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# The influence of online education on pre-service teachers' academic experiences at a higher education institution in the United Arab Emirates

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Online education has gained widespread adoption in recent years due to several factors, including the COVID-19 pandemic, which has accelerated the growth of online education, with universities transitioning to online platforms to continue their activities. However, this transition has also impacted the preparation of pre-service teachers, who receive training to become licensed or certified teachers. This study investigates the influence of online education on the academic experiences of 130 pre-service teachers attending the Postgraduate Diploma Program at Al Ain University in the UAE. It also explores the relationships between pre-service teachers' demographics and five academic experiences. A quantitative questionnaire consisting of five newly-developed scales was used for data collection. Pre-service teachers' demographics were found not to impact effective teaching and learning, skill development, or satisfaction. Age and employment status were found not to influence pre-service teachers' views of faculty online assessment and feedback or course organization and management. However, online course organization and management and faculty online assessment and feedback were significantly correlated with marital status as engagement and motivation with employment status was, but not with age or marital status. Effective teaching and learning, faculty assessment, and feedback positively impacted pre-service teachers' engagement and motivation, while effective teaching and learning and course organization correlated with pre-service teachers' skill development and satisfaction. Research on online education and pre-service teachers' experiences post-pandemic is limited. Thus, future studies should explore this relationship to understand better pre-service teachers' online learning experiences, involvement, and success.

## KEYWORDS

pre-service teachers, online education, academic experiences, Professional Diploma in Teaching, United Arab Emirates, demographic characteristics

## Introduction

The widespread adoption of online education is variously attributed to technological advances, revolutionized delivery of educational content, and the flexibility and convenience of anytime, anywhere access. Enrolment in online education grew steadily for a decade in the United States, reaching 6.3 million students in 2016 (Jiang et al., 2019). However, many students and faculty members had little or no online teaching/learning experience until the

COVID-19 pandemic (Rajab et al., 2020), when growth accelerated as campuses closed and higher education (HE) institutions rapidly transitioned to online teaching platforms (Liguori and Winkler, 2020).

The pandemic also impacted the training and instruction of pre-service teachers on programs delivering the knowledge, skills, and experience needed to teach effectively. While the transition to online education has brought opportunities for pre-service teachers, impediments to its effectiveness include technical difficulties, unfamiliarity with online tools, and limited access to reliable devices and internet connections (Salifu and Owusu-Boateng, 2022), underscoring the need for effective online teaching strategies and support for students and educators (Okyere et al., 2022). For example, online education requires pre-service teachers to develop digital literacy and technological skills, such as proficiently navigating online platforms and adapting to video conferencing tools and learning management systems (Aristeidou and Herodotou, 2020). During the pandemic, Lee et al. (2022) report that pre-service teachers became more familiar with online technologies, enhancing their digital competencies to effectively transform course materials to online versions, deliver instruction, provide academic support to future students in virtual classrooms, and resolve technical issues. Thus, pre-service teachers' technological integration and competence will likely continue to expand and be an asset for their future teaching practices (Özüdoğru and Cakir, 2020).

Pre-service teachers worldwide face several hurdles during the shift to online education, such as problems related to internet connectivity, student engagement, and pedagogical abilities (Bunyamin, 2021; Gustine, 2021). However, additional issues become relevant while considering the particular circumstances of pre-service teachers in the UAE. A study by Mohebi et al. (2022) suggests that the socioeconomic and cultural disparities in UAE classrooms can present distinct difficulties during online practicum, in contrast to Western environments. Moreover, Emirati pre-service teachers may encounter particular difficulties associated with the presence of diverse students in inclusive classrooms (Saqr and Tennant, 2016).

Although research has shown that online teacher training programs effectively prepare pre-service teachers for inclusive teaching, it is important to note that the findings may not be widely applicable due to the small number of participants and the specific settings, such as private universities in the UAE. This highlights the necessity for doing more extensive research that considers a wider variety of institutions and participants to fill the research gap and comprehend the difficulties and possibilities encountered by pre-service teachers in the UAE. Examining the shift to online education for pre-service teachers in the UAE is important because it enables the customization of teacher education programs to suit the unique requirements of this setting. To better equip future educators for success in the UAE educational system, teacher education programs should focus on recognizing and tackling the distinct problems pre-service teachers encounter.

