



Bridging the Gap: Social Networks and Professional Development in the Eyes of Prospective Science Teachers

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Abstract

Virtual social network platforms have rapidly become settings for cultivating various types of bonding, bridging, and building social capital. This promotes professional and personal relationships and has implications for our psychological wellness. Our qualitative study, which has taken place in the United Arab Emirates (UAE) and Oman, explored the perspectives of science teachers in training regarding the utilization of social networks for professional development (PD). We conducted 26 semi-structured interviews across both countries. Our results unveiled nuanced insights into the influence of social networks on the professional development of prospective science teachers, the challenges they face while using these means for networking, and how cultural norms and institutional factors impact learning, collaboration, and adoption of such virtual social systems. The findings suggest that social networks can serve as valuable tools for the professional development of prospective science teachers. Notably, there was a subtle divergence between the two groups. The UAE participants have emphasized global perspectives and valued insights into worldwide educational trends, whereas the Omani participants have appreciated the global perspective and prioritized local connections. Additionally, remarkable differences in technology access and infrastructure challenges between UAE and Oman teachers in training highlight the need for more equitable professional development opportunities. Emirati and Omani participants differ in their access to international educational trends and technology because of economic disparities. This could be translated into more resources for education and technological infrastructure, as the geographical location of the UAE as a global hub makes it easier to access global networks and trends. The implications of these findings point to the critical need for the effective use of social networks in the professional development of science teachers.

Keywords:

Social Networks;
Professional Development;
Prospective Science Teachers;
UAE; Oman.

Article History:

Received:	22	October	2023
Revised:	04	January	2024
Accepted:	16	January	2024
Published:	01	February	2024

1- Introduction

Education in the 21st century has undergone a fundamental transformation that was primarily driven by the pervasive influence of technology. Governments in both the United Arab Emirates (UAE) and Oman recognize this evolution as a pivotal point in their transition toward knowledge-based societies [1–4]. Still, how teachers are experiencing this transformation remains a concern.

Constructive communication in the current workplace between employees and stakeholders necessitates the enhancement of digital skills in schools [5]. Learners have transformed from being acquiescent spectators to agile users and collaborators who build, share, plan, and discuss knowledge in social networks [5, 6].

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DOI: <http://dx.doi.org/10.28991/ESJ-2024-08-01-014>

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Inside the education system, social networks fall within the concept of shared cognition [7, 8]. Worldwide, numerous platforms have become widespread in higher education [9, 10]. As per the findings by Mac Callum et al. [11], digital technology is both powerful and pervasive in providing teachers with a valuable tool to enhance teaching effectiveness. As they offer a new approach to shared cognition and learning, online social networks represent a platform of communication that shares information and ideas [12]. The rapid progress of virtual social networks has made learning more attainable and offers teachers new tools for enhancing both learning and instruction [13, 14]. Learners currently have various communication options with which they can experiment with objects of learning [15, 16]. On a global level, designers have been developing similar platforms for higher education [17]. Empirical research has documented that a substantial number of teachers use Facebook and WhatsApp for teaching [18–20]. They generally approve of using such platforms inside learning institutions, and most are favorable towards more usage of digital network sites from an educational viewpoint [21].

Given this worldwide trend, social networks are emerging as the new learning instruments for students and teachers inside the classrooms in both the UAE and Oman. Their respective governments encourage this educational innovation [22–25]. From 2009 onward, both countries experienced a significant increase in internet use, facilitated by undisturbed online connectivity and access [1]. Although governments have promoted platforms in learning and instruction [15, 22–25], the impact of social networks on the classroom experience and professional development has yet to be described by teachers.

For teachers, professional development can be conceptualized as any effort made in continuous learning [26]. Social network offers innovation in learning and instruction [27]. Some findings stress the need for teacher awareness and expectation of probable technical snags [28]. In the UAE, teachers prefer clear guidance on the usage of social networks and require training courses about what needs to be provided by the Ministry of Education [1]. Consequently, Lumen Learning [29] reveals key aspects of learning that have been emphasized by prospective teachers, such as (1) the significance of transferring learning to either future or new circumstances, (2) readiness and sequencing, and (3) academic achievement and curriculum content. Perspective research conducted by Powers & Green [30] on social networks in schools suggests a strong agreement on the adoption of social networks in the classroom among 52% of teachers in training. Another study by Greenhow & Askari [31] revealed that social networks improve individual experiences of learning and teaching, such as collaboration and building connections. Teachers consider online interactive networks as instrumental in fostering participation in international or national teaching projects, a cooperative platform to support education, and an environment that can be utilized to improve their professional and personal development [32].

