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Between Tradition and Technology: A Phenomenological Exploration of Digital Citizenship Knowledge Gaps Among Female Pre-service Teachers in Pakistan

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ABSTRACT

This phenomenological study explored the digital citizenship knowledge gaps among female pre-service teachers at a women university in Pakistan. The worldwide acceleration of educational technology integration requires research on how pre-service organise their digital citizenship education views and preparation methods, especially in a society with unique social and cultural characteristics. Using Interpretative Phenomenological Analysis, this study analysed in-depth interviews with six female pre-service teachers to uncover their lived experiences with digital citizenship education. The study uncovered five essential findings: tensions between traditional values and digital competencies; institutional barriers limiting digital citizenship preparation; varied personal technology navigation experiences; perceptions of unpreparedness for teaching digital citizenship; and aspirations mixed with concerns about future classroom implementation. The existing knowledge gaps in the study area resulted because of cultural factors, alongside insufficient infrastructure, and inadequate curricular content. This study contributes to understanding how female pre-service teachers in Pakistan experience digital citizenship education and highlights the need for contextually relevant teacher preparation that addresses the unique challenges of navigating digital spaces while respecting the cultural values. Teacher education institutions in Pakistan should reform the digital learning curriculum, develop digital infrastructure, and establish cultural approaches to teaching digital citizenship.

Introduction

Educational programs on digital citizenship are essential because technology has transformed all areas of modern life, including social structures, communication systems, and learning processes (Jääskelä et al., 2022). Digital citizenship education poses fresh obstacles for teachers in developing nations who need to teach students safe digital conduct (Jamal & Rizvi, 2023). The upcoming years in Pakistan will require urgent action to integrate digital citizenship programmes into educational frameworks because the country is experiencing rapid digital infrastructure expansion and had its Internet usage rate to reach 36.7% at the start of 2023 (PTA, 2023). The current research establishes major shortcomings in the preparation of future educators to convey and instruct digital citizenship (Jamal & Rizvi, 2023). The education system for women faces significant barriers because traditional gender norms interact with emerging technologies while presenting technical limitations (NCSW, 2023). The limited digital citizenship preparation among pre-service teachers potentially perpetuates digital divides and leaves future generations unprepared for ethical technology use.

This study examined the lived experiences of female pre-service teachers in Pakistan regarding their preparation for digital citizenship education. This study investigates future teaching professionals who encounter and process their expert-level commitment gaps regarding digital citizenship training which includes digital literacy, online security, digital identity and cyberbullying protection, and ethical technology practice (Ribble & Park, 2022). More specifically, this research analyses how Pakistani female university students experience professional preparation gaps in digital citizenship education, while considering cultural traditions and organisational frameworks, as well as individual life histories.

This study aims to provide deep insight into how female pre-service teachers experience and interpret their preparation for teaching digital citizenship, illuminating the barriers, opportunities, and contextual factors that shape their understanding. Several important factors underline the value of this study. This study fills an essential gap in the research on digital citizenship education within the non-Western educational system of Pakistan (Adnan & Anwar, 2020). Second, this study places female education professionals at the centre because their insights remain absent from Western-based research approaches (Liu & Liu, 2021). This study delivers research-based findings which will help curriculum designers and policymakers improve teacher education programmes across Pakistan. Future research on digital citizenship conceptualisation will benefit from understanding how sociocultural contexts affect teacher thinking based on this study.

This study addresses the following three primary questions:

1. How do female pre-service teachers at a Pakistani women's university experience and interpret their preparation for digital citizenship education?
2. What knowledge gaps do they perceive in their professional preparation for digital citizenship?
3. How do contextual factors influence these perceived knowledge gaps?

The research starts with this introduction before it proceeds to review digital citizenship models, teacher development methodologies, and the status of educational technology in Pakistan. Later section describes the research method which uses an interpretative phenomenological approach. Research findings are first presented through meaningful themes and then examined in relation to both local and international research, while also discussing Pakistani educational environments. The paper ends by suggesting implications and providing recommendations for teacher-education programmes.