## Higher education in the United Arab Emirates

The United Arab Emirates (UAE) government has invested heavily in becoming a global HE hub, attracting foreign students through international branch campuses and programs (Karabchuk

et al., 2021). The COVID-19 pandemic impacted HE in the UAE as institutions adapted to online learning (Mukasa et al., 2021), compelling HE institutions in the UAE to switch to online learning to protect students' safety while continuing the broader transition to entirely online learning (Al Dulaimi et al., 2022). This impacted the academic experience of learners and teachers and the provision of educational continuity and quality (Omar et al., 2021). For example, the UAE Ministry of Education implemented a virtual learning initiative delivering financial aid, resources, and support for teachers and students to access remote learning tools and technologies such as tablets and laptops (Shah, 2023). It is significant that while COVID-19 accelerated the acceptance of online learning, it was not uncommon pre-COVID, when training programs and colleges began shifting toward more online, self-directed learning (Silkens et al., 2023).

Reforms to HE in the UAE, primarily in reaction to the pandemic, have also impacted the education of pre-service teachers. For example, in order to ensure that they receive essential practical training and assistance, it has been necessary to amend the methodologies and approaches of their training programs. The abrupt move to online/hybrid learning has significantly impacted the pre-service teacher observation and training components, according to Quirke and Saeed AlShamsi (2023), who explored a "phygital" community of interest, combining physical and digital components to enable pre-service teachers to provide reflective peer observation of teaching in online learning contexts within the UAE. This involved observing colleagues' teaching to provide constructive feedback, ensuring that pre-service teachers continue to receive beneficial practical instruction and assistance.

## The postgraduate Professional Diploma in Teaching Program

Al Ain University in the UAE offers a Professional Diploma in Teaching Program (PDTP) for holders of bachelor's degrees in relevant disciplines. Its curriculum of theoretical coursework and practical teaching experience covers a range of teaching-related topics, including educational psychology, assessment and evaluation, classroom management, curriculum development, and educational technology, emphasizing the development of the teaching skills these pre-service teachers will need. They are exposed to many pedagogical approaches and techniques and are urged to use what they learn in actual classroom situations. The PDTP strongly emphasizes how technology can be used effectively to enhance teaching and learning, offering pre-service teachers the knowledge and skills to design stimulating and dynamic learning environments. Its graduates should have the knowledge, competencies, and skills necessary to succeed in education and contribute to the growth of the sector in the UAE by working as teachers in a range of public and private educational settings. During the pandemic, Al Ain University had to shift the PDTP entirely online to ensure continuity of education for pre-service teachers, using platforms such as Moodle, Teams, and Google Classroom to deliver remote learning.

## Literature review

This section reviews literature on the challenges and advantages of online learning for pre-service teachers; the quality of online

teaching; engagement, motivation, skill development, and satisfaction in online education; and online education and pre-service teachers' characteristics.

### Challenges of online learning for pre-service teachers

The significant challenges for pre-service teachers of switching to online learning and adjusting to new platforms and technologies include poor internet connections, lack of enthusiasm, and increased stress (Zheng et al., 2021). They may have been affected socially and emotionally by the lack of face-to-face connection and physical classroom presence (Dergham et al., 2023). Some may also have been poorly prepared for online learning. In Kosovo, Nikoçeviq-Kurti (2023) found pre-service teachers had lower readiness in computer/internet self-efficacy, communication self-efficacy, and learning control.