Since the existing research has acknowledged the transformative potential of social networks in education [33–35], several crucial gaps remain unresolved regarding their specific impact on professional development [36–38], particularly for science teachers in the UAE and Oman. First, since much of the current literature focuses on teachers in general while neglecting the unique needs and perspectives of science teachers [39, 40]. Science teaching necessitates fostering inquiry-based learning and collaboration skills that are potentially well-supported by social networks but require further investigation within this specific context. Secondly, existing research often originates from Western contexts, which overlook the cultural and educational nuances of the UAE and Oman.

Despite the growing interest in social networks and professional development, there is still a significant knowledge gap about how these factors influence science teachers' practices and student-learning outcomes in the UAE and Oman. This study, therefore, has the potential to bridge these gaps by offering valuable insights into the role of social networks in shaping the professional development landscape for future science teachers in the UAE and Oman.

1-1-Problem Statement

The effectiveness of contemporary classroom instruction hinges significantly on continuous professional development for teachers across all tiers of the education system. However, notable challenges are obstructing the path to professional development for prospective teachers in both the UAE and Oman. Traditional professional development avenues, such as in-person workshops and conferences, often demand significant time commitments and financial resources. Moreover, such conventional teacher-training approaches frequently lack opportunities for participants to connect and network with experts and experienced teachers. In consideration of the UAE and Oman's dedication to delivering top-tier education in alignment with contemporary requirements, it becomes imperative to seek innovative avenues for professional development.

Within this context, the integration of social networks as a means to enhance teacher development presents a promising opportunity. Yet, there is a conspicuous gap in our understanding of the challenges and potential benefits associated with the use of social networks for professional development in the UAE and Oman, especially from the perspective of science teachers in training. That is, the transition from traditional modes of professional development to numeric platforms introduces challenges influenced by cultural norms, technological readiness, and pedagogical

approaches. While interactive networks have exerted a substantial impact on various aspects of modern society, their potential for enhancing teacher professional development has not been fully described [41, 43].

Within this context, several key questions emerge: (1) How do prospective science teachers in the UAE and Oman perceive the influence of social networks on their professional development; (2) What barriers do prospective science teachers encounter when utilizing social networks for professional development? And (3) In what ways do cultural and institutional factors impact learning, collaboration, the adoption of interactive virtual networks, and their overall effectiveness?

1-2- Significance of the Study

While previous studies explored similar themes using quantitative methods, our qualitative approach through semi-structured interviews offers a deeper understanding of participants' lived experiences and motivations. Acknowledging the role/use of digital network platforms, this study delves into the perspectives, experiences, and difficulties of social network use by prospective science teachers in the UAE and Oman. More specifically, the study explores the use of social network platforms such as Facebook, Twitter, WhatsApp, and YouTube, among others, in the classroom. In addition, the study could assist in shedding light on the preparedness of teachers in training and assist students in integrating their learning. This study aims to fill a research gap in the professional development of teachers in two high-income yet developing countries.

2- Literature Review

2-1- Theoretical Framework

The technology acceptance model (TAM) acknowledges and supports the integration of new technology for teaching and learning. TAM represents a theoretical approach that identifies both basic affective and cognitive factors in the acceptance of technology [43]. It posits that individual (behavioral) intentions determine technology usage and acceptance, which correspond to actual behavior. Behavioral intentions are dictated by individual cognitions regarding use. These are then ascertained by the perceived usefulness and user friendliness. Therefore, individual perceptions of benefit are explained by the magnitude to which users think that innovation will assist in achieving pedagogical tasks and objectives [44]. User-friendliness can be operationalized by how users explain the ease of handling and studying to work with devices.