Literature Review

Theoretical framework of digital citizenship

The development of digital citizenship now extends beyond internet safety education to feature complete standards which include tech responsibility and digital competence with moral online conduct. Ribble and Park (2022) outline nine specific elements of digital citizenship: digital access, commerce, communication, literacy, etiquette, law, rights and responsibilities, health and wellness, and security. The framework exists as a multidimensional model which educational institutions worldwide have started to implement. Jones and Mitchell (2021) developed a digital citizenship understanding by stressing civic engagement as a vital requirement for practising digital citizenship through active digital social issue resolutions. Others developed a culturally appropriate system of study to analyse how digital citizenship appears differently among various cultural backgrounds (Choi, 2016; Choi et al., 2017), specifically within the context of Pakistan's education systems These different frameworks work together to demonstrate that digital citizenship demands educators to master more than technical know-how; they need to navigate ethical aspects and social and cultural elements.

Digital citizenship education in teacher preparation programs

Current scholarly research demonstrates Global educational programs for teachers show substantial gaps in preparing candidates for digital citizenship education. Krutka and Carpenter (2017) found that many pre-service teacher programs focus predominantly on technical skills rather than comprehensive digital citizenship education. The lack of ethical training in technology subjects among educators makes them unable to handle complex digital situations effectively. Multiple discrepancies in teaching digital citizenship in education preparation programs because many institutions consider it supplementary to core subject matter. These voids create unfavourable consequences across educational settings, as Warsi and Rani (2024) explained that teachers unprepared in digital citizenship perpetuate digital inequities because they lack the basic digital education skills needed to build student digital competency. Richardson and Milovidov (2019) introduce novel educational models that promote digital citizenship education across entire teacher training curricula instead of teaching it in dedicated computer science subjects only.

Context of Pakistan's educational technology landscape

Pakistan's educational technology environment presents specific obstacles and prospects for executing digital citizenship education. Through the Digital Pakistan Policy of 2018, the government demonstrated its interest in educational technification, but its operational execution has encountered multiple complications (PTA, 2023). According to Hussain and Shah (2021), the education of digital citizenship remains limited by prevailing infrastructure issues, including unstable power supply and constrained Internet access, especially in rural regions, and insufficient digital resources in educational institutions. Shahzad (2024) identified substantial educational inequality in digital access and skills between urban and rural schools, especially affecting universities which have inadequate technology resources. According to Khan (2023) the educational policy frameworks in Pakistan show a slow adaptation to complete digital citizenship concepts because they prioritise technical skills instead of ethical dimensions. When preparing teachers within Pakistani educational programs, the form of digital citizenship education is determined by contextual factors.

Gender dimensions in digital literacy in Pakistan

This makes the evaluation of digital citizenship in Pakistan more problematic with gender-related social dynamics. Female students experience less technological resources than male students

(Hameed & Ismail, 2024). Apart from that, female students are concerned about digital opportunities for engagement as they have concerns regarding online security and family rules (Hameed & Ismail, 2024). Female pre-service teachers had significantly lower practical experience with educational technology compared to males and hence they face preparedness imbalances (Dayan et al., 2018). According to Mahmood et al. (2021), gender-embedded expectations leave teachers more inclined to prioritise online safety and ethical conduct regarding female students but provide these female teachers with less technical education than males who are its recipients. Understanding these gendered dimensions is important for developing effective digital citizenship education for female pre-service teachers in Pakistan.

