Scaffolding Preservice Teachers' Professional use of Social Media Spaces: A Scholarship of Teaching and Learning (SoTL) Project

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Abstract
A growing number of Higher Education Faculty (HEF) are reimagining how they create learning spaces that prepare learners for rapid, complex, and uncertain societal transitions. Some have begun to embrace online, blended, and hybrid delivery models. Others are extending the metaphorical walls of their classrooms to include social media for formal and informal experiential learning. This paper is part of a more extensive Scholarship of Teaching and Learning (SoTL) mixed-method study, a proven and practical approach, conducted at a university in rural Pennsylvania, US. We briefly describe survey data that yielded Contextual Knowledge (XK) related to 215 PSTs' use of instructional technology and SM, personally or academically, in high school and college. Next, we describe how Author 1 used preliminary findings to redesign the digital instructional technology course taken by 17 education majors during their freshman or sophomore year. She revised the course to provide PSTs with a (Socio)Material space mutually shaped by social media (SM), teaching methods, and contexts. We describe how PSTs used three Performance-based Playlists to guide transition and professional engagement with teachers, principals, and professional organizations on Facebook, X (formerly Twitter), and Instagram. Qualitative data collected after each situated learning experience highlight how this (Socio)Material space increased PSTs' access to diverse voices and concerns, nurtured relationships, and enhanced their social awareness, responsibility, and accountability. This paper illustrates how educators can use the SoTL approach to better understand students' XK before making curricular changes. It also illustrates how educators can use discipline-specific Performance-based Playlists to scaffold transitions, including, but not limited to, SM.

Keywords: Social Media, Contextual Knowledge (XK), Social Networking, Societal Transitions, Teacher Educators

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Introduction

Our understanding of what constitutes a learning space has expanded over the last few decades. Learning spaces, which previously included brick-and-mortar schools, now include asynchronous online instruction, a wide range of blended and hybrid delivery models, exchange programs that may be traditional or virtual, and learning that takes place via SM. A (Socio)Material space is shaped not just by technology, teaching methods, and contexts but also by the educators who guide and facilitate learning within it. Within these spaces, educators play a crucial role in modeling attitudes, dispositions, and skills that can be used to access knowledge, build adaptive capacities, invite diverse voices and concerns, and nurture relationships. They can prepare students for uncertain times by providing curricular and pedagogy that equips them with the skills to collaborate across disciplines, grapple with interconnected challenges, and contribute meaningfully to the community. With the exponential growth of instructional technology and the increasing popularity of SM use across different age groups, HEF can use SM to create a (socio)Material space for formal and informal learning.

A growing body of literature describes how people use SM for informal and formal learning. Vogels (2019) reports that around three-fourths or more of Millennials and GenXers report using Facebook (84% vs. 74%, respectively). Others report that X (Carpenter et al., 2019; Greenhalgh & Koehler, 2019) and Instagram (Carpenter et al., 2019) are also rising. However, fewer studies describe how educators in general (Kahveci, 2015) and teacher educators (TEs) in particular, use SM as a learning space for professionals (Bruns & Burgess, 2015; Carpenter & Harvey, 2019; Shirky, 2011) and pedagogical purposes (Kelly & Antonio, 2016). Studies that describe how TEs modify college courses based on their evaluation of PSTs' technology use would enhance the approach to ongoing curriculum redesign. With this end in mind, Author 1 used the Scholarship of Teaching and Learning (SoTL) approach to evaluate 215 PSTs' access to digital devices and use of technology and SM in high school and college. We begin this article by synthesizing scholarly literature that informed the project's design. Next, we describe the background and context of the study, its purpose, method, and critical findings. We then describe how Author 1 used the preliminary findings of survey data related to PSTs' Contextual Knowledge (XK), collected during the first week of a digital instructional technology course, to redesign the course to include situated learning experiences inclusive of three Performance-based Playlists. We use qualitative data, collected after each experience, to describe the learning outcomes that ensued while PSTs interacted with other educators on Facebook, Twitter, and Instagram.

Theoretical Foundation

The scholarly literature in this section informed the design of the SoTL study, the survey, and the three Performance-based Playlists Author 1 designed to facilitate PSTs' professional use of social media.

K-16 Students' Use of SM as a Space for Learning

Over the last couple of decades, SM has become ubiquitous. Globally, more than 5 billion people were using SM in 2024, projected to increase to over 6 billion in 2028 (Jo Dixon, 2024). Some K-12 students, college students, PSTs, and in-service teachers (ISTs) use SM more than ever. K-12 students increased SM use, revolutionizing how they communicate, learn, and interact with the world (Vogels et al., 2022). Even though there are restrictions in many schools, scholarly literature documents children's use of popular platforms like Facebook, Twitter, Instagram, and Snapchat to connect with their peers, share information, and communicate with others. For example, Chapman and Marich (2021) describe how students in two elementary grades used Twitter to connect with people beyond their small-town community; they tweeted the information they were learning. They also describe how 9th-grade students used Twitter to connect with people living through significant global events. Similarly, Koutsakas et al. (2019) described Greek vocational high school students using Facebook for collaborative learning while enrolled in a massive open online course (MOOC) hosted on the Udemy platform. We cannot ignore the amount of time teens are spending online. Many of Anderson's (2023) survey respondents, who were teens in the US, reported that they are online almost constantly (46%) or several times a day (47%).

Many scholars have described the dramatic increase in SM use for learning at the postsecondary level. Vizcaya-Moreno and Pérez-Cañaveras (2020) describe how GenZ's distinctive combination of beliefs, attitudes, and social norms demand innovative ways of learning and have changed the education paradigm. They reported that GenZ prefers SM over face-to-face communication. Additionally, they expect technology over books and select storytelling over reading a book (Shatto & Erwin, 2016; Williams, 2019). Ansari and Khan's (2020) empirical study of 360 students at a university in Eastern India revealed that using SM for collaboration between teachers and students remarkably improved students' academic performance. Several scholars reported that Facebook was more beneficial than other types of SM. For example, Shahzad and Bilal's (2019) quantitative study showed that

Twitter's contribution to the academic motivation of 130 mass communication students in Pakistan was relatively small compared to Facebook, which positively impacted their academic motivation. Similarly, Giannikas (2020), who used a survey approach with Cyprus University of Technology students, reported that Facebook groups were a handy addition to the Learning Management Systems (LMS). Similarly, Comen et al. (2021) online survey of 872 Romanian students revealed that students were more inclined to use Facebook for teaching, global collaboration, and learning than Instagram. McGarr and McDonagh's (2020) survey data, collected from PSTs upon entry to an initial teacher education program in Ireland, showed frequent SM users but reported lower use of other digital technologies. This unusual finding merits further investigation.