Moreover, personal traits and individual variances can impact the effectiveness of online education. Kaspar et al. (2023) found that personality factors, educational attainment, and gender all significantly affected the online learning outcomes of university students during the pandemic, while anxiety was found to moderate pre-service teachers' inclination to use digital technologies. Thus, individual circumstances may influence the success of online education. Other challenges were related to the quality of online teaching and overall learning outcomes and satisfaction with online education. A qualitative study by Nikoçeviq-Kurti (2023) found that pre-service teachers encountered challenges including technological skills, unrealistic assessments, and students being overloaded with assignments not counted in final assessments. Some participants reported that the practical portion of online classes was entirely absent, despite its importance for them, while some educators lacked motivation when teaching online. Martin et al. (2019) discovered that faculty new to online education felt unprepared and required pedagogical and technological support, emphasizing the importance of pinpointing the skills needed to train faculty for online instruction.

### Advantages of online learning for pre-service teachers

Despite such difficulties, educators benefit from the flexibility of online learning, enabling them to reconcile their personal and academic obligations (Lemay et al., 2021). Online education is recognized for its effectiveness, practicality, and adaptability, allowing students to work at their own pace and in the setting of their choice, control their learning schedules, and access course materials (Zapata-Cuervo et al., 2021). Lemay et al. (2021) assert that pre-service teachers have benefited significantly from this flexibility because they frequently have other obligations, such as part-time work or family responsibilities, which online learning can help them to manage efficiently. Moreover, by fostering ownership and motivation, the flexibility and autonomy of online courses has helped pre-service teachers to engage in effective self-directed learning (Uyen et al., 2023).

Crucially, online education has allowed future teachers to advance their technological expertise (Ogbonnaya et al., 2020). Using learning technologies and online platforms enhances active learning, facilitates collaboration, discussion, and communication between pre-service teachers, their classmates, and educators, and allows them to exchange resources and feedback, thus improving the quality of education (Irfan and Asif Raheem, 2023).

### Quality of online teaching

Phillips (2021) notes that the transition from face-to-face to online pedagogies presents challenges and opportunities for postgraduate students who are themselves teachers. Therefore, HE institutions must ensure robust and flexible pedagogical practices to deliver quality teaching and learning. Effective online teaching of pre-service teachers requires faculty to have a comprehensive understanding of pedagogical principles and the ability to create interactive and engaging learning experiences. Among insights into the best strategies and practices for effective teaching in online education, Byrka et al. (2022) list 12 principles for effective online teaching in postgraduate education, covering course design, lecture readiness, assessment and feedback, and student engagement. Educators must also acquire appropriate technological skills for effective online teaching and learning (Biedermann and Ahern, 2023). According to Ramaila and Mavuru (2022), online education gives pre-service teachers sustainable development opportunities to boost their capacity to implement online teaching and learning. Effective teaching of pre-service teachers also requires the ability to create engaging and interactive learning experiences. Engagement entails enthusiastic participation and immediacy of communication, using applications and platforms such as online forums to facilitate dialog and interaction (Mendelowitz et al., 2022) and reduce anxiety, essential to enhance postgraduate students' learning experience (Kumar and Verma, 2021).

Moreover, effective teaching and learning in postgraduate diploma programs, particularly online, requires careful planning, clear alignment of objectives, and innovative pedagogical approaches, to help pre-service teachers understand what is expected of them while enhancing their learning experience, which varied during the pandemic. Rafiq et al. (2022) found that pre-service teachers of English as a foreign language varied in readiness for online learning and in technological/pedagogical content knowledge. A study of pre-service English teachers in Hong Kong found that online education provided limited opportunities for immediate and extensive feedback (Atmaca, 2023). Yildirim (2022) explored 72 pre-service teachers' perceptions of online education during the pandemic, finding that 80% considered face-to-face classes more productive. Participants identified contributory factors including internet connection problems, digital literacy, readiness for online learning, lack of communication and interaction, lack of motivation and self-regulation, and feedback mechanisms.

Among research into the effects of the epidemic on online instruction, Khoiriyah et al. (2022) found that collaborative lesson planning improved pre-service teachers' motivation and self-efficacy and shaped their professional identities, illustrating the importance of considering their specific knowledge and skills and the required professional development.

