Nursing students' perceptions of using smartphones in the community practicum: A qualitative study

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ABSTRACT

Background: Smartphones have the potential to revolutionize the way in which nurses practice by facilitating access to evidence-based resources, however their integration in nursing practice remain variable. Millennials tend to be more comfortable with technology, yet find themselves limited in their ability to use smartphones within the context of clinical practice.
Methods/Data Sources: Using a qualitative descriptive design, we explored nursing students' perceptions of using smartphones in the community practicum. Individual semi-structured interviews were conducted and verbatim transcripts were subjected to data analysis.
Participants: The sample consisted of 8 undergraduate and graduate nursing students. Participants were recruited using a purposive sampling strategy.
Results: Students' narratives describe unclear expectations regarding the use of smartphones that force them to adopt individualized strategies to maintain their professional image and avoid negative consequences.
Conclusion: A cultural shift will be required at the academic and organizational levels if we are to foster acceptance of smartphones in community practice going forward.

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1. Introduction

Today, we all use smartphones and other mobile Information and Communication Technologies (ICTs) for a variety of social and professional purposes. Being small and easy to carry, smartphones facilitate mobility as well as flexibility for information retrieval (Mosa et al. 2012). These attributes make them an interesting tool for clinical nursing practice and education, where access to evidence based material is necessary to ensure the best possible standards of care. This may be especially true in a context of community practice, where students are often lack access to information resources and may be required to make clinical decisions in the absence of peer support (Doran et al. 2007; Elfrink et al. 1999; Ndiwane 2005; Pearce et al. 1999). Smartphones have the potential to help address some of these challenges by facilitating access to a staggering number of mobile resources: current estimates indicate that no less than 100,000 medical applications are available online for the major smartphone operating systems (Hussain et al. 2015). Although a number of studies support the integration of mobile ICTs in nursing curricula (Altmann and Brady 2005; Farrell and Rose 2008; Morris and Maynard 2010; White et al. 2005), few have explored the matter from the perspective of community practice, and the integration of mobile devices across practice settings remains variable (Lamarche et al. 2014).

2. Background and Literature

The use of mobile ICTs in clinical practice emerged as a result of the development of applications targeted for physicians and designed to support diagnostic processes (George et al. 2010). Forward thinking nursing bodies followed this trend, supported by emerging literature suggesting that the use of mobile ICTs may promote patients' safety through enhanced access to evidence-based resources (Bakken et al. 2004; Gorelick 2010; Doran et al. 2010; Johansson et al. 2012; Zayim and Ozel 2015) and reduction of medication errors (Greenfield 2007; Doyle et al. 2014). For nursing students in clinical environments, studies have indicated that the use of mobile devices saves time (Johansson et al. 2012; Kuiper 2008) and promotes self-efficacy (Kuiper 2008; Goldsworthy et al. 2006). Furthermore, mobile devices may foster anytime and anywhere interactions between students and instructors, reflecting a communication paradigm that is better aligned with the

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habits of millenials (Strandell-Laine et al. 2015). Nursing associations across North America have acknowledged this change in technological landscape and have made the recommendation that nursing curricula ought to promote and develop skills related to the use of mobile ICTs (Nagle et al. 2014; Canadian Association of Schools of Nursing 2012; American Association of Colleges of Nursing 2008).

The literature exploring the use of mobile devices by nursing students has largely focused on students learning in acute care settings. These studies have reported on measures of usefulness, indicating that students found the devices to be useful in fostering clinical efficacy, supporting decision making, and developing competencies (Chioh Mei et al. 2013; Williams and Dittmer 2009). They were also perceived to reduce nursing students' sense of isolation and stress during clinical practica (George et al. 2010; Strandell-Laine et al. 2015; Johansson et al. 2014). The students in these studies found online mobile resources to be more useful than traditional textbook resources, and were more likely to use evidence-based resources (Kuiper 2008; Williams and Dittmer 2009). Drug reference guides and best practice guidelines were perceived as the most useful resources accessible on a mobile device (Grabowsky 2015).