Previous studies on pre-service teachers and digital citizenship

Specifically, in teaching environments outside Western nations, studies on pre-service teacher preparation for digital citizenship are lacking. According to Durmuş Cemcem et al. (2023), pre-service educators showed higher competence in technical capacities than ethical proficiency, which revealed problems in their digital citizenship education. According Jeffery et al. (2021), the rise in connectivity in Pakistan over the past year has not diminished inequalities in digital citizenship--and inequalities are mainly economic but also social and cultural. Durmuş Cemcem et al. (2023) reported substantial differences between what pre-service teachers believed they could do regarding digital citizenship situations versus their true ability to handle these scenarios. Past research which indicates that Pakistani pre service teachers lack sufficient knowledge of intellectual property rights, privacy protection and methods for reducing cyber bullying, our study found oppositely (Jeffery et al., 2021). According to research conducted by Durmuş Cemcem et al. (2023), such skill deficits will continue into the early stages of teaching careers unless measures are implemented to address them, thus impacting the development of digital citizenship competencies in the next generation.

Methodology

The researchers used Interpretative Phenomenological Analysis (IPA) to study how female education students experience digital citizenship education. IPA examines how participants make sense of meaningful life events through extensive evaluations of their individual stories (Smith et al., 2022). This method was chosen because it reveals comprehensive participant meanings in digital citizenship training practice while incorporating both participant construction of meaning and researcher interpretation. The interpretive method by Smith and Osborn (2015) proves most helpful for exploring sophisticated experiential processes that change people because it helps explain how pre-service teachers handle professional education requirements between values and technological needs.

Researchers conducted this study at a female educational institution based in Punjab, Pakistan which delivers both undergraduate and graduate degrees. Approximately 7,000 female students attend this institution which enrols middle- and upper-middle socioeconomic students whose population mainly resides in urban and semi-urban locations. The teacher education programme at the university adopts the national curriculum from Pakistan's Higher Education Commission while showing limited presence of digital citizenship themes. Educational institutions offer computer laboratories alongside Internet connectivity; however, students' access to these facilities depends on the department and the instructional needs of their classes. The educational environment allowed researchers to gain a specific understanding of how Pakistani female education students experience digital citizenship education in national educational settings.

Purposive sampling enabled the researcher to choose participants because they possessed in-depth knowledge of the research subject matter (Patton, 2022). Six pre-service female teachers in their

final academic year of the teacher education programme participated in this foundational research. This study is part of ongoing extended research. The research accepted participants from two main groups: (1) teacher preparation students, (2) students who finished an educational technology course, and (3) reflective participants dedicated to digital citizenship understanding. The study included six pre-service teaching students aged 21 to 24 with diverse socioeconomic conditions and urban (4) and rural (2) residential backgrounds. The participants demonstrated mixed levels of technological self-efficacy regarding educational technology use, since half reported high confidence, while the other half exhibited moderate to low confidence levels.

Each interview lasted between 30 and 60 minutes in the university campus room as part of the data collection process. For phenomenological interviewing (Smith et al., 2022; Smith & Osborn, 2015), the researcher utilised an open-ended protocol that crafted exploration prompts to obtain full descriptions of participants' digital citizenship education experiences. The interview questions addressed students' grasp of digital citizen concepts and their experiences in and outside of school, while also assessing their teaching readiness and their struggles between respecting traditional values and managing digital requirements. The interview sessions conducted in both English and Urdu, based on the participant's choice, were recorded with permission and later transcribed verbatim.

The data analysis procedure used the six-step framework (Smith et al., 2022). Several reviews of each transcript allowed us to become familiar with their content and emotional expressions. The process of initial noting required a line-by-line annotation system to mark descriptive comments (content) and linguistic observations (language use) as well as conceptual comments (interpretive). The researchers developed psychological themes from their annotated findings to summarise the core elements expressing participant experiences. The researchers identified connecting points that emerged between various themes within each case and then organised these themes according to conceptual intertwining. The researcher began the sixth step of pattern detection after performing the previously described independent case analysis. The researcher demonstrated IPA's double hermeneutic method by recognising that participants created their meanings, and the researcher analysed those meanings (Alase, 2023). Member checking involved showing participants preliminary themes, while two peer researchers from Pakistan, who were familiar with research contexts, provided their interpretative views to enhance the research's trustworthiness.