Educators Use of SM for Teaching and Learning

Some tech-savvy ISTs and PSTs have begun to use Facebook, X, and Instagram in their personal lives. They also use SM professionally to connect with peers, share resources, and engage with students and their families. The scholarly literature highlights similarities and variability in PSTs' and ISTs' preferences and the use of different types of SM. For example, Schroeder et al.'s (2019) exploratory qualitative approach with 112 teachers revealed that teachers of all levels used Pinterest to find and adapt instructional resources to their classroom needs. Schroeder et al. noted that PSTs made more complex connections when evaluating excellent materials on Pinterest than ISTs. Eubanks et al. (2021) reported that the 125 PSTs enrolled in a teacher education program on the Gulf Coast indicated that SM tools such as Facebook, Pinterest, and YouTube are excellent for future classroom preparation. Kearney et al. (2020) report that PSTs, in their last year, used professional learning networks (PLN) to transition into teaching. Calderón-Garrido and Gil-Fernández's (2022) survey, administered to 812 PSTs at six Spanish universities, revealed their preference for YouTube, WhatsApp, and Instagram. They noted that undergraduate usage was more intense than postgraduate usage. They also reported that PSTs consumed more content on SM than they created, failing to fully capitalize on social capital and possible employment or academic prospects provided by their efforts. Even though the literature confirms that HEF has begun integrating SM tools, there continues to be a need for additional research that explores educators' pedagogical use of these tools (Watson, 2020).

Are Teacher Educators (TEs) using SM to create (Socio)Material spaces mutually shaped by technology, teaching methods, and contexts, and mediated by educators and learners? While some TEs have begun integrating SM intentionally into the explicit curriculum, these educators are the exception rather than the norm (Machado et al., 2024a; Machado & Seifert, 2024b). Boholano (2017) notes that, "smart social networking requires critical-thinking skills and the ability to integrate and evaluate real-world scenarios and authentic learning skills for validation" (2016, p. 21). TEs must remember this and continuously update and revise the curriculum (Warr et al., 2023). They must build teachers' competence and confidence in integrating technology into teaching and learning (Williams et al., 2023). To accomplish this, they should build e-professionalism training early in the teacher preparation program (Crompton et al., 2016) and model the use of technology in various contexts (Jin et al., 2023). Zinskie and Griffin (2020) recommend incorporating SM policies and topics into the curriculum and modeling the appropriate use of SM. TEs must also build partnerships with PK-12 leaders and teachers for teacher mentorship and induction (Sprague et al., 2023).

Using the ISTE Standards to Support Integration of SM into the Curriculum

TEs, in-service teachers (ISTs), and PSTs need to keep abreast with the field of instructional technology, which is growing exponentially. Educators must also prepare students for future uncertainties by integrating technology and social media into the curriculum to enhance teachers' ability to learn, lead, and engage in digital citizenship. This can be accomplished using SM as a (Socio)Material Space. They can create this space using The International Society for Technology in Education (ISTE) Standards as a guide. The ISTE Standards for Educators empowers educators to grow as Learners (ISTE Standard 2.1), Leaders (ISTE Standard 2.2), Citizens (ISTE Standard 2.3), Collaborators (ISTE Standard 2.4), Designers (ISTE Standard 2.5), Facilitators (ISTE Standard 2.6), and Analysts (ISTE Standard 2.7). Over the last five years, scholars have used the ISTE Standards to evaluate teachers (Aslam et al., 2020) and school leaders (Raman et al., 2019; Miller, 2021). Aligning course objectives to these standards could potentially enhance how TEs design coursework that targets developing digital skills deemed essential in the Sustainable Development Goals Report (UN, 2023).

Context of the Study

Scholarly literature emphasizes the importance of educators critically evaluating the design characteristics and functionalities of digital learning spaces to optimize learning outcomes and social interactions for students (Bruner & Hutchison, 2023). This study was conducted at a mid-sized, rural, four-year university in the US, spanning three 15-week semesters. At this university, the PSTs of 17 education majors take only one stand-alone technology course, ACE103 Digital Instructional Technology, while they are freshmen or sophomores. At the time of this study, the faculty had not revised this course for over a decade. Having worked at the university for 12 years, Author 1 knew that PSTs' use of technology for teaching and learning was limited. Recognizing that technology competence may vary significantly based on their location, access to digital devices, and the types of schools they attended, Author 1 decided to employ the SoTL approach to gain a deeper understanding of PSTs' context for curriculum redesign. Instead of focusing on the three interlocking circles of Mishra and Koehler's (2006) TPACK framework – Technology Knowledge (TK), Pedagogy Knowledge (PK), and Content Knowledge (CK)- she decided to focus on the dotted circle that surrounds them. Mishra (2019) proposed that this dotted circle, context, should be renamed "Contextual Knowledge (XK)." He described XK as "everything from a teacher's awareness of available technologies to the teacher's knowledge of the school, district, state, or national policies they operate within" (p. 76). We describe the purpose of this study and the methodology we employed to evaluate PSTs' XK in the following section.

Methodology

This study was part of a more extensive QUAN-QUAL SoTL study on enhancing PSTs' digital literacy. This section outlines the rationale for employing the SoTL approach to address three research questions. It also includes a description of the data sources, our positionality as authors, the steps taken to enhance data quality, and the participants' enrollment status across the various course delivery models.

Research Questions and Rationale for Using the SoTL Approach

We used the SoTL approach to engage in systematic research-based inquiry, reflective thought, and action. The SoTL approach gained popularity with teacher-scholars after former Carnegie Foundation President Ernest Boyer published *Scholarship Reconsidered* in 1990. Glassick et al. 's follow-up publication *Scholarship Assessed* (1997) further enhanced scholars' familiarity with this approach. Since then, there has been a growing awareness that "engaged SoTL research output at the institutional level can send a powerful signal to prospective students and other stakeholders that the university takes teaching and learning seriously" (Asarta et al., 2018, p.737). The following questions guided the study:

(1) Which technologies did PSTs use personally and academically in high school/college?
(2) How often do PSTs post content online in public forums like Facebook, Twitter, Instagram, Snapchat, and websites? Was there an association between gender and student status with the frequency of posts?
(3) How did PSTs describe their technology use in terms of each of the ISTE Standards for Educators before completing ACE103 coursework?

The SoTL approach served two purposes. Firstly, the survey data Author 1 collected over three consecutive semesters enhanced Author 1's understanding of PSTs' XK. Secondly, Author 1 used the XK data collected in the fall of 2019 to inform the design of several learning experiences grounded in Situated Learning Theory, including three Performance-based Playlists, which is the focus of this paper. She embedded these into the courses she taught in the spring and fall of 2020; in this paper, we describe the influence of the first data collection phase on the learning outcomes that resulted, as reflected in PSTs' written reflections in the spring and fall of 2020. The SoTL approach proved ideal because it promoted individual and collective learning (Dyck, 2017; Hanc, 2016). It also allowed us to bridge the divide between the scholarship of discovery and teaching (Hutchings et al., 2011).

