachers’ TPACK knowledge (Mouza, 2016; Mouza & Karchmer-Klein, 2013; Wen & Shinas, 2020). Given that there is a gap between Tina’s reported TPACK knowledge and its application, the sources of this variability in the reported knowledge

and applied knowledge need to be further investigated. Finally, more research is needed on examining the effect of hands-on digital portfolio projects (such as digital storytelling, blog, etc.) and how teacher candidate can benefit from different types of scaffolds, ranging from modeling, discussion to specific guidelines for class projects.

In conclusion, the study examined how an international graduate student enrolled in a teacher education program in the United States defined and expressed her understanding of 21st century literacy instruction through participating a technology-focused literacy course. By examining our sample's course artifacts, we found the effect of the teacher preparation course, though moderate, in transforming her pedagogical thinking regarding her knowledge, skills and disposition to integrate technology in literacy instruction. Tina's interview and reflection also helped us understand how the transformation happened: the coursework helped her negotiate her identity, both professional and cultural. We learned that her experiences with exploring and using technological tools in and beyond her class community allowed her to express her cultural and sociocultural perspective. We also found that the course's scaffold and hands-on nature of project-based learning deepened her knowledge and skills as teachers-to-be. Thus, the study provided teacher educators with the deeper understanding of how to build coursework that supports preservice teachers in building more sophisticated thinking about technology use in instruction and how their new understanding potentially affected their future teaching.

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