This study followed standard research ethic guidelines. Every research participant provided consent after being assured of privacy protections using pseudonyms and the removal of identifying details. Every participant was informed that they could withdraw from the study at any time without any negative effects. To address the sensitive nature of cultural tension discussions, participants received both culturally sensitive interviews and multiple opportunities to avoid responding to questions they found problematic. The researcher understood the potential power differences between themselves and the participants; therefore, they presented the interviews as joint sense-making activities rather than expert-knows-best conversations.

Findings

Overview of thematic structure

The interpretative phenomenological analysis generated five linked themes, which represented how participants experienced their digital citizenship education alongside their understanding of information deficiencies. The identified themes present the main ways in which pre-service female teachers experience digital citizenship education: tensions between traditional values and digital competencies; institutional barriers limiting digital citizenship preparation; varied personal technology navigation experiences; perceptions of unpreparedness for teaching digital citizenship;

and aspirations mixed with concerns about future classroom implementation. This study presents themes which create an intricate network showing participants' understanding of digital citizenship preparation in Pakistan's cultural environment.

Theme 1: traditional values versus digital competencies

Participants repeatedly talked about the conflicts that exist between cultural traditions and the requirements of digital citizenship. Participants demonstrated this theme by describing their experience of managing family restrictions on online behaviour with the development of their future educator professional online identities. When Participant 1 shared their family's lessons on being discreet with their online images before joining university, but university officials called for an educational platform's professional portfolio, it was a complex situation. Such a situation arises when participants must handle family tradition as well as shoulder the work burden (Participant 5). As a result of this negotiation, there were gaps of knowledge with regards to digital identity management that participants admitted to not knowing how to resolve such conflicts.

Participants were interested in an integrated solution between cultural principles and essential digital literacy requirements and not as two opposite binary forces. This binary educational environment in Pakistan has very high tensions which have a particular impact on female teachers. Participant 2 stated that utilising their traditional values while being digitally competent is not opposing; it just requires proper preparation to fairly use ethical practices to adhere to cultural norms.

Theme 2: Institutional barriers to digital citizenship education

Major obstacles to digital citizenship preparedness were determined to be created by institutional obstacles. Three main barriers were identified in terms of reaching the educational system: first, the curricula of education were poor; second, the infrastructure of university was unable to fulfil all the requirements; and third, teaching approaches in education neglected some aspects of digital citizenship education. Every participant in the study observed that teacher preparation programmes did not explicitly teach digital citizenship. Participant 4 stated that education technology courses do not provide education on online ethics or cyberbullying.

Inadequately equipped infrastructure systems intensified existing educational deficits. The study participants reported unreliable Internet service, old computer facilities, and insufficient access to modern technology equipment. Access restrictions prevent students from understanding how they would teach digital citizenship, despite being new to the concept. The Internet provides irregular services throughout the day. Participant 6 observed that different departments within the institution possessed varying levels of computer system quality. Pedagogical instruction at the education department lacked proper demonstration of how to practice effective digital citizenship. The teaching staff at our institution rarely showed students how to incorporate digital citizenship principles into their classroom practice. According to Participant 3, the faculty demonstrated an ineffective approach to teaching technology by delivering lectures instead of showing ethical use of technology through practical applications. The documented institutional hurdles of educational organisations produced major knowledge deficiencies regarding digital citizenship practical skills.

Theme 3: personal experiences with technology navigation

The participants' accounts demonstrated how the process of learning technology influenced their development of digital citizenship knowledge. Participants learned digital citizenship concepts through self-teaching and peer education outside traditional educational systems. Five participants taught themselves or learned by making mistakes rather than receiving proper instruction on digital citizenship concepts. Participant 2 indicated that most of their online safety knowledge only

emerged after their blunders or hearing about harmful experiences from friends, instead of traditional educational instruction. The participants showed varying levels of knowledge development since they felt more confident about what they experienced firsthand but realised they lacked an understanding of unexplored digital spaces.