Data Sources

We analyzed data from three primary sources: PSTs' pre-session survey responses, discussion board posts submitted to the learning management system, and ePortfolio artifacts. A total of 215 PSTs completed the validated 14-item pre-session survey within the first 10 days of three 15-week semesters. Items 1–6, 8, and 10–14 generated quantitative data related to PSTs' Context Knowledge (XK); Items 7 and 9 yielded 352 open-ended responses. Additional qualitative data included 465 discussion board posts and 10 randomly selected ePortfolios from the 155 that PSTs submitted at the conclusion of the spring and fall 2020 semesters.

Positionality and Data Quality

Both authors are females with K-12 teaching and administrative experience in the Global South. Author 1, a full professor at a research university in the US, played dual roles as course instructor and researcher. Author 2 is a teaching associate at the same university; she assisted with analysis and manuscript preparation when she was Author 1's graduate assistant. We view our positionality as an asset for the study and strive for transparency throughout the review process to enhance the trustworthiness of our research. We employed several steps to enhance the validity and reliability of the survey data, and the trustworthiness of qualitative data. Author 1, who has taught traditional, synchronous, and asynchronous college courses for eighteen years, designed the pre- session survey. Two postgraduate students with experience in digital instructional technology established face validity of the survey (Marshall & Rossman, 2014). The validated survey included three demographic items, nine scaled items, and two open-ended items. We collected additional qualitative data sequentially over the 15 weeks. We asked participants for permission to analyze survey data, discussion posts, and eportfolios after the course ended to avoid the Hawthorne effect and minimize the feeling of coercion. First Author 2 used SPSS, a quantitative research software, to run descriptive statistics. Next, she used the codebook that we both collaboratively developed to manually code the qualitative data generated through open-ended survey questions 7 and 9. We increased the trustworthiness of the qualitative data by using a structured approach to team coding, as recommended by Saldana (2021). We also used NVivo, a qualitative research software, for typological and interpretive coding (Hatch, 2002). We frequently employed memoing and peer debriefing during the data analysis and manuscript preparation phases to minimize misinterpretation and author bias, and to eliminate over-
or under-emphasis of ideas (Edmonson & Irby, 2008).

Participants

A total of 215 PSTs, enrolled in ACE103 Digital Instructional Technology for three consecutive semesters at a research university in the US. With these PSTs consent Author 1 analyzed their survey responses and written artifacts, including responses to discussion prompts and ePortfolio submissions. Of these participants, 144 identified as female (67%), 70 as male (32.6%), and one PST identified as "other." These participants represented a range of academic classifications, with the majority being sophomores (n = 111, 51.6%). Freshmen comprised 21.9% of the sample (n = 47), followed by juniors (n = 42, 19.9%) and seniors (n = 15, 7.0%). Participants also varied in their intended teaching disciplines. The largest proportion planned to teach in the humanities (art, theatre, English, and history; n = 63, 29.9%), followed by social studies (n = 39, 18.5%) and early childhood education (n = 37, 17.5%). Approximately one-fifth of participants intended to teach health and physical education (n = 20, 9.5%), science and mathematics (n = 26, 12.3%), or vocational education and family and consumer sciences (n = 26, 12.3%).

Table 1 shows PSTs' enrollment by course delivery format. Prior to the pandemic, it was offered in person and asynchronously online. While the course continued to be offered asynchronously online during the pandemic in spring 2020 and fall 2020, the face-to-face class for spring 2020 was converted to an online class in March. In the fall of 2020, the instructor taught both classes online. One of the two sections met synchronously on Tuesday and asynchronously the rest of the time.

Table 1. Different course delivery models employed to teach ACE103 Digital Instructional Technology

Year	In-person n (%)	In-person (Synchronous from March 2020 onward) n (%)	Asynchronous n (%)	Hybrid (Synchronous /Asynchronous) n (%)
Fall 2019	25 (41.7)		35 (58.3)	
Spring 2020		26 (47.3)	29 (52.7)	
Fall 2020			58 (58)	42 (42)
Total	25 (11.6)	26 (12.1)	122 (56.8)	42 (19.5)

Proportionally, more PSTs had enrolled in the online asynchronous format (n = 122; 56.8%) compared to the hybrid option (n = 42; 19.6%) or the in-person option (n = 25; 11.6%).

Analysis and Findings

We used SPSS and NVivo to analyze numeric and qualitative data from the 14-item pre-session survey in the fall of 2019. Based on these findings, Author 1 modified the course to include three Performance-based Playlists in

the spring of 2020. She taught the modified course in the fall of 2020, as well. We continued to collect additional XK data with the survey in the spring and fall of 2020 for comparison purposes. Additionally, we used PSTs' written responses submitted to the Learning Management System (n = 155). We randomly selected written reflections from their eportfolios (n = 10) to evaluate the effectiveness of the three performance-based playlists.

PSTs' Description of Technology Use Before the Course

Research question one identified the technologies PSTs used personally and academically in high school and college. We used a codebook in NVivo and typological analysis (Hatch, 2002) to code the 352 open-ended responses related to items 7 and 9; the data broadly fell into 22 categories. PSTs referenced Microsoft products many more times than (n = 454) than Google products (n = 250); they did not reference Apple products as much (n = 18). This is unsurprising; many of the students at this university cannot afford Apple products, which are more expensive. Very few PSTs reported using Entertainment Technologies (n = 22) and Instructional Technology (n = 24) in high school and college. Conversely, many reported using Instagram, Snapchat, and Facebook, followed by YouTube and TikTok in their personal life (n = 415). However, fewer PSTs reported using SM for academic purposes (n = 48). Next, we used interpretive analysis (Hatch, 2002) to code the technologies PSTs listed for open-ended items 7 and 9. Based on the number and nature of technologies listed, we placed each PST into one of the following four categories: *very few, average, above average, or well above average.* Most PSTs reported using *very few* technologies in high school and college (n = 98; 55.37%). We categorized a third as *average* (n = 59; 33.33 %), a fifth as *above average* (n = 19; 10.73 %), and only one PST in the *above-average* category.