2-2- Using Social Network Sites for Education

Social network sites are conspicuously featured in empirical and practical discourse within education [45, 46]. They are widely considered interactive technologies that enable the sharing of pedagogical interests, ideas, data, and other types of expression through virtual networks and communities [47, 48]. They also incorporate various tools and technologies [44]. Some research has focused on interactions within virtual platforms. A study conducted by Chugh & Ruhi [49] evaluated Facebook's use in higher learning institutions. It revealed a beneficial role in improving student engagement, student-teacher, and student-student interactions. Similarly, Henry et al. [50] found that healthcare students preferred asking questions and interacting with faculty members in closed social network discussion groups. Furthermore, social networks may support student self-efficacy in argumentation and discussion. For instance, in an English foreign language class in Oman, students and teachers used social media messaging apps to assist students in developing concept maps to facilitate argumentative and organized debates and engage in rapid revisions [51, 52].

Professional development in implementing social networks for pedagogical innovation has become essential. Even though 80% of teachers use social network sites for professional or individual purposes, less than 15% utilize them for teaching [53]. Moreover, 62% of the teachers expressed unwillingness to incorporate social network sites into their teaching practice [54]. Thus, compelling reasons for professional use are needed. These should incorporate not just how to integrate various types of social networks as instructional tools and methods into the curriculum but also ensure that students are safe and protected from passive learning, cyberbullying, manipulation, and identity theft [30].

The UAE has become the center of excellence in both research and education in the Middle East [55, 56]. The higher education sector in the UAE has experienced tremendous development in learning and teaching due to recent emerging digital technologies [57, 58]. The latest studies have revealed increased growth in the e-learning sector, with teachers, students, and other stakeholders integrating and delivering online applications in education [1]. In Oman, e-learning / online education have significantly improved over the past decade due to the broad availability of internet services offered to the public. It has become a commonly used and accepted component in tertiary education [15, 59]. A study conducted by Ahmed [51] showed that primary school teachers in Oman are inclined toward technology. They employ social network sites to improve student interest and engagement, especially in learning English language skills.

2-3-Prospective Teacher Perceptions of Digital Network Sites and Social Networks

Previous literature has focused on student perceptions and feelings with respect to using social network sites for education. A study conducted by Daniels & Billingsley [60] found that students feel confident about the influence of social network sites on their interactions, cognitive skills, and learning environment. Another study conducted by Fosu et al. [61] confirmed similar findings. A study conducted by Sari & Hasibuan [62] regarding student perceptions of social networks in learning Arabic showed that social networks enhance language expertise, make education more inspiring, and transform student views on language learning. A study conducted by Balliammanda [15] on the use of mobile technology in Oman by school students revealed that learners felt uncomfortable when they forgot to carry their hi-tech devices. This is likely because the devices have applications and features compatible with learning [15, 44, 63, 64]. In line with Tondeur et al. [65], teachers' beliefs regarding technology play an essential role in adopting and using technologies for learning and instruction. Most previous studies on social networks in education focused on learner perceptions [66]. However, one study conducted by Ajjan & Hartshorne [67] revealed that although many teachers knew the probable benefits of social network sites, many were not utilizing them. Current innovation and popularity have rendered them a vital component of professional development. In another study, Gruzdt et al. [68] utilized a reward-of-use method to conceptualize teacher decision-making on the integration and maintenance of social network sites in teaching. They discovered that teachers used social network sites to promote learning via collaboration and interaction, extend the learning environment, and expose learners to social interactions compatible with the concept of shared cognition.

By shedding light on the unique perspectives of science teachers in these countries, this study contributes to a deeper understanding of how social networks are used in educational settings and lays the foundation for future research.

3- Research Methodology

3-1-Participants and Research Design

The study adopted a qualitative phenomenological design with 26 prospective science teachers from the UAE and Oman. This design describes a wide range of perspectives and insights on the studied phenomenon. The study used semi-structured interviews in English, and each interview lasted approximately 30 minutes. The group consisted of 16 females and 10 males, aged between 21 and 28 years. All participants were currently enrolled in distinct teacher education programs within the UAE. A detailed breakdown of the participant demographic details is reported in Table 1.