The research data demonstrated that the participants had diverse initial technology abilities because their backgrounds and family attitudes towards technology differed. Participant 5 explained that their classmates developed technology skills at home under parental supervision for online activities: "My regular internet use began when I started my university studies." Participants acquired a limited understanding of new situations because they learned from personal experiences instead of structured education programs. The participant admitted to having learned personal online security through trial and error yet struggled to teach digital footprint creation to students because they had no education about it. Thus, digital inequities for female students in Pakistan existed.

Theme 4: Perceptions of preparedness for teaching digital citizenship

All participants expressed major concerns regarding their ability to teach digital citizenship concepts to future students. Participants revealed this theme when they discussed their insufficient knowledge and shortage of instructional techniques for digital citizenship education. Participant 1 summarised group thinking by stating: "There is no way I can teach students basic online protection except for myself because my training is insufficient." All participants mentioned cyberbullying prevention as one of their primary knowledge gaps, in addition to data privacy, critical evaluation of online information, and responsible social media use.

Participants expressed additional apprehension about finding appropriate teaching techniques to implement digital citizenship education. Participants mentioned a lack of knowledge about effective instructional methods for different student age groups to teach these concepts. The participants evaluated their readiness relative to international standards through their engagement with online teaching groups where Participant 4 observed "teachers in other countries deliver broad digital citizenship programmes but we only teach basic concepts." The perception of under-preparedness caused Participant 2 to worry that they and their peers might pass on digital citizenship knowledge gaps to the next generation because of their restricted readiness.

Theme 5: Aspirations and concerns for future classrooms

Research participants displayed both a thorough knowledge of digital citizenship shortcomings and an actual interest in teaching it, even with practical barriers to doing so. Participants were aware that digital citizenship is an important aspect that enables future Pakistani students to tackle sophisticated digital landscapes.

At the same time, participants were worried about installation obstacles but worked simultaneously to reach their main goals. Towards the end of the interviews, the participants reported the existence of three main impediments: pushback from educational leaders (four participants), clashes with parents' technology attitudes (five participants), and insufficient technological resources in their future schools (all participants). However, Participant 5 stated "I want to teach complete digital citizenship education but lack of ability to implement programmes such inadequate Internet connection and strict online protocols at my department." As Participant 2 suggested, the realisation of online self-expression concepts should occur in accordance with cultural values, as Western digital citizenship approaches are insufficient in this context. These accounts show how teachers achieve their commitment to digital citizenship teaching by understanding what institutions will allow through the lens of observations in Pakistani education practices.

Discussion

Contextualizing findings within Pakistan's socio-cultural landscape

The participants' experiences revealed three key educational challenges that should be focused upon in Pakistan's teacher training programmes. Digital citizenship education without a curriculum leads teachers to create critical deficiencies in key topics, such as data privacy knowledge and fact verification, that are taught in classrooms across the country. The phenomenon of digital citizenship policy lag results in the lack of current-day digital solutions in the present educational guidelines. Since they do not have exposure to topics that go beyond their own experience, the participants develop mixed experiences and use personal learning experiences and trial-and-error exploration. With the experiential inequity between their backgrounds and those of the educators, digital divides are created because teacher quality relies on the individual digital access rather than standardised educational mechanisms (Butt & Park, 2024).

The study revealed crucial cultural barriers because participants faced challenges in applying worldwide digital citizenship practices to their Pakistani cultural background. A conflict exists between traditional and digital teaching methods, but it runs deeper than that because Pakistani education needs culturally sensitive digital citizenship models. Western digital citizenship models tend to fail when applied to non-Western cultural environments (Jeffery et al., 2021). Student, parent, and educator knowledge gaps go beyond technical shortcomings because they demonstrate how social structures intertwine with educational methods and social values which require multiple-level interventions in teacher training programmes (Rizvi, 2023).