Assessment and feedback are important in guaranteeing the quality of teacher education programs, particularly online. COVID-related changes to online teaching/learning have introduced obstacles and opportunities for faculty to assess and deliver feedback to pre-service teachers. In India, Joshi et al. (2020) examined the impact of the pandemic on instructors' attitudes toward online teaching and assessment, identifying challenges including lack of technical support and awareness of online teaching platforms, security concerns, and personal issues such as technical incompetence, negativity, and weak enthusiasm. Having examined faculty readiness for online crisis

teaching during the pandemic, [Cutri et al. \(2020\)](#) concluded that they must have adequate training and resources to transition effectively.

## Engagement, motivation, skill development, and satisfaction in online education

Numerous research studies have found the engagement and motivation of pre-service teachers to be significantly impacted by online education. [Uyen et al. \(2023\)](#) found that the incorporation of online project-based learning into teacher education during the pandemic positively affected how pre-service teachers developed their knowledge, professional abilities, and learning attitudes. However, it also presented difficulties for educators, such as the need for teachers and students to possess the necessary knowledge and abilities and access to facilities and technology.

Motivation and engagement are influenced by attitudes and preparedness. [Düzgün and Kaşkaya \(2023\)](#) report that pre-service teachers' views of online instruction were more positive in certain programs, such as social studies and early childhood education, than in others, while [Chibisa et al. \(2022\)](#) found that pre-service teachers' perceptions of the usage of online learning influenced their readiness to adopt it, concluding that for online learning to be implemented successfully, pre-service teachers' attitudes must change. According to [Atmaca \(2023\)](#), the effectiveness of online education could be improved by raising the caliber of online learning platforms and the instruction given to pre-service teachers and their educators. [Malabanan et al. \(2022\)](#) established that pre-service teachers had the pedagogical skills necessary for the 21<sup>st</sup> century and were prepared for online learning. Similarly, [Uyar \(2023\)](#) concluded that pre-service teachers had 21<sup>st</sup>-century skills at high level.

## Online education and pre-service teachers' characteristics

Several studies have investigated the effects of demographic factors including age, employment status, gender, and marital status on pre-service teachers' academic performance, knowledge, and skills. While no research has been identified as specifically addressing these in the context of the UAE, there are pertinent studies of how demographic factors affect teaching methods and online academic experiences in general.

One such factor is age. [Yang et al. \(2022\)](#) found that younger people frequently possess greater technological knowledge and expertise, which can enhance their online learning opportunities. They emphasize that other characteristics, such as digital competency and access to technology, may nonetheless have more impact on online academic experiences.

Another demographic factor, albeit rarely examined, that may affect online academic experience is marital status, whose influence may extend to educational ambitions. Married people, for instance, may have obligations and responsibilities that limit their capacity to engage in online learning ([Chen et al., 2021](#)).

As to employment status, working people may struggle to balance their academic goals with their professional obligations, especially in an online learning setting, and they may have different reasons for wanting to pursue an online degree and different objectives, which can affect how engaged and satisfied they are with the learning process ([She et al., 2021](#)).

Gender has also been found to affect teachers' attitudes toward online learning and digital competencies ([Yang et al., 2022](#)). [Yalley](#)

[et al. \(2022\)](#) found that pre-service teachers' demographic characteristics, including program of study, gender, and major and minor areas of expertise, were important predictors of technological competence.