PSTs' SM Use Before the Course

Research question two investigated how frequently PSTs posted content online in public forums, including Facebook, Twitter, Instagram, Snapchat, and websites, in both high school and college settings. We used survey items 7, 8, and 9 to answer these questions. Figures 1 and 2 show that PSTs, on average, posted content 1-3 times a month. We ran Chi-square tests to determine if there was an association between the number of times they posted and two independent variables: gender (Figure 1) and student status. (Figure 2). In both cases, the results were not statistically significant.
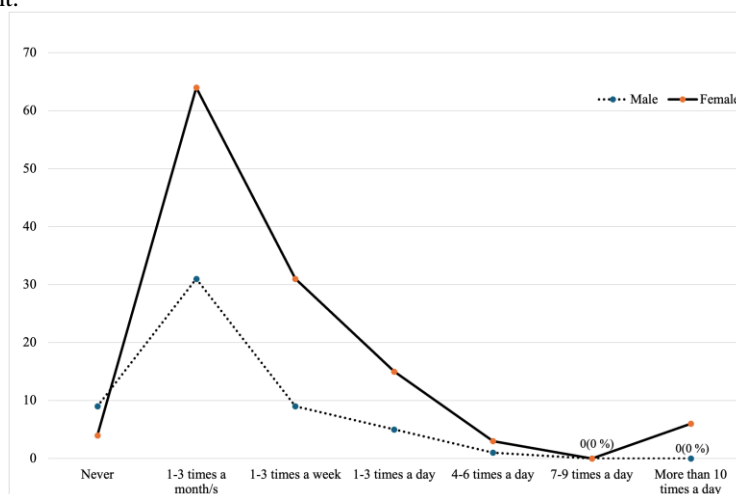

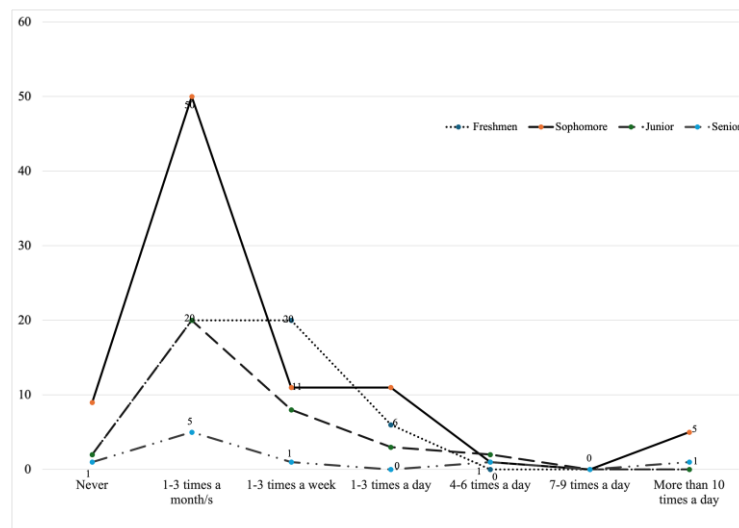Figure 1. PSTs' online posting frequency by gender

Figure 2. PSTs' online posting frequency by enrollment status

Research question three explored PSTs' technology use before taking ACE103. We used survey item 11, based on the ISTE Standards for Educators, to answer this question. Figure 3 shows that proportionately, more PSTs reported using technology to Learn (ISTE Standard 2.1, n = 157, 78.1%) and Collaborate (ISTE Standard 2.4, n = 132, 65.7%). Interestingly, the technologies they listed for open-ended items 7 and 9 did not support their claim about collaborative use. The only collaborative tools they mentioned were Google products. Descriptive data on their use of Google products shows that less than half of the PSTs reported personal use of Google Docs (n = 71, 43%); fewer PSTs used Google Docs in high school/college (n = 31, 37%). Only a fourth reported using Google Slides personally (n = 42, 25.8%) and in high school/college (n = 22, 26.2%). A limited number of PSTs reported personal and academic use of Google Classroom (12.9% and 4.8%, respectively), Drive (8% and 6%, respectively), Sheets (5.5% and 7.14%), and Gmail. (4.3% and 19.1%). In terms of the ISTE Standards for Educators (see Figure 3), fewer PSTs reported using technology to develop their skills as Leaders, Digital Citizens, Designers, Facilitators, and Analysts (ISTE Standards for Educators 2.2, 2.3, 2.5, 2.6, and 2.7, respectively).
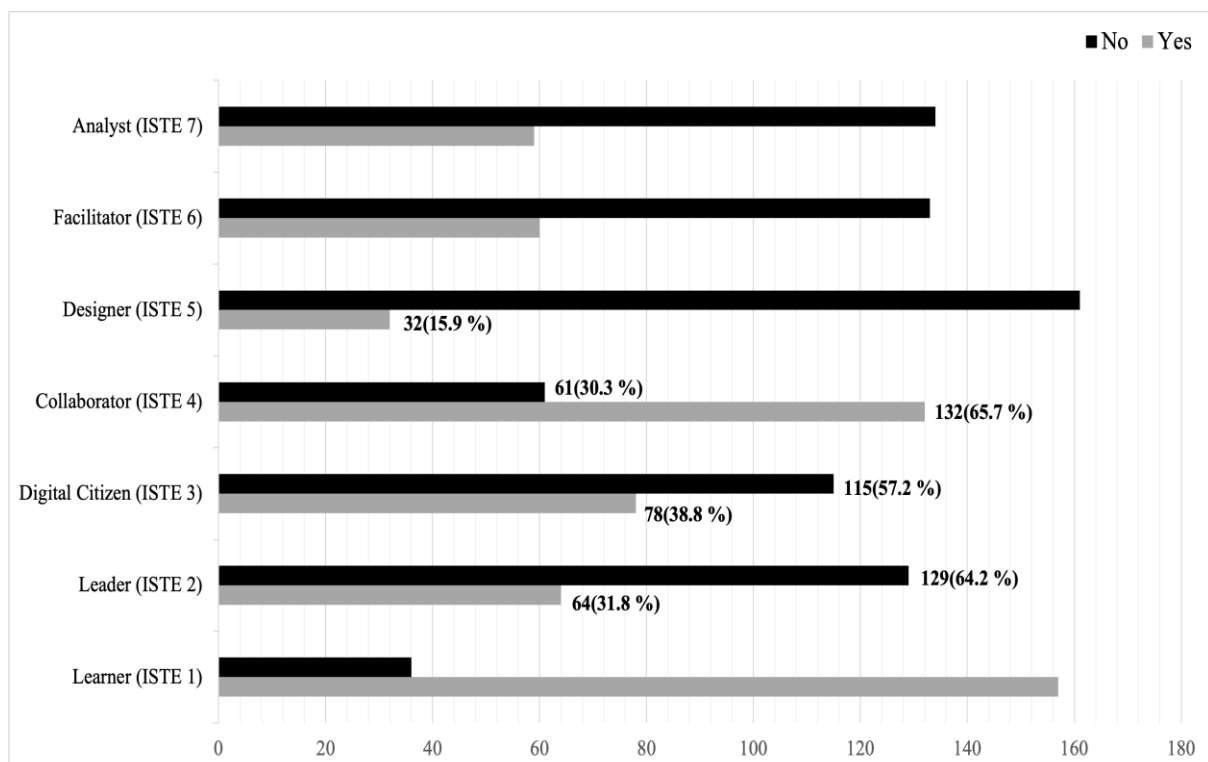