Table 1. Participants' Demographic Information

Major	N	Gender	Place
Biology	3	Female (8)	UAE
Physics	2		
Chemistry	3		
Biology	2	Male (5)	
Physics	2		
Chemistry	1		
Biology	3	Female (8)	Oman
Physics	2		
Chemistry	3		
Biology	1	Male (5)	
Physics	3		
Chemistry	1		

3-2-Context of the Study

The two contexts, the UAE and Oman, were deliberately selected for several reasons. First, the UAE and Oman have distinct cultural and contextual backgrounds. For example, the UAE is known for its economic development and multicultural society, while Oman harbors a rich history and a unique cultural heritage. These distinct characteristics may result in varying approaches to technology and social media usage among teachers. Second, both countries have different educational systems, curriculum frameworks, and policies. The education system in the UAE has undergone

significant reform, focusing on innovation and modernization. Oman's education system has also undergone significant reform in recent years; the teachers often combine traditional classroom instruction with hands-on experiments and use technology as a teaching aid. In addition to textbooks, they utilize digital resources and educational apps to make lessons more engaging and relevant. Such discrepancies can lead to variations in how teachers engage with social networks for professional development. Third, both countries differ in the economic and socioeconomic factors that likely play a role in determining the availability of resources and access to technology. The level of technological infrastructure, internet access, and affordability of devices is favored in the UAE, which likely impacts how teachers in each country use social networks for professional development.

3-3-Data Collection and Analysis

The study used semi-structured interviews (see Figure 1) to allow individuals to express themselves in their own words about their opinions, feelings, and perceptions [69]. In this study, open-ended questions were designed to explore science teacher perspectives on the challenges faced, perceived benefits, and professional impact of social media use. We then conducted thematic analysis procedures in several stages: familiarization with the data, generation of initial codes, theme search, theme review, theme definition and naming, and production of the final report. The data was manually coded.

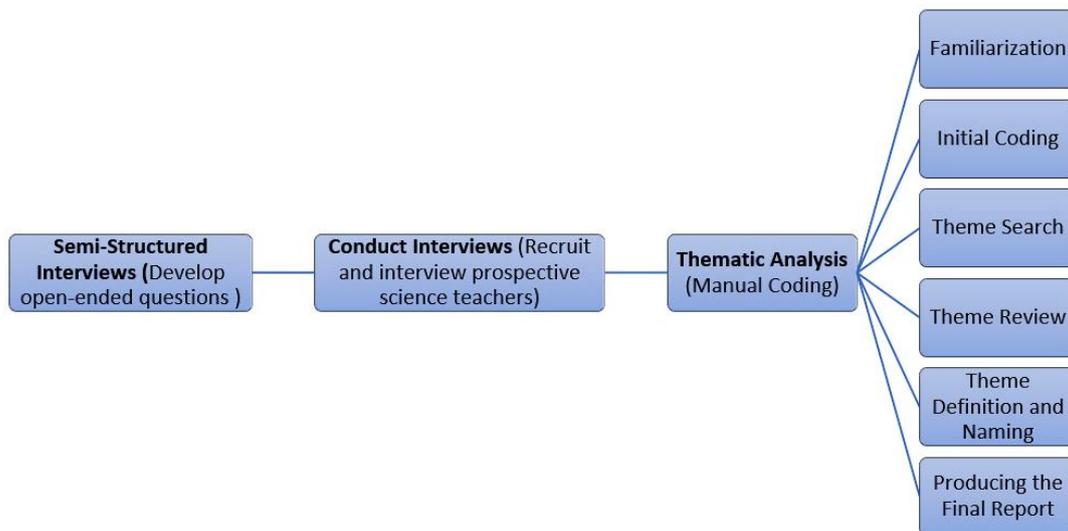


Figure 1. Study Methodology Workflow

4- Findings

Qualitative analyses occurred simultaneously during the data collection phase of the study to generate patterns and themes. As a result, reliable themes were derived using precise data synthesis techniques.

Two themes emerged in the analysis of the first research question: "How do prospective science teachers in the UAE and Oman perceive the influence of social networks on their professional development?"