In community settings, the use of mobile ICTs has been under-studied compared to acute settings. Many studies included community-based students as a subset of larger samples of students learning in hospitals; however few have explored the use of mobile devices in settings where access to computers and other information resources may be limited. Nevertheless, the results from these few studies indicate that such devices were perceived as useful in those settings. Students felt that access to a smartphone or a similar device improved their time management and was helpful for medication calculations and drug administration (Guillot and Pryor 2007). Unlike computer access, geographic dispersion did not have a negative effect on smartphone use: students learning in remote locations were just as likely to use a smartphone and did not list Internet connectivity as a barrier (Grabowsky 2015).

In three mixed-method studies, Wu explored nursing students' perceptions of using tablet computers in the context of a public health practicum course (Wu 2013; Wu 2014a; Wu 2014b). Students expressed that the tool enhanced data collection processes, facilitated quick retrieval of evidence-based resources, and was convenient to prepare material ahead of educational activities with the clients. Combined with a social media application, the tool allowed students to engage in self-criticism and to review their work outside of practicum hours. Students indicated that the tool helped with reducing their stress, providing real-time instructor support, and enhancing their confidence with professional skills. The challenge with these studies is that they report on students' perceptions of using specific pre-approved mobile applications and may not reflect students' everyday use of mobile devices outside of a controlled study environment.

In summary, the use of mobiles devices is compatible with student learning in acute hospital settings and may have significant implications in community nursing education. To take advantage of mobile ICTs in community nursing education, it is important to secure an understanding of students' perceptions of using these technologies in community practice.

3. Design and Methods

The study used a qualitative descriptive approach and began after receiving ethics approval. A purposive sampling strategy was used to recruit undergraduate and graduate nursing students, who were eligible to participate provided that they were enrolled in a community practicum that included experiences in community settings beyond hospitals and large institutional sites. The students who volunteered to participate and met the inclusion criteria were reminded of the confidential nature of their participation, and were invited to fill a short socio-demographic questionnaire. Written consent was obtained from all

participants. Individual semi-structured interviews were conducted at an agreed upon location on campus, at a time when all participants had experienced several hours of exposure to their respective community placements. A set of sample questions was prepared ahead of the interviews, and the participants were asked to elaborate on questions such as "how do you believe smartphones affect your experience in the community practicum?" or "what do you think other students' perceptions are regarding the use of smartphones in the community practicum?" The interviews, which lasted between 45 and 60 min on average, were audio-recorded and transcribed verbatim.

An inductive approach described by Elo and Kyngäs (Elo and Kyngäs 2008) was used for data analysis. Each interview was supplemented with field notes and was read through repeatedly so that insights could emerge from complete familiarity with the data. Special attention was paid to detect persistent words, phrases, and ideas. A process of open coding followed, in which captions were assigned to as many segments of the transcripts as necessary to describe all aspects of the data. The codes were organized into categories and themes that captured similar concepts, from which descriptive statements were formed and supported by quotes from the transcripts. This process was repeated until a consensus was reached between the researchers.

Appropriate steps were taken to enhance the trustworthiness of the study. Credibility was established through a process of member checking. To address confirmability, dependability, and transferability, the researcher wrote reflexive notes immediately after each interview, documented personal feelings, insights, possible biases and preconceptions, and committed to a detailed description of the research methods, participants, and settings.

4. Results

The sample ($n = 8$) comprised Bachelor of Science in Nursing (BScN) students ($n = 4$), Bachelor of Nursing Integrated (BNI) students ($n = 2$), a Masters of Science in Nursing (MScN) student ($n = 1$) and a Nurse Practitioner (NP) student ($n = 1$). All participants were females aged between 22 and 28. The students' practice settings included home care ($n = 3$), school health ($n = 1$), a homeless shelter ($n = 1$), outpatient clinics ($n = 2$), and primary care ($n = 1$). At the time of the interviews, the students had completed between 44 and 825 h (median $= 108$) of practicum. All participants reported owning a smartphone, which they carried with them in the community practicum. All participants reported using their smartphone at least once per day of community practicum for purposes related to the internship experience.

Students' perceptions of using smartphones in the community practicum can be described along a context continuum (Fig. 1): the contextual variability from one setting to another in terms of their support of the use of smartphones causes nursing students to adapt their use of technology depending on their perceptions of acceptability. At one end of this continuum, students working in environments that do not support the use of smartphones experience fear of negative consequences to their performance evaluations when using their devices and thus refrain from using them, which they believe may lead to unharnessed potential. On the other end, environments that embrace the use of smartphones are perceived by students to promote autonomy and accountability, and to lead to favorable patient outcomes. Students' narratives describe a "stuck in the middle" zone, where there are unclear and non-explicit expectations regarding the use of smartphones. The lack of contextual clarity forces them to adopt individualized strategies to maintain their professional image and avoid negative consequences.