Comparison with existing literature

The research results validate previous studies on digital citizenship education for pre-service teachers in Pakistan and comparable educational settings. The discovered curriculum gaps match Raza et al. (2023) observations of deficient digital citizenship training in Pakistani teacher education, yet they provide comprehensive phenomenological comprehension of educator experiences regarding these deficits. The participants' use of informal learning pathways for digital citizenship parallels Durmuş Cemcem et al. (2023) study but delivers a more detailed view of the professional and emotional dimensions of unstructured preparation.

The intricacy of the process by which cultural adjustments to women in pre-service training need to navigate is presented by this study as a new insight, although such practices have not been documented in previous research. This study shows that pre-service female teachers choose to balance professional needs with cultural demands, instead of facing the passive barriers put forth by NCSW (2023) with the finding that such digital access challenges vary based on gender. Given that participants prefer diverse learning opportunities that encompass cultural values in saving digital capabilities, it is necessary for decision-makers to provide integrated digital services. The work of Jamal and Rizvi (2023) provide evidence that rather than developing the digital citizenship frameworks based on the standardized educational approach, we develop the ones which are situated within the cultural context.

Implications for Teacher Education Programs

The research results have multiple important implications for teacher education systems to close digital citizenship knowledge deficiencies. It is time for technical skill development programmes now outdated and programmes for teacher preparation to become the main focus of curriculum developers programming for teacher preparation. According to Richardson and Milovidov (2019), the most effective way of educating digital citizens is in an integrated form in other subjects rather than a technology distinct course. Teacher educator should show how digital citizenship should be

taught, instead of only lecturing, because it corresponds to the concern raised by participants on pedagogical practices.

The findings of this research imply that programmes will need to develop frameworks in which relevant cultural variables will be applied to the negotiations already occurring in such research. Therefore, teacher education programmes must create local digital citizenship strategies for Pakistan to welcome Pakistan's cultural heritage and prepare teachers to participate in global digital interactions. To address the issues of infrastructure related to Internet accessibility, programmes must find solutions using digital citizenship resources alongside mobile learning methodologies. Pre-service teachers need to be taught digital advocacy in departments. Therefore, gradual modification of practices should be replaced by a comprehensive reformation of teaching practice so that female pre-service teachers will have adequate skills when they teach digital citizenship within the Pakistani educational system.

Conclusion

Using the interpretative phenomenological methodology, the research revealed large digital citizenship knowledge deficits among the Pakistani female pre-service teachers owing to educational conditions, societal traditions, and personal learning experiences. They also overlapped conflicting traditional beliefs and digital skills and received professional training, leading to major learning deficits. They received inadequate formal instruction in digital citizenship and used personal experience as their basis for the development of digital citizenship which caused the unequal distribution of the knowledge of digital literacy. This research shows that all the individuals in it showed their uncertainty of the digital citizenship education skills but also considered that their skills are very important for their future students. Pre-service teachers reported having positive intentions for delivering digital citizenship education and accepting obstacles they foresaw for classroom implementation.

The research presents in-depth exploration through six participants from a single institution but lacks the capacity to suggest generalizability. The research sample consisted mostly of urban participants whose experiences might not represent pre-service teachers from rural areas. The research timing which occurred during participants' last year, may have highlighted specific concerns stemming from approaching professional obligations.

Future research must include various institution types across different geographical areas in Pakistan to develop a full understanding of teacher preparation in digital citizenship. Follow-up research with prospective teachers from their training to their initial teaching careers would demonstrate how recognised educational deficits materialise in their early classroom conduct. The development of cultural digital citizenship frameworks by teacher education programmes must include specific framework recognition for the Pakistani context, along with global digital environment preparation. The curriculum requires a digital citizenship framework that connects this theme to all subjects, rather than creating dedicated technology courses. Teacher educators require specialised training to develop their digital citizenship competencies to serve as strong examples to their students. The government should invest specifically in higher education facilities for women to overcome the structural limitations that prevent digital citizenship education.

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