Figure 3. PST self-assessment using ISTE standards

Course Redesign Based on Pre-Session Survey Data

Consistent with the findings of other scholars (Guntara & Utami, 2021; Smith et al., 2020; McGarr & McDonagh, 2020), the PSTs' XK data, collected between fall 2019 and 2020 and described in the previous section, showed that PSTs' use of digital instructional technology was limited. It also corroborated anecdotal evidence observed by Author 1 that spanned several years. Guided by the SoTL approach, which fosters individual and collective learning, Author 1 used the XK data to recommend the adoption of the ISTE Standards for Educators (2017) at the college level. Once the Teacher Education Constituent Council approved of this change at the college level, Author 1 initiated a revision of the course. A subcommittee, which included Author 1 and three other faculty, revised the course objectives and rubrics for data collection and accreditation purposes.

PSTs' Professional Use of SM Spaces - Learning Outcomes

Using backward design (Wiggins & McTighe, 2005), Author 1 designed "situated learning experiences with technology" (Calderon, 2021). These learning experiences and performance-based activities were grounded in Lave and Wenger's (1991) Situated Learning Theory (SLT). They included modeling, practice, feedback, and reflection (Calderon, 2021; Jin et al., 2023; Lave & Wenger, 1991). Instead of reading and discussing emerging technologies, as had been the case, the learning experiences were more hands-on, with PSTs exploring, designing, and creating technology-rich instruction. These experiences fostered higher-level thinking and real- time problem-solving. The department, the University-wide Undergraduate Curriculum Committee, and the University Senate formally approved the course revision by the end of the fall 2019 semester. Author 1 taught the revised course in the spring and fall of 2020, as described below.

Knowledge in Action (Weeks 1 – 2)

During the first two weeks Author 1 introduced PSTs to theories and frameworks, such as Rogers' Diffusion of Innovation Theory (DIT) and the Partnership for 21st Century Skills' rainbow diagram, emphasizing the importance of the 4Cs: Communication, Collaboration, Critical Thinking, and Creativity. PSTs identified technologies that helped and hindered their 4C skill development and identified areas for improvement. In addition to exploring and discussing their digital footprints online, PSTs discussed statistics and news about how teachers misuse SM. They also discussed ways to manage their online reputation proactively. Author 1 provided PSTs with direct instruction on the implications of inappropriate SM use, including future hiring decisions and possible sanctions for violating P12 school/ district SM policies. PSTs also discuss the importance of balancing personal and professional use of SM and provide PSTs with access to role models who successfully do this on various platforms. PSTs also learned to find and follow influential teachers and school leaders on Facebook, Instagram, and Twitter. They paid close attention to the nature of the content that influential teachers posted and shared the illustrative examples they curated with the class.

Design, Creation, and Testing (Weeks 3 – 11)

During weeks three to eleven PSTs learned how to identify, explore, evaluate, curate, and adopt new digital resources and tools for learning (ISTE Standard 2.2). They learned to utilize technologies such as Nearpod, Google Docs, and Google Sheets to create innovative digital learning environments that recognize, support, and accommodate learner variability (ISTE Standard 2.4). They used infographics, Sways, and Screencasts to create, adapt, and personalize learning experiences that foster independent learning and accommodate learner differences and needs (ISTE Standard 2.5). They also utilized technologies like Kahoot and Quizizz to design and implement a variety of assessments that cater to learner needs, provide timely feedback to students, and inform instruction (ISTE Standard 2.7). They practiced creating and facilitating student learning on digital platforms and in virtual environments, such as Zoom, Flip, and VoiceThread (ISTE Standard 2.6). PSTs also used digital tools to promote safe, legal, and ethical practices when posting content online. They made positive, socially responsible contributions and showed empathetic behavior that helped build relationships and foster a sense of community (ISTE Standard 2.3).

SM Engagement (Weeks 12 – 14)

Given the variability in PSTs' social media use prior to taking this course (see Figure 3) and the different forms of each social media interface, Author 1 designed Performance-based Playlists to scaffold PSTs' professional use of Facebook (see Appendix A), Twitter, and Instagram. PSTs familiar with the features of a particular social media type could use the Playlist at an accelerated pace; others who were less familiar with that social media could use

the Playlist to engage in the experience at a slower pace. Figure 4 presents a brief overview of the expected learning outcomes of the three situated learning experiences.
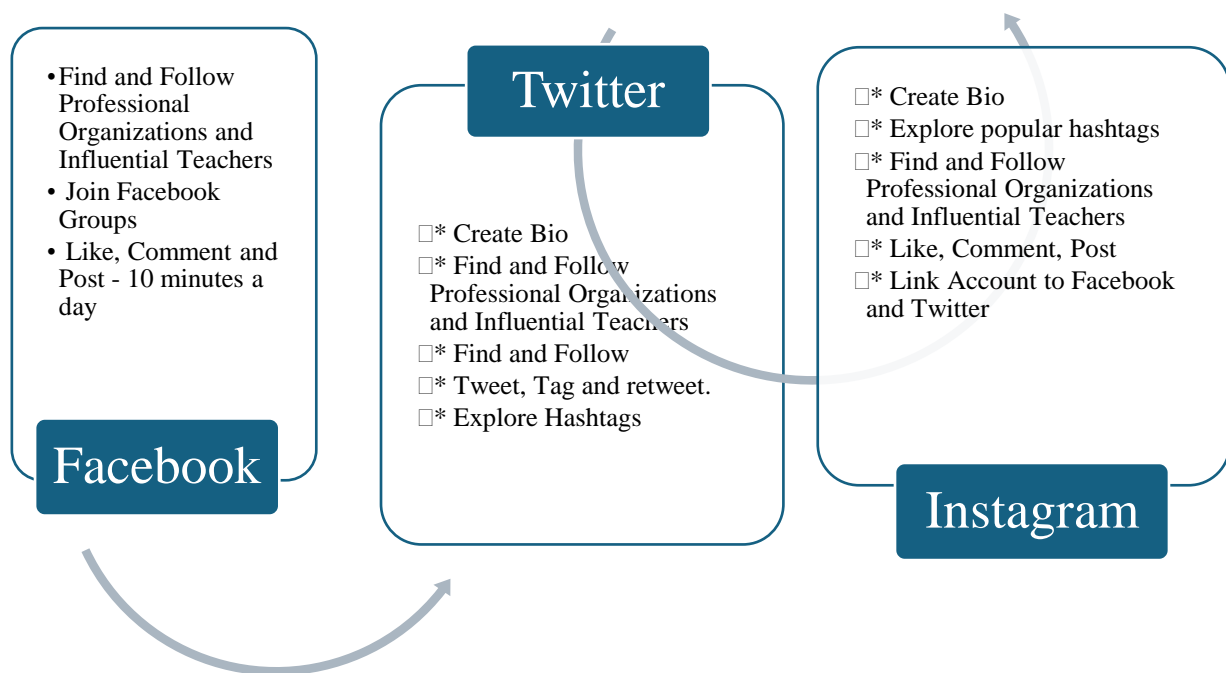