4.1. Non-supportive Environments

All students expressed internalizing institutional policies experienced in current or previous settings that forbid the use of smartphones.
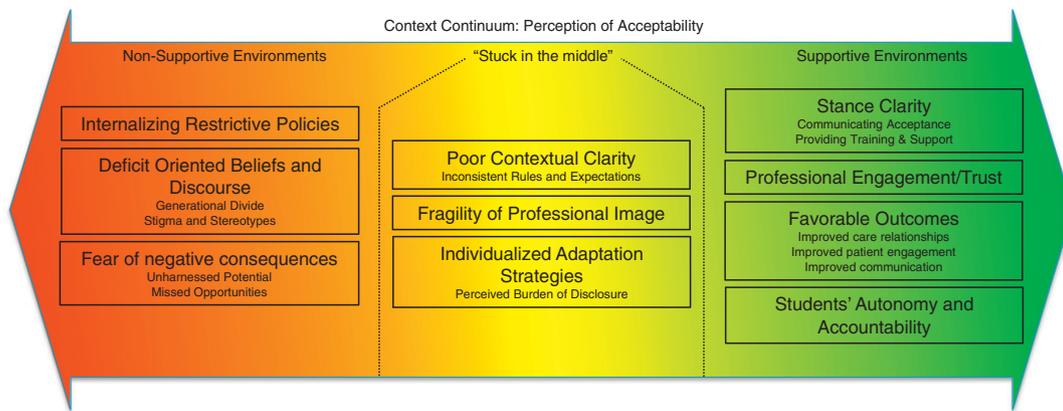
Fig. 1. Nursing students' perceptions of using smartphones in a community practicum.

One student described how these policies influenced her perceptions of using technology in subsequent placement settings: "I had a lot of teachers that forbid us to use our phones during [practicum]. They would say that it's not OK, it's not polite to use them and, sometimes they can be really severe about that. So maybe that just stayed with me as I continue my education". Students therefore thought it was inappropriate to use a smartphone knowing that many healthcare institutions forbid their use. Half of the students believed that such restrictive policies are partly rooted in legitimate concerns for patients' safety (e.g. concerns for microbial spread), however some felt that restrictive policies were at times rooted in archaic beliefs: "I remember in the hospital […], people used to believe that using phones could crash all of the equipment or medical devices".

All students have expressed the perception that in non-supportive settings, the discourse around the use of smartphones is either absent, or is deficit driven. One student explained: "There's always these bad things that are coming up with [their] use, but they don't explore what's the good things that could be done with your phone". They all felt that the deficit-driven nature of the discourse surrounding the use of smartphones was related to stigma and stereotypes. One student explained: "I think it's like a stigma, that phones are the new zombie thing […], people walk and they're holding their phone, their social lives are in their phone, their entertainment is in their phone". All students agreed that in today's contemporary world, the widespread use of social media and personal devices for private purposes creates an aura of non-professionalism around mobile communication technologies.

Furthermore, students expressed the idea that stigma and negative stereotypes create a generational divide between students, patients, and healthcare professionals. Most students thought that older patients might perceive the use of smartphones as impolite, disrespectful, or unprofessional. Likewise, they felt that older nurses or preceptors might not be 'friendly' with technology and have negative perceptions of students using a smartphone, and that older professors were sometimes "old-school" and resistant to technology. One student said: "I think there's this perception that younger people spend all day on their phones, and [it's] not productive, it's not professional, just social. [There is] a negative perception of say someone younger on their phone in a clinical setting when they're supposed to be caring for people".

The process of internalizing restrictive policies and a deficit-oriented discourse led students to fear negative consequences that may result from their use of a smartphone. Rather than expressing concerns for patient safety, the students were afraid to tarnish their professional image or to be penalized in their performance evaluation. One student, speaking of restrictions around the use of smartphones in some settings, expressed that "you don't want to do anything wrong, […] if there are consequences on your grades or your opportunities of working in this

institution because you broke the code, you didn't respect the rules, then it's something else that you have to consider". The students thus refrained from using smartphones in those environments perceived as non-supportive.