- *Enhancement of teacher engagement*: This refers to the active participation, motivation, and commitment of teachers to professional development or educational activities. Strategies to increase teacher engagement can make learning experiences more interesting, relevant, and interactive (see Table 2).
- *Accessibility and Convenience*: This entails ensuring that content and services are easily accessible to a diverse audience with few obstacles and offering users convenient means to engage with technology.

The perceptions of prospective science teachers from Oman differed from UAE teachers regarding the use of social networks. Nevertheless, most teachers (21 out of 26) have expressed that using social networks would benefit academic learning (see Table 2). Teachers who considered using social networks for classroom material reported that such platforms facilitate more student involvement as an interactive learning method, as they felt more associated with the classroom environment. As reported in Table 2, teachers indicated engagement in learning methods that were relevant to their interests and needs. They expressed that they were involved in creating learning environments that were supportive and collaborative. Moreover, they were able to access educational activities regardless of background or circumstances. They appreciated the ease of obtaining, flexibility, and accessibility of information.

Table 2. Description of themes and their illustrative examples- Question One

Themes	Description	Illustrative Quotations from the Teachers
<i>Enhancement of Teacher Engagement</i>	It provides teachers with opportunities to learn in ways that are relevant to their interests and needs and creates learning environments that are supportive and collaborative. This may involve strategies to empower teachers to create more engaging, pertinent, and interactive learning experiences.	<ul style="list-style-type: none"> • “I find myself actively engaging in conversations, sharing my experiences, and seeking guidance. It goes beyond professional development; it encompasses personal development too.” • “Interacting with teachers from diverse backgrounds globally has widened my perspective. It goes beyond the effectiveness of methods in my local setting; it involves embracing global best practices.” • “Sharing my experiences and insights on social networks not only benefits others but also prompts me to reflect on my teaching approaches.”
<i>Accessibility and Convenience</i>	Accessibility pertains to the capability of every student, irrespective of their background or situation, to reach and engage in educational activities. The convenience with which students can acquire education is denoted as flexibility and ease of access.	<ul style="list-style-type: none"> • “Having the capability to review content, discussions, and resources at my convenience is a significant benefit, fostering ongoing learning.” • “Online learning can be tailored to meet the needs of learners with different learning styles and preferences.” • “It extends beyond accessibility; it embodies inclusivity. Online learning caters to diverse learning styles and preferences.”

Regarding research analysis of the second research question: "What barriers do prospective science teachers encounter when utilizing social networks for development?" two themes emerged:

- *Technological Challenges*: These signify the difficulties, obstacles, or issues encountered by individuals or organizations in using or embracing technology. Such challenges may encompass hardware and software issues, a lack of technical skills, security concerns, or any other factors impeding the efficient use of technology.
- *Pedagogical Alignment*: This refers to the process of ensuring that teaching and learning are both consistent with the best practices in education. This means that the content, methods, and strategies used in the classroom should be in tandem with the pedagogical principles, objectives, and goals of the curriculum.

As documented in Table 3, teachers from UAE and Oman described technological challenges and obstacles they faced when integrating technology into the learning process. They stated many examples, including issues such as limited access to technology, inadequate technical skills, and the need for ongoing practical support. On the other hand, they took into consideration the pedagogical alignment as a multifaceted process aimed at coordinating the curriculum and determining the most appropriate instructional strategies, and assessment methods to create a consistent and effective learning environment. From their general perspective, it was clear that accomplishing pedagogical alignment provides them with the skills needed to create a meaningful learning experience by maximizing the benefits of technology integration.