Figure 4. Expected learning outcomes in SM spaces

Author 1 embedded the Playlists into spring and fall 2020 courses. Initially, many PSTs were apprehensive about participating in local and global learning networks and leveraging technology to improve student learning (ISTE Standard 2.1). The "Learn and Do" design of each Playlist (see Appendix A) helped PSTs familiarize themselves with the conventions of the three SM types and use them for learning, leading, and digital citizenship.

PSTs' Professional Use of Facebook

Author 1 built structured discovery in the Facebook Playlist (see Appendix 1), primarily because the survey revealed that very few PSTs had used it (n = 6). Many PSTs were initially reluctant to use Facebook because they thought it was designed for older adults. They expressed surprise when they read the statistics in the Facebook Playlist. In their discussion board posts, PSTs reported that they overcame their hesitance to utilize this platform and began to enjoy it after using the Facebook Playlist (see Appendix A). PSTs who had a working knowledge of Facebook before this course and those experiencing it for the first-time reported benefits.

> I use Facebook daily, so when I saw this assignment, I thought it would be fun. I enjoyed listening to what teachers had to say about using technology in the classroom. After doing this assignment, I learned much more about using technology in school. (JL, D2l Discussion, October 19, 2020)

> I don't enjoy interacting like this online and do not do it often. I would rather interact in person, but I found a little enjoyment once I was on and doing it. I understand that interaction like this is an integral part of teaching, and I will do it in the future. I don't enjoy it as much as others. (HH, D2l Discussion, October 19, 2020)

Many PSTs showed agency by joining Facebook Groups other than the ones listed in the Playlist. Their comments highlight a willingness to communicate with people they did not know, pose questions, and interact meaningfully with teachers worldwide.

This activity helped me understand the importance of communication and being active with other teachers. I got to speak to people I did not know and see what technology was all about. (AP, D2l Discussion, October 19, 2020)

This activity turned out to be very enjoyable for me! It was nice to receive encouragement and learn from other teachers. I also liked seeing that many other teachers have a good sense of humor and seem to love what they do. The whole experience made me excited to start my career. (SMW, D2l Discussion, October 19, 2020)

Others acknowledged that the platform, which they once considered inappropriate, was valuable. A nontraditional PST who teaches at a vocational school described how he began using Facebook to interact with his students.

One of my biggest hurdles with the online learning being conducted right now was assembling all my students. We were taught to avoid Facebook, but now it is a tool. When all this started, I received permission to start a Facebook page and group to communicate with my students quickly and herd them into Schoology. Facebook Messenger is one way my students can ask me questions about how we post for Zoom conferences. I can also use the group and messenger on Facebook to remind my students to continue getting work done or to log on because of a new post. One positive thing about this is that I only let my students into the group so that it is class-specific and will not have others joining for no reason. (PC, D2l Discussion, October 16, 2020)

The Playlist helped PSTs become more conscious about privacy literacy. They used the blurring option, where appropriate, to conceal the identity of the teachers they followed.

PSTs' Professional Use of Twitter (now X)

We were surprised to note that PSTs did not list Twitter as a technology they used in high school and college. Once PSTs became familiar with Facebook, Author 1 introduced them to the professional use of Twitter. Twitter can be very overwhelming initially. To scaffold PSTs learning, Author 1 embedded links to short videos in the Twitter Playlist to introduce PSTs to the norms, followed by performance-based prompts that allowed them to make their learning public on Twitter. Per the guidelines, PSTs included Author 1's handle when they Tweeted. This enabled Author 1 to interact with PSTs on Twitter. PSTs' reflective posts showed the realization that SM can be used for learning, professional growth, and networking with other teachers. Many were surprised they could gain pedagogical knowledge on Twitter from teachers in different parts of the world.

Twitter exposed me to millions of tweets made by teachers from all over. One teacher shared how crucial it is to say hello and goodbye to your students. She realized her engagement, even if it was small, had an impact on her students when she received a note from a girl in her class that said: You tried to connect with all of your students and say hello and goodbye to them, and I appreciated that because sometimes in my classes, my teacher's kind of forget I'm even there. (MA, December 2021)

MB's comments reflected the new insights she gained in terms of the roles she could play as a digital citizen and leader:

I tweeted about different technologies and resources that support student empowerment and success and can improve teaching and learning. (MB, portfolio, December 2021)

I acted as a leader by advocating for equitable access to educational technology, digital content, and learning opportunities to meet the diverse needs of all students. I modeled the identification and exploration of new digital resources for learning. (MB, portfolio, December 2021)

I made tweets that create experiences for learners to make positive and socially responsible contributions to build relationships in the educational community. I tweeted about different technological resources that can be used to help teachers and students. I modeled and promoted safe and ethical digital tools and established a learning culture fostering curiosity and critical online resource examination. I created positive content to try to build relationships in the education community. (MB, portfolio, December 2021)

PSTs' Professional Use of Instagram

While most PSTs had used Instagram personally (n = 136), prior to this course, some had been using it for the first time. PSTs, accustomed to using Instagram, were challenged to view it differently. One student said, "Doing the same action with a new account felt strange, but helped remind me of what I should be looking for in SM interaction" (AR, D2l Discussion, November 2, 2020). PSTs described various new ideas they gained from the

videos and assigned readings. They discovered that Instagram is an excellent platform for connecting with students and teachers worldwide. One PST said, "Instagram made me realize this is an excellent way to connect with the younger generation" (QS, D2l Discussion, November 2, 2020). Another said, "I learned that there is an overwhelmingly large community of teachers on Instagram, also known as Teachergram. This allows teachers worldwide to connect, use, and share ideas" (ZM, D2l Discussion, October 29, 2020).

PSTs learned how to set up and manage a professional profile and discovered additional features to enhance the professional networking experience.