Ultimately, all students perceived that smartphones' potential in clinical education remains largely unharnessed. They felt there may be missed opportunities to provide better care with enhanced access to evidence based materials, to engage with patients through the use of educational media, and to enhance communication between students, faculty, and healthcare workers. One student shared that as long as she can get her patient's approval, she doesn't think the use of smartphones should be restricted: "If you just prohibit before even asking what is your opinion about it, you're just losing this opportunity to give better care".

4.2. Supportive Environments

Supportive community organizations were described as having a clear stance on the use of smartphones. Some students felt it should be the organization's responsibility to communicate their stance: "the best option really would be that the institution actually promotes the use of smartphones in the setting", whereas for others, it was a matter of setting the tone with their preceptor: "for me to be able to just go on my phone, I have unrestricted access to that, I've cleared it with my preceptor".

When describing examples of using a smartphone in the community practicum, all students used expressions that emphasized how valuable the devices appeared to them. They used phrases such as "I have the whole world at my fingertips", and "I can check everything in a timely fashion, so that I can go on with my day", highlighting the value of having information readily available. Supportive environments were perceived as settings that recognize and communicate the value of mobile technologies, environments that "support the fact that it's actually helpful, it's helping you study and learn" and recognize that "it's actually a tool for learning, not just a tool for social media". All students agreed that in order for community settings to move towards acceptance of mobile technologies, provision of training or advice should be seen as essential. "I think just training or incorporating that into our studies would be great, because more and more we're finding students use their personal electronic devices everywhere".

Supportive environments were also described as one where students' professionalism wouldn't be constantly under scrutiny; one where it is "not seen as unprofessional to use your phone; […] it's actually helpful, it's helping you study and learn". In those settings, staff and students alike use smartphones for professional purposes: "the majority of the people I've worked with, they all use their phone, like the doctors, the residents, the nurses as well". The perception of hospital settings was different: "in the hospital it was a different reaction, there was

more negative feedback, you didn't want to pull out your phone as much". Students practicing in supportive settings felt more engaged and felt that supporting their need for information with the use of a smartphone did not compromise their professional image: "it's really nice to be able to address information needs at the bedside, when it's happening. [I'm] constantly having to look things up, and I find if I can do it on my phone very easily, very quickly, it looks more professional than me taking out my notebook and flipping through pages".

Acceptance of smartphones was perceived to help maintain care relationships: "[Using a smartphone] means I can spend more time with my patients, because I can be there with them while I'm looking this information up". Some students agreed that most patients are familiar with smartphones, making it an appropriate tool for patient education. They felt they could empower patients by showing them how to use their own smartphone to look for information relevant to their health: "I could use it as a tool to […] teach [patients] how to use different apps and show them about different tools, using their own devices".

All students expressed that smartphones can support their learning and promote positive health outcomes. One student crystallised this perception when describing her phone: "This is my bible in a tiny device […], it helps me find the kind of information that I need to provide best care for my clients". By using popular search engines, such as Google or Wikipedia, one student also felt she could get a perspective of the kind of information the patients have access to.

Students shared the idea that using a smartphone could improve their communication with their preceptor, with faculty, as well as with other students. One student mentioned using it to submit important documentation relevant to her community placement, while others described using it extensively to coordinate scheduling with their preceptor. The ability to communicate using a smartphone was perceived as a benefit and as a means to save time: "I'm able to communicate with my instructors or anyone I need to with ease, [it] really helps me save time".

When discussing relevance to their learning, students emphasized that smartphones provided them with independence and initiative. By having the ability to access information anytime and anywhere, they felt they could be proactive with their learning: "if I have a question I don't have to go look through it in my textbook later tonight, which I'll probably forget […] and will never know the answer". Some students spoke of autonomy and stressed the importance of information literacy skills in the development of critical thinking: "It promotes your autonomy, it promotes your skills of looking for information and being able to sort out what are good sources versus what are less good sources".

4.3. "Stuck in the Middle"

When describing current and previous practicum settings, students expressed a lack of clarity as to why institutions forbid the use of smartphones: "I don't know if it was more for distraction […], I'm not sure actually why they had the policy against cellphones". They felt that their setting's culture could at times be perceived as supportive of using smartphones, whereas in some cases it could also be perceived as non-supportive. One student only felt appropriate using her smartphone only in some circumstances: "I'm using it in the office, but otherwise I try not to carry it around in the [setting]". Students were concerned of being regarded as unprofessional: "I wish I felt that I was able to bring [my smartphone] and use it more easily without being concerned about the perception of my use".