Table 3. Description of themes and their illustrative examples- Question Two

Themes	Description	Illustrative Quotations from the Teachers
<i>Technological Challenges</i>	The challenges encountered by students, teachers, and schools in the utilization of technology.	<ul style="list-style-type: none"> • “Occasionally, I struggle to allocate time for utilizing social networks for professional development. The demands of my teaching and other responsibilities often make it challenging to find additional time to acquire new knowledge and skills.” • “My inconsistent internet access makes it challenging to join online courses and webinars.” • “I lack confidence in how to utilize social networks effectively for professional development. I seek guidance and support on how to leverage social networks for effective professional development.”
<i>Pedagogical Alignment</i>	Pedagogical alignment involves ensuring that the curriculum, instructional methods, and assessments are harmonized to optimize the learning experience.	<ul style="list-style-type: none"> • “I leverage social networks to discover and engage with professional development opportunities that are directly relevant to my teaching practice, seeking new knowledge that I can readily implement in my classroom.” • “I harness social networks to seek professional development opportunities that are tailored to my students' needs. I aim to explore innovative teaching methods that can contribute to the success of my students.” • “I utilize social networks to identify professional development opportunities that align with my personal career goals. I intend to persistently engage in learning and evolving as a teacher.”

Two themes emerged for the research analysis of the third research question: "In what ways do cultural and institutional factors impact learning, collaboration, the adoption of social networks, and their overall effectiveness?"

- *Cultural norms and values*: These encompass the shared beliefs, behaviors, customs, and principles that define a culture or society. They influence how people interact, communicate, and make decisions within that culture.
- *Infrastructure and access to technology*: It is the ability to access and use the necessary technology to participate in online activities. This includes having devices, internet access, software, and other tools required for technology-enabled activities.

It was clear that cultural norms and values play a key role in involving teachers in technology and social networks for professional development (see Table 4). Many teachers were aware of the power their online presence can have to avoid content that may be considered unpleasant or culturally insensitive. They also were able to recognize the potential of social networks in linking them with teachers from diverse backgrounds and nurturing a rich examination of diverse cultural and educational settings. However, the extent to which teachers can benefit from these opportunities could be determined by the infrastructure and access to technology.

Table 4. Description of themes and their illustrative examples– Question Three

Themes	Description	Illustrative Quotations from the Teachers
<i>Cultural Norms and Values</i>	The commonly accepted beliefs and behaviors are deemed appropriate within a specific culture.	<ul style="list-style-type: none"> • "I'm mindful of the impact of my social network posts, avoiding anything that could be offensive or culturally sensitive." • "I leverage social networks to forge connections with teachers from around the globe, eager to explore their cultural and educational landscapes."
<i>Infrastructure and Access to Technology</i>	Encompasses the tangible and digital resources essential for schools to facilitate technology-enabled teaching and learning.	<ul style="list-style-type: none"> • "Intermittent internet access prevents me from fully engaging in online courses and webinars." • "As a science teacher at a well-resourced school, I have ample access to technology and time to leverage social networks for professional development. However, I perceive that the quality of professional development opportunities on social networks is inconsistent, and there is significant variability in the quality of the professional development opportunities offered on these platforms." • "As a science teacher at a remote school, I face technological constraints that hinder my ability to leverage social networks for professional development."

5- Discussion

Despite the small variation between teachers from the UAE and Oman, the social network descriptions were almost indistinguishable. The science teachers in training articulated that social networks improved their engagement in professional development, as they became active participants in discussions, shared their experiences, and sought guidance. Interacting with teachers from various backgrounds and cultures broadened their perspectives, allowing them to look beyond the success of their local teaching strategies and adopt international best practices. Teachers were encouraged to reflect on their teaching methods as well as help others by sharing their experiences and thoughts on social networks.

Social networks provide a space for prospective science teachers to share teaching strategies, resources, and ideas with a global community. By connecting with teachers from diverse backgrounds and locations, participants can gain new perspectives, learn about new teaching methods, and develop cross-cultural insights. This collaboration fosters continuous learning and knowledge exchange among prospective science teachers. Teacher participants valued the flexibility of being able to access diverse content, including webinars, articles, and video tutorials, at their convenience. They regarded this autonomy in learning as a notable advantage compared to conventional modes of professional development. Additionally, participants highlighted customizing learning experiences to match their requirements and interests, thereby enabling a more personalized path to growth. For example, prospective physics teachers expressed their potential use of Twitter and Facebook for sharing links to articles covering recent physics research, posting videos demonstrating physics experiments, and providing other resources pertinent to their student learning. Additionally, they underscored the exploration and discussion of online physics simulations, with platforms like PhET Interactive Simulations used in teaching specific physics concepts. Biology and chemistry teachers articulated their use of Instagram and TikTok for sharing images and videos showcasing scientific experiments, field trips, and various classroom activities. Employing platforms such as LinkedIn or dedicated communities for biology and chemistry teachers, they could exchange and deliberate on case studies pertinent to biology and chemistry education.