> I also learned that Instagram has an "explore" tab where you can go on and look at other accounts similar to those you already follow and explore new people you may want to connect with on Instagram. (ZM, D2l Discussion, October 29, 2020)

> I learned that it is essential to make yourself marketable in the biography part of Instagram and state your services or area of expertise. (HW, D2l Discussion, October 28, 2020)

> I also learned that you should put your career title in the name section of the bio so that when people look up the career, they can find you in case they don't know you. Lastly, I also learned that using keywords in your bio and name section is vital...I also learned to keep my page organized and look good to others. I also learned the steps to create my page for professional use. This way, I can separate my personal life from my career. (LB, D2l Discussion, November 2, 2020)

> I was also introduced to some interesting creative ways to establish a page… I learned various things, such as color-coding your page and deciding on a theme, like keeping it organized and aesthetically pleasing. (JC, D2l Discussion, November 2, 2020)

> I learned that using hashtags and tagging others is also very important. This will help you get discovered and connect with others who share the same interests as you. (HH, D2l Discussion, November 2, 2020)

> I learned new, helpful information. I had learned that if I accessed Instagram from a desktop and went to the website, there was an "embed" option on the posted picture. Using the embed option allows the user to copy a code and be able to post it anywhere, like a blog or email (HW, D2l Discussion, October 28, 2020)

Their comments confirmed that their knowledge of privacy literacy was growing.

> I learned how to gain followers through commenting and engaging other accounts, ways in which to be safe when posting pictures of students (getting their permission), balancing well between posting and engaging with those you follow, and how to create a great page without including images of your face or displaying any personal information. (JV, D2l Discussion, November 2, 2020)

> If your friend has tagged you in something that may not be school-appropriate or do not want on your profile, you can remove it by tapping on your profile and selecting "Hide from my profile." (KB, D2l Discussion October 31, 2020)

Discussion and Implications

The UN's Sustainable Goals calls for instruction that develops learners' digital skills (communication/collaboration, problem-solving, safety, content creation, and information/data literacy). Irrespective of discipline, the new generation of learners must be digitally and culturally competent. Global awareness and transcultural capacities are built over time. When PSTs graduate, they need to be prepared to meet the ever-changing needs of their workplace. This includes empowering K-12 students to develop digital skills that help them function and thrive in a digitally connected world. Even though there is a growing awareness that TEs need to integrate technology across the curriculum, stand-alone digital instructional technology courses continue to be popular at many institutions in the US. Until this changes, TEs must critically evaluate digital learning spaces' design characteristics and functionalities (Bruner & Hutchison, 2023). They must consider creative ways to make stand-alone courses relevant to PSTs' needs. With this end in mind, Author 1 used the SoTL approach to collect data about PST's technology use in high school and college so that she could use this data about PSTs' Contextual

Knowledge (XK) to make meaningful changes to a digital instructional technology course that had not been modified in over a decade.

In this paper, we focus on the practical implications of our research. Research question one aimed to identify the technologies PSTs used personally and academically in high school and college. Consistent with McGarr & McDonagh's (2020) findings, the PSTs' XK data confirmed that they were frequent SM users but made limited use of other digital technologies. More than half of the 215 PSTs reported using very few technologies in high school and college (n = 98; 55.37%)—most referenced fundamental technologies like Microsoft, PowerPoint, and Google products. The 215 PSTs made fewer references to the academic use of SM in high school and college (n = 48) compared to referencing personal SM use (n = 415). This is not surprising. Based on anecdotal information, these statistics could be attributed to the fact that HEF and K-12 teachers in this area make limited use of SM and discourage their students from doing the same.

Research question two explored how often PSTs posted content online in public forums like Facebook, Twitter, Instagram, Snapchat, and websites. Regarding frequency, PSTs in this study reported posting content 1-3 times a month. This finding is inconsistent with the nationwide studies. For example, Anderson's (2023) survey respondents reported that they are online almost constantly (46%) or several times a day (47%). Like the PSTs of this study, some learners may be reluctant to use SM for professional purposes. They may need direct instruction to help them see SM as a legitimate space for teaching and learning. Others already using SM for personal purposes may be using it without guidance. With some support, they can use SM for academic and professional learning.

Research question three aimed at exploring how PSTs described their use of technology in terms of the ISTE Standards for Educators before the course. More PSTs reported using technology to Learn, ISTE Standard 2.1 (n = 157, 78.1%) and Collaborate, ISTE Standard 2.4 (n = 132, 65.7%). Interestingly, qualitative data from open-ended items 7 and 9 did not support this claim. Their use of Google's collaborative tools was limited. Descriptive data on their use of Google products shows that less than half of the PSTs reported personal use of Google Docs (n = 71, 43%); fewer PSTs used Google Docs in high school/college (n = 31; 37%).

Author 1 used the insights gained from the XK data and the UN's Sustainable Goals for improved digital skills (communication/ collaboration, problem-solving, safety, content creation, and information/data literacy), to align the course objectives with the ISTE Standards for Education (2017). These standards empower learners to grow as learners, leaders, collaborators, digital citizens, facilitators, and analysts. She used these standards to guide the design of a series of learning experiences grounded in SLT, inclusive of three Performance-based Playlists. Author 1 augmented the skills PSTs gained in this stand-alone course by integrating SM into the course assignments (Machado et al., 2024a; Machado & Seifert, 2024b). In doing so, she and her mutually students created and mediated a (Socio)Material space for ongoing experimental learning on Facebook, Twitter and Instagram. Keeping in mind the recommendations of several scholars' advice, Author 1 shared her own SM experiences with PSTs during weeks 3-11 of the course to assist PSTs in developing their own personal and professional guidelines (Carpenter et al., 2017; Damico & Krutka, 2018; Muñoz & Towner, 2009). She also modeled how PSTs could leverage SM to enhance their professional knowledge, disposition, and skills (e.g., Carpenter et al., 2018; Eubanks et al., 2021) and build a professional community (e.g., Carpenter et al., 2018; Greenhalgh, 2021; Rosenberg et al., 2016). Author 1 modeled attitudes, dispositions, and skills used to access knowledge, build adaptive capacities, invite diverse voices and concerns, and nurture relationships.

The (Socio)Material space enhanced PSTs' adaptive capacities. The exploration and discussion-based experiences during weeks 1-11 align with Crompton et al.'s (2016) recommendation that e-professionalism training occurs early in the teacher preparation program. PSTs benefited from discussions related to the risks of inappropriate SM use, the benefits of e-professionalism, how PSTs can use SM to convey a positive image of teachers and the teaching profession (Chang-Kredl & Colannino, 2017; Kelly et al., 2017), and how they can be positive role models for their P-12 students (Poth et al., 2016). The experiential learning experiences during weeks 12 -14 prepared PSTs for uncertain times by providing them with curricula and pedagogy that equipped them with the skills to collaborate across disciplines, grapple with interconnected challenges, and contribute meaningfully to the community. The qualitative data, collected on an ongoing basis after PSTs used each of the three Performance-based Playlists, confirmed the tangible impact of the course in enabling learners to collaborate across diverse backgrounds, contexts, disciplines, and professions. It also confirmed how promoting learner self- reflection, self-regulation, and self-monitoring leads to positive learning outcomes (Means et al., 2009).