Students' interactions with their preceptor and other healthcare staff were also perceived as a source of inconsistency, and served to guide the students' expectations. One student described this dynamic: "if I had a preceptor who has a smartphone, who used apps, who used texting, who used it to influence and impact her care, then I totally would be on board and I'd feel comfortable doing that as well".

In settings where expectations of smartphone use were unclear, students described feeling as though their professionalism was constantly under scrutiny. The recurring explanation as to why using a smartphone would be perceived as unprofessional was that: "people don't actually know why you're using your phone, you might be using it to look up something relevant, [but] you could be also texting someone". As a result, students were afraid to compromise their professional image when using smartphones. Among other explanations, students also expressed the perception that they may become too reliant on technologies. Furthermore, all students agreed that ethical concerns, such as privacy and confidentiality, contributed to the fragility of their professional image when using smartphones: "I think the reason why they don't want [students using smartphones] is that they are scared that confidentiality is breached". Thus, students resorted to individual strategies to maintain a functional balance in meeting their needs for information, while respecting a set of inconsistent and sometimes implicit rules.

In coping with a lack of contextual clarity, inconsistent expectation, and a hovering threat to their professional image, students consciously felt as though they needed to use strategies to demonstrate that they can be trusted with smartphones. Some of those strategies were as simple as adjusting the device's settings to avoid any distraction from texts, phone calls and social media. But for the most part, these strategies revealed a much more insidious pressure that is cast upon the students: "[I] know that it can look unprofessional so, I think a lot of it is using strategies to decrease client's, or patient's perception, and the perception of other health care workers, that this is unprofessional, I suppose. Strategies like making your use very apparent, or explaining what you're doing". All students in fact repeatedly expressed an impression that they had to make their use of smartphones apparent and to continually disclose what they were using them for, in order to gain trust in their setting. This constant need for disclosure was expressed as a sort of a burden: "unless you make it very apparent what you're doing, it can be difficult […], it can reinforce negative stereotypes, and give people a bad impression of you". This burden may ultimately discourage students from considering the use of mobile ICTs as a valuable resource.

5. Discussion

The results of this study corroborate many findings reported in the current literature. A number of previous studies have been identified in which students shared perceptions that unit culture complicated their use of mobile technologies (Doyle et al. 2014; Strandell-Laine et al. 2015; Pimmer et al. 2014). Students in previously published studies have also reported discreet use of mobile devices in front of staff or patients (Strandell-Laine et al. 2015), feared becoming reliant on or distracted by their devices (Airth-Kindree and Vandenbark 2014; Mann et al. 2015), or perceived that staff and patients assumed they were using the devices for personal reasons (Mann et al. 2015). Interestingly, one study had also documented student's perception that they were spending more time with the patients as a result of their ability to look up information at the point of care, and that they felt this improved the quality of care and enhanced patients' safety (Grabowsky 2015).

The students in this study echoed much of the currently available research in expressing the perception that using a smartphone in front of patients and staff compromised their professional image. Throughout the literature, students have persistently reported that they abstained from using their smartphone because they believed it was rude (O'Connor and Andrews 2015), made them look incompetent (Johansson et al. 2014; O'Connor and Andrews 2015), compromised privacy (Pimmer et al. 2014; Mann et al. 2015), or gave the impression that they were using the device for personal and social purposes (Pimmer et al. 2014; Mann et al. 2015). The recurring observation is that nursing students do not seem to associate the use of smartphones with the attributes of a professional nurse.

Where the image of an individual is associated with an expression of their status within an organization (Zhang et al. 2010), it is understandable that nursing students want to project a professional image that is

in-line with the image that they have formed of what constitutes a professional nurse. The students' construction of what constitutes a professional nurse is related in part with the image transmitted by their mentors, preceptors, clinical instructors, and by other nurses. These professionals model working methods, ideas, values and attitudes that shape students' identities as future professionals (Arreciado and Isla Pera 2015). What is taught to students, what they see or do in clinical placement is what will constitute their idea of a professional nurse (Arreciado and Isla Pera 2015). Hence it may well be that community nursing students see the use of mobile devices as useful if they perceive that people important to them in their jobs think they should use the technology, and if it involves a better image in the organization (Zhang et al. 2010).