These findings are consistent with previous research on the use of social networks for pedagogical development among teachers. For example, Qalati et al. [70] found that prospective teachers in the UAE and Oman believe that social networks can facilitate their professional development. The researchers found that social networks can help teachers stay

informed about educational trends and developments, connect with other teachers and share resources, connect with experts in their field, and become more reflective practitioners. Trust et al. [71] observed that teachers who used social networks for professional development reported feeling more connected to the teaching profession, more confident in their pedagogical skills, and more aware of educational trends and developments. Both studies demonstrate how it can enhance student engagement and foster both student-teacher and student-student interactions. This study is also in line with Greenhow et al. [41]. In light of the promise to deliver top-level education in the UAE and Oman, it remains crucial to look for innovative techniques to foster pedagogical-development to be in line with contemporary demands.

Additionally, continuous professional development for teachers across all educational sectors might play a significant role in the perceived success of classroom instruction and retention of teachers. However, in the UAE and Oman, science teachers encounter a serious challenge when being involved in traditional avenues for professional development, as these approaches need significant time commitments and financial resources. This poses obstacles to the professional development of teachers and minimizes their opportunities to connect with experts and experienced teachers. Prospective science teachers from both countries voiced their worries about the challenges social network platforms would bring to classrooms. These challenges are diverse, including non-productive activities in class and continuous irrelevant distractions, which will be hard for teachers to observe and manage. Additionally, incorporating virtual interactive platforms in schools would transfer learning from the teacher to social network tools, contributing to less communication and interaction between students and teachers. Overcoming such challenges is a key factor to fully leverage the full potential of integrating social networks into professional development programs.

Our findings are consistent with previous research on the use of social networks for professional development among teachers. For example, Qalati et al. [70] found that prospective teachers in both UAE and Oman have difficulty using social networks for professional development...due to several factors: such as limited time, lack of internet access, technical skills, privacy concerns, and guidance. These challenges are similar to those faced by teachers in other studies, such as Slimi [72], who found that Omani teachers faced challenges such as limited time, lack of internet access, and technical skills. Despite the difficulties, the study conducted by Qalati et al. [70] identified that prospective teachers in the UAE and Oman appreciate the use of interactive virtual networks for professional development. They hold the belief that these have the potential to enhance their pedagogical potential and contribute to their career advancement.

Finally, teacher experiences were significantly influenced by cultural norms, values, infrastructure, and access to technology. Their online behavior was affected by cultural norms and values, which promoted thoughtful and courteous interactions on social networks. While this was going on, infrastructure and technological accessibility had an impact on teacher-skill's enhancement. Participants valued the opportunity to connect and share with experienced teachers and mentors on virtual social platforms. They were especially appreciative of the ability to seek out mentors from outside of their immediate location, which gave them access to expertise that might not have been readily and locally available.

A notable distinction surfaced regarding the accessibility of technology and infrastructure. Participants from the UAE generally had more favorable access to technology and dependable internet connections; whereas, those in Oman have encountered obstacles related to infrastructure. Although prospective teachers in the UAE and Oman both saw the value of international exposure through social networks, there was a slight difference in their focus. UAE participants placed a greater emphasis on global perspectives, appreciating the opportunity to learn about educational trends and practices from around the world. In contrast, Omani participants, while also valuing a global perspective, seemed to place a higher priority on connecting with peers within their own country. This difference likely reflects distinct cultural contexts and educational priorities between the two nations. This study highlights the versatility of social networks in meeting both local needs and global aspirations.