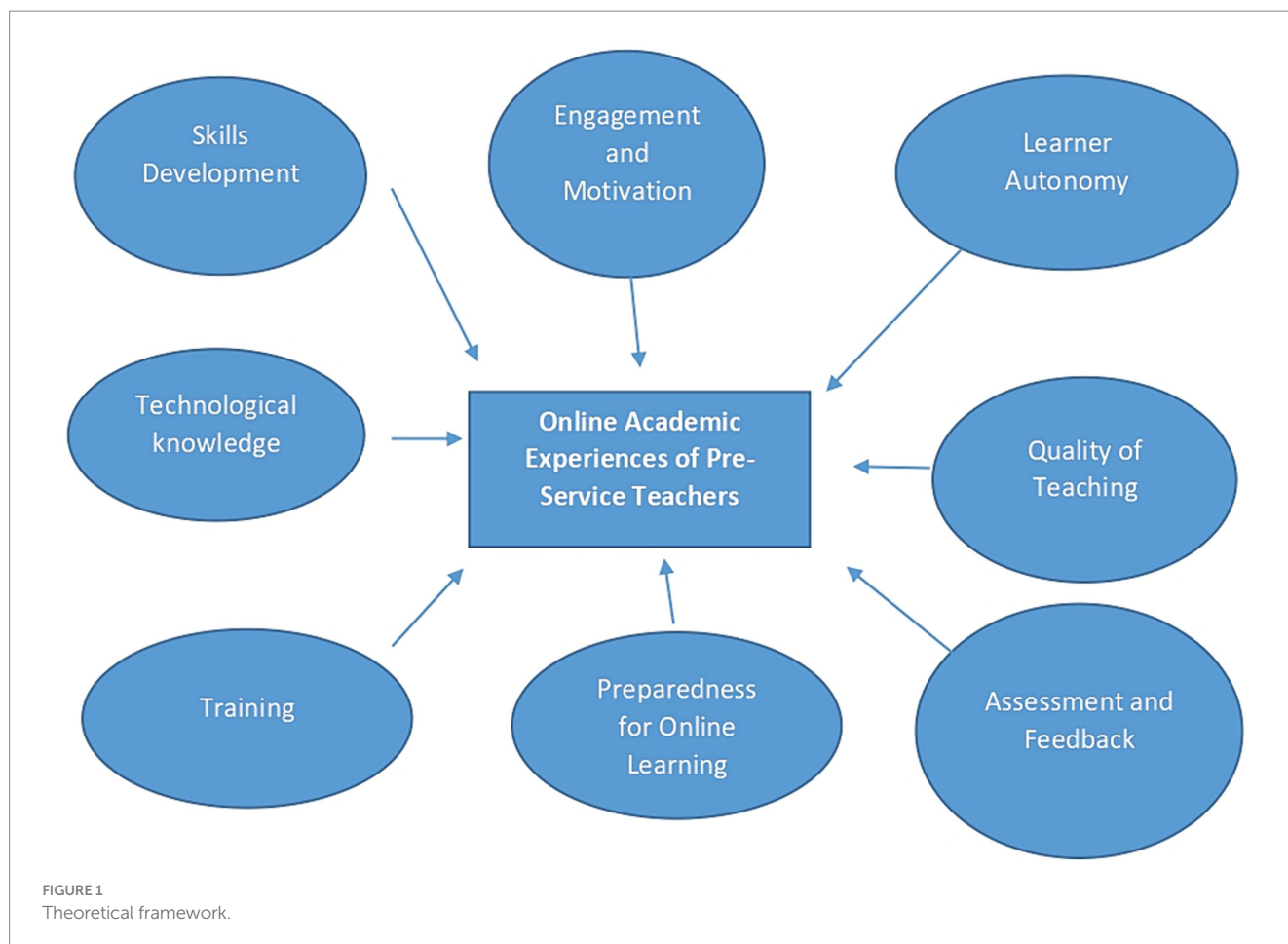
In conclusion, there has been limited research into relationships of pre-service teachers' demographic traits (age, marital status, work status, and gender) with their online academic experiences in the UAE, although existing literature on factors affecting such experiences may shed light on the possible impact of demographic traits. Therefore, further detailed research is required to investigate this association in the particular context of pre-service teachers in the UAE.

## Theoretical framework

The Community of Inquiry paradigm developed by Garrison, Anderson, and Archer ([Duncan and Barnett, 2009](#)) offers a suitable theoretical foundation for a study on online education for pre-service teachers. This framework prioritizes the educational experience of persons in online environments, with a specific emphasis on the significance of cognitive presence, social presence, and teaching presence. Using this framework, researchers can examine how pre-service teachers participate in online learning, create educational material, and manage the intricacies of teaching in virtual settings. Within the scope of a research project examining online education for pre-service teachers in the UAE, the Community of Inquiry framework would be crucial for comprehending the manner in which these teachers engage with online platforms, cooperate with peers and instructors, and enable significant learning opportunities for students. This theory would offer a systematic methodology for analyzing the difficulties and possibilities encountered by pre-service teachers as they shift to online teaching methods.