In this study, several participants have suggested that training should be considered as a way to foster the integration and acceptance of mobile ICTs in the clinical practicum. A lack of training and support were frequently identified in previous studies as the most salient challenges associated with the use of such technologies (George et al. 2010; Kuiper 2008; Williams and Dittmer 2009; Grabowsky 2015; Pimmer et al. 2014). This absence is especially puzzling in light of the knowledge that students make extensive use of smartphones and other mobile devices in clinical practice (Grabowsky 2015). As previously noted, several professional organizations have advocated for the use of mobile ICTs to be integrated into nursing curricula. Students largely support this claim and believe that they would benefit from learning to effectively and professionally use these tools in the provision of nursing care (Grabowsky 2015; Mann et al. 2015). Where such training programs were implemented, successful implementation of mobile ICTs in the clinical practicum ensued, and students reported that they gained wider perspectives of the uses of technology in nursing care (Strandell-Laine et al. 2015; Jones et al. 2016).

Instigating change at the level of the curriculum may however be insufficient. Encouraging students to think critically about the uses and benefits of mobile ICTs may be in vain if the values conveyed in the classroom are not transferable to the practicum setting. Like nursing students, nurses ought to take part in formal learning activities aimed at developing a broad set of skills in media literacy and technological competency (Pimmer et al. 2014). The content of these learning activities should include the use and appraisal of reputable information sources (Doyle et al. 2014; Pimmer et al. 2014), appropriate use of social media (Jones et al. 2016), using devices in alignment with professional standards (Doyle et al. 2014), and thinking critically about professional experiences, online behaviors, and ethical practice (Pimmer et al. 2014). Nursing educators who receive similar training are also more likely to adopt mobile technologies and model their appropriate use in the clinical setting (O'Connor and Andrews 2015; Raman 2015). Fostering a culture of community care that includes a sense of normalcy about students' use of mobile ICTs may be better addressed by initiating this enculturation within the practicum settings where students will be shaping their nursing identity.

5.1. Limitations and Recommendations

Limitations to this study include a small sample size and the selection of participants from a single school of nursing. Although small and skewed towards undergraduate perceptions, the sample was representative of contemporary nursing student cohorts and provided rich data. It is difficult to assess whether the presence of male participants would have impacted the results. The sampling strategy increased the likelihood of self-selection bias, where students who communicated an interest to participate may have held particular views about the use of smartphones in community practice.

Moving forward, it may be important for researchers interested in the field of mobile ICTs to reach a consensus with regards to the terminology used to describe various mobile devices. Many studies have used the acronym for "Personal Digital Assistants" (PDAs), however we

believe that this appellation evokes technologies that are outdated and seldom used in today's world. A number of contemporary studies have recognized this discrepancy and elected to use other acronyms, such as "Personal Digital Devices" (PDDs) and "Advanced Mobile Devices" (AMDs), others yet have preferred to use "Handheld Computers". This lack of consensus in terminology may compromise the task of researchers looking to compile evidence from the literature in the future. In this study, we have made a decision to use the term "smartphones" as it better reflects the types of devices that participants reported using.

6. Conclusion

The popularization of smartphones has resulted in a cultural shift, creating anytime and anywhere access to information. These unique features provide unrestricted access to evidence-based resources that may serve to enhance students' knowledge and improve patient care. Clinical instructors and students alike should consider adopting smartphones to strengthen community nursing education and practice. However, this will require addressing many cultural barriers. This study provided a rich description of the range of contextual factors experienced by students and how these factors contributed to their perceptions of acceptability or disapproval of using a smartphone in the community practicum. Much of the research adopted a descriptive approach based on the students' self-reported perceptions, but this method provides only one viewpoint, that of students, which could be biased. Alternate perspectives, such as those of clinical instructors and staff nurses, patients, organizational management, and nursing faculty, could also offer valuable insights into the complexity of using mobile ICTs in the community nursing practicum. Future experimental studies may be needed to quantitatively measure the impact of mobile technologies on outcome variables such as therapeutic relationships, patient safety, students' sense of isolation in community environments, and clinical reasoning.

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