Limitations

TE must use tools and frameworks, such as the ISTE Standards for Educators, to evaluate PSTs' evolving digital competence. The SoTL project had several unique features, including an instructor who is an active SM user who taught all sections of the course with fidelity. Additionally, she had seniority in the department, agency, and the freedom to redesign the curriculum without interference; this may be difficult to replicate at other institutions. Despite promising results, it is essential to acknowledge certain limitations of the study. First, we used survey data to ascertain PST's XK; survey data could be subject to recall bias. Nevertheless, this data helped guide Author 1 in responding to the immediate needs of PSTs. We mitigated some of the limitations of survey data by analyzing PSTs' lengthier open-ended reflective posts submitted after they used each of the three Performance-based Playlists, and reflections PSTs included in their eportfolio. Furthermore, our prolonged interaction with participants helped enhance the trustworthiness of the data analysis and interpretation. Finally, participants were from a predominantly white rural community in the US; this limitation restricts the generalizability and transferability of the findings to universities that are urban and more diverse.

Conclusion

This paper describes how an education faculty used a pre-session survey to gain insight into 215 PSTs' Contextual Knowledge (XK) regarding access to digital devices and using instructional technology and SM before taking a 100-level course. Data revealed that most PSTs in several sections of the 100-level course were more accustomed to using technologies like PowerPoint and Microsoft Word for teaching and learning. Based on these findings and the UN's Sustainable Goals that call for instruction that develops learners' digital skills (communication/collaboration, problem-solving, safety, content creation, and information/data literacy), Author 1 redesigned the course to align with the ISTE Standards for Educators and included performance-based activities grounded in Situated Learning Theory. In doing so, Author 1 used SM to create a (Socio)Material Space for learning, leading, and digital citizenship. Dividing the semester into three phases —Knowledge in Action, Creation, and Engagement — helped increase PSTs' confidence. PSTs learned how to create and manage their professional digital footprint during the first phase. During this phase, PSTs reflected on and discussed various theoretical frameworks that inform their practice. They also identified SM role models and followed them. During phase two, they participated in performance-based activities grounded in Situated Learning Theory. They created and tested different technologies individually and in small groups. They also shared these digital artifacts with their SM network. During phase three, PSTs utilized Performance-based Playlists to guide the exploration and professional use of Facebook, Twitter, and Instagram. Each Playlist included embedded links to articles and tutorials for each SM type, which made bridging significant gaps in PSTs' SM knowledge and skills easier. Being immersed in each of the three SM types for three weeks provided PSTs with sufficient time to discover the benefits of metaphorically demolishing the classroom walls. They used SM to gain proficiency in self-marketing techniques by creating an online professional presence and using digital tools for public engagement and online reputation management. They discovered they could also use SM to find and prepare for a job.

SM platforms have the potential to both mitigate and exacerbate pedagogical inequalities in higher education. On one hand, they can democratize access to diverse perspectives, resources, and professional networks, especially for students in under-resourced or geographically isolated institutions. On the other hand, unequal access to digital literacy, reliable internet, and culturally responsive content can reinforce existing disparities in engagement and learning outcomes. When thoughtfully integrated into curriculum design, as illustrated in this study, SM can serve as a (Socio)Material space that fosters inclusive dialogue, nurtures professional identity, and enhances students' social awareness and accountability. This paper illustrates how educators can use the SoTL approach to learn more about students' XK before making curricular changes. It also illustrates how educators can use discipline-specific Performance-based Playlists to scaffold transitions, including, but not limited to, SM.

Declarations Conflict of Interests

The authors have no conflict of interest to declare or financial interest to report. The authors have seen and agreed with the contents of the manuscript. The authors certify that the submission is an original work and is not under review at any other publication.

Author (s) Contribution Rate

Both authors contributed significantly to the development of this work. The contribution rates are as follows:

- **Author A**: 60% – Conceptualization, research design, data collection, data analysis, manuscript drafting, critical revisions, and final approval of the version to be published

- **Author B**: 40% – Literature review, SPSS data analysis, graphs, figures and tables development, editing, formatting and critical revisions

Both authors have read and approved the final manuscript.

Ethical Approval

For this study, ethical approval was obtained from the Institutional Review Board (IRB) of Indiana University of Pennsylvania. The study was approved under decision (Log No. 19-254) dated December 02, 2019. Subsequent modifications to the approved research protocol were reviewed and approved by the same IRB on April 22, 2020

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Appendix A

Facebook Playlist, Week 12

Facebook has just completed 16 years and has more than 2.4 billion active users. Approximately 300 million images are uploaded to Facebook every day. On average, five new profiles are created every second. The most typical age demographic on Facebook is 24-35 years. This age demographic does not include your future students. However, it does include their parents, the teachers and principals with whom you work, and the professional organizations that decide what we need to teach and assess. Teachers, therefore, need to use Facebook for the following reasons:

- To keep abreast of new developments in the field, follow the posts of professional organizations like ISTE, NAEYC, AMLE, etc.
- Connect with other tech-savvy, innovative teachers and principals who share resources and help troubleshoot classroom issues.
- Connect and communicate with parents.

1. Join: Use your teacher's Gmail account to create a Facebook account.

2. Learn the Basics: Watch this 5-minute screencast to learn some of the basics like:

- how to find and join groups.
- how to share content on your page.
- how to comment appropriately.
- how to you produce a screenshot of your activity log.

If you need more guidance, please find tutorials on YouTube to learn more.

3. Follow: To ensure that you receive excellent content in your feed, search for, like, and join the following groups:

- Teaching with Technology
- Teachers using Google Suite for Education
- Technology Teacher Tribe with Brittany Washburn
- Free Tech for Teachers
- Common Sense Media
- Teaching Resources for all
- Technology Integration for Teachers
- Do a keyword search based on your major to find groups that relate specifically to it. Add two to three of those groups.

4. Engage:

- **Comment:** For the next week, spend at least 10 minutes each day reading and commenting on the posts in your feed/home page. The rules for effective online engagement in the virtual world are simple: be kind, cheerful, and helpful; use school-friendly language; and do not provide personal details about your family, friends, and activities.
- **Share:** Practice being a learner and digital citizen by sharing 1-2 daily posts on your timeline. The content you share should relate to technologies you can use in the classroom in the future.

5. Make your Learning Public: Use Nimbus to capture a screenshot of your activity log (see tutorial above). Use the blurring option, where appropriate, to hide the identity of others. Insert this screenshot into your post.