Using the Community of Inquiry framework can help to examine the particular factors of online education that affect pre-service teachers in the UAE, including digital literacy, technological expertise, and the capacity to develop captivating online learning environments. By employing this theoretical framework ([Figure 1](#)), a thorough examination may be conducted to investigate how pre-service teachers in the institution under study adjust to online teaching methods and acquire the essential skills needed to succeed in virtual educational environments.

The literature review above indicates that positive online academic experiences for pre-service teachers require adaptation to new online platforms and technologies ([Zheng et al., 2021](#)). Personal traits and individual variances impact the effectiveness and quality of pre-service teachers' online education ([Kaspar et al., 2023](#)), which also require faculty to have a comprehensive understanding of pedagogical principles and the ability to create interactive and engaging learning experiences ([Byrka et al., 2022](#)). Understanding faculty's readiness and providing them with the required training and resources, along with effective assessment and feedback, are crucial for the transition to high-quality online teacher education programs ([Cutri et al., 2020](#); [Joshi et al., 2020](#)). Online education significantly involves pre-service teachers' engagement and motivation ([Uyen et al., 2023](#)). Finally, factors including age, employment status, gender, and marital status can affect online academic experiences ([Chen et al., 2021](#); [She et al., 2021](#); [Yang et al., 2022](#)).



## Study rationale

Rapid advances in educational technology have promoted online learning, significantly impacting pre-service teachers' academic experiences. This quantitative study investigated the effects of online education on pre-service teachers' academic experiences at Al Ain University, paying particular attention to the quality of teaching and learning, engagement and motivation, assessment and feedback, organization and management, and skill development and satisfaction. We believe that investigating pre-service teachers' online learning experiences is critical to understanding how the change from face-to-face to online learning can affect the experiences of prospective teachers. This study is significant because pre-service teachers often rely on applying theoretical knowledge in real classroom contexts to develop their classroom management techniques and pedagogical skills, so the shift to online education may have challenged them by limiting their practical teaching experience and in-person classroom observations. Given the paucity of UAE-specific research into demographic influences noted above, we also believe that insights regarding pre-service teachers' perceptions of the effectiveness of the pedagogical approaches employed by faculty members in online education will be valuable in designing and implementing future online teacher education programs in the UAE. Therefore, we anticipate that the findings of this study can guide the development of effective training programs, inform policy development and practice and suggest tactics to improve pre-service teachers' online learning experiences.

## Research questions

The study sought to answer the following questions:

- 1 Is there any relationship between pre-service teachers' demographic characteristics (age, marital status, and employment status) and their academic experiences, which include: quality of teaching and learning; engagement and motivation; assessment and feedback; organization and management; and skill development and satisfaction?
- 2 Do perceptions of effective teaching and learning (ETL) and faculty assessment and feedback (FAF) predict pre-service teachers' engagement and motivation (PTSEM)?
- 3 Do ETL and course organization and management (COM) predict pre-service teachers' skill development and satisfaction (PTSDS)?

## Methods

In this study we utilized a descriptive survey design with quantitative technique to investigate the impact of online education on the academic experiences of pre-service teachers. The research design was chosen to investigate the effects of online education on different aspects of pre-service teachers' academic experiences,

including the quality of teaching and learning, engagement, motivation, assessment and feedback, organization and management, and skill development and satisfaction. The study sought to investigate potential correlations between demographic variables such as age, gender, marital status, and work status of pre-service teachers and their academic experiences.

The choice of a descriptive survey design is consistent with the nature of the research questions presented in the study. Descriptive survey methods are particularly suitable for creating a comprehensive overview of important concepts within a specific environment. This makes them an excellent choice for examining the impact of online education on the academic experiences of pre-service teachers (Güler, 2022). This design facilitates gathering data that may be subjected to quantitative analysis to get insights into the connections between various variables, such as demographic features and academic experiences among pre-service teachers (Obispo et al., 2023), yielding valuable insights for educational practitioners and policymakers.

In addition, applying a quantitative technique in the descriptive survey design allows to systematically collect numerical data on the many scales created to assess the various aspects of pre-service teachers' academic experiences. This methodology simplifies the examination of the data to detect patterns, trends, and possible correlations among the variables being studied (Asanga et al., 2023).

## Procedure

A descriptive survey methodology was developed, using Microsoft Forms to collect quantitative data on demographic characteristics (age, gender, marital status, and employment status) and on five scales developed by the researchers to measure quality of teaching and learning, engagement and motivation, assessment and feedback, organization and management, and skill development and satisfaction. These had five response options, from Strongly Disagree = 1 to Strongly Agree = 5.

The target population comprised all 450 pre-service teachers enrolled in the Professional Diploma in Teaching Program during the Spring semester of the 2021–2022 academic year, who were sent a link to the survey through their university Microsoft Teams accounts. An accompanying document stated the study's purpose, assured respondents of confidentiality, and gave detailed instructions on accessing and completing the survey. Recipients were given 2 weeks to respond, during which polite reminders helped to increase response rates. Responses were received from 130 teachers, constituting 34.6 percent of those invited and exceeding the recommended minimum sample size of 10% of the population for descriptive quantitative research (Purbasari et al., 2023).

## Data analysis

The following statistical procedures were employed to analyze the data using IBM SPSS Statistics 26:

- 1 Descriptive statistics, which involved calculating the means and standard deviations of participants' scores on each scale.
- 2 The independent-samples *t*-test investigated the effects of participants' marital and employment status on their academic

experiences: quality of teaching and learning; engagement and motivation; assessment and feedback; organization and management; skill development and satisfaction.

- 3 Analysis of variance (ANOVA) was used to quantify the effects of age on the same dependent variables.
- 4 Regression analysis was used to investigate the association of engagement and motivation with effective teaching and learning and with faculty assessment and feedback and that of course organization and management with skill development and satisfaction.

Gender was excluded from the analysis because only 1.5% of respondents were male.

## Instrument

In order to examine the influence of online education on the academic experiences of pre-service teachers, data gathering involved the use of five created scales. These scales evaluate several elements, including the effectiveness of teaching and learning, the level of engagement and motivation, the quality of evaluation and feedback, the efficiency of organization and management, and the extent of skill development and satisfaction.

The creation of these scales followed a strict methodology to guarantee their accuracy and consistency in measuring the essential aspects of teaching and learning quality, student engagement and motivation, assessment and feedback, organization and management, and skill development and satisfaction in online education. Therefore, creating these scales involved the participation of some experts, testing with a sample of pre-service teachers, analysis of individual items, running factor analysis to verify the validity of the measures, and testing for internal consistency to determine reliability. Accordingly, the scales were improved through expert and participant feedback to ensure they precisely represented the intended concepts and were appropriate for assessing the academic experiences of pre-service teachers in online education. The following are descriptions of all scales:

### Effective teaching and learning scale

The ETL scale was developed to assess the efficacy of instructional techniques, curriculum materials, and educational achievements in the context of online learning. This scale consisted of instructional design items, information delivery lucidity, and learning activities' applicability (Liang, 2023). The ETL scale, developed initially, comprised 13 items, reduced to 10 and again to eight, following successive reviews by the researchers and by experts in the field. Assessing the internal consistency of the scale on a sample of 60 pre-service teachers yielded a Cronbach's alpha ( $\alpha$ ) value of 0.80.

### Pre-service teachers engagement and motivation scale

The PTEM scale, developed to gather data on online engagement and motivation, originally had 10 items, reduced as above to eight, then to six. This scale included factors such as student motivation, active engagement, and the perceived worth of the learning process (Vasyukova et al., 2022). Its internal consistency, assessed as for