The findings of the study strongly support the concept of shared cognition [12, 73]. They also support the Technology Acceptance Model (TAM), which proposes that two key factors influence user intentions with technological innovation: perceived usefulness and user-friendliness. Participants perceived social networks as a useful tool for professional development because they allowed them to access and share resources, stay up to date on the latest developments in science education, connect with other science teachers, and learn from their experiences. Additionally, they perceived social networks as relatively easy to use. They were able to learn how to use social networks quickly and easily, and they found them to be a convenient way to connect with other teachers and access resources. This led to higher user intention to use it for professional inspiration.

In conclusion, the incorporation of social networks presents an opportunity for future science teachers in the UAE and Oman to improve their pedagogy. It offers chances for greater accessibility, convenience, and engagement in their educational experiences. To fully obtain the benefit, it would be essential to offer technological support and make sure that pedagogical congruence is achieved. A supportive environment for efficient virtual platform use should take into account cultural norms, values, and access to infrastructure. Our findings shed light on how to move forward in utilizing digital platforms that support pedagogical skills and inspiration.

6- Conclusion

The outcomes of this study hold several important implications for the education sector, policymakers, and science teachers in both countries. First, this study elucidates the digital literacy among prospective science teachers in both the UAE and Oman. Armed with this insight, policymakers and teachers can tailor training programs that encourage digital skills while promoting responsible usage of social networks as tools. Second, a comparative analysis of the viewpoints held by prospective science teachers in the UAE and Oman unveiled intriguing cross-cultural differences or similarities. These findings could prove invaluable for educational research and may also provide ideas for policies and future strategies for international collaboration and exchange among teachers. Third, this study has the potential to spark further exploration. For instance, it might instigate subsequent studies into the actual usage patterns of social networks for professional development among teachers and their consequent impact on teaching methodologies and student outcomes. Furthermore, it might be a stepping stone for what lies beyond the UAE and Oman and seem pertinent to other nations grappling with similar challenges and opportunities in the realm of teacher training. Fourth, it is recommended that teacher training incorporate objectives and content on the effective utilization of virtual interactive platforms. This proactive approach will empower prospective science teachers with the requisite skills and knowledge to harness the myriad advantages offered by social networks. Lastly, schools and educational institutions should facilitate both teacher and student access to virtual support systems for teaching and learning. This might involve granting workday access for engaging with social networks as well as providing financing for training to cover the costs of online courses and workshops.

6-1-Recommendations

In line with the findings and the implications presented above, the following recommendations are suggested:

- Although several studies related to the impact of the introduction of social network platforms on classroom environment and student learning, government support for social networks for the professional development of teachers in training seems essential. A systematic approach is needed to assess whole-school technology applications with recognizable success criteria for implementation.
- The study showed that most teachers are willing to participate in training to facilitate the implementation of social network platforms in the classroom. Therefore, it would be necessary for instructional trainers to have sufficient knowledge, adequate training on social network platforms and become solution providers when dealing with institutional guidelines and policies. Also, the training should be tailored based on the individual's needs and demands. Therefore, auditing their professional priorities and needs should be accompanied by congruous continuing opportunities for training and innovation.
- To encourage more teachers to participate in the professional development program for social networks and ensure they have positive perspectives, both governments should consider giving incentives to teachers who have participated in the required training. Incentives should encourage reluctant teachers to join the training.
- The schools need to adopt rules and regulations for social network platforms to caution users of the impacts of distraction and misuse. Also, it is essential to teach users about the inappropriate use of social network platforms by organizing lectures or workshops.
- Schools should involve parents in initiatives on social network platforms, as they play a significant role in supporting students at home. They can be involved through regular meetings with teachers to showcase important information regarding learning projects on innovative platforms to maximize learning and instruction.

7- Declarations

7-1-Author Contributions

Conceptualization, K.A. and L.S.P.; methodology, K.A. and S.A.; validation, L.R.; formal analysis, L.A. and L.R.; data curation, L.A.; writing—original draft preparation, K.A. and L.S.P.; writing—review and editing, S.A., H.T., and M.A. All authors have read and agreed to the published version of the manuscript.

7-2-Data Availability Statement

The data presented in this study are available on request from the corresponding author.

7-3-Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

7-4-Institutional Review Board Statement

Not applicable.

7-5- Informed Consent Statement

Informed consent was obtained from all subjects involved in the study.

7-6- Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

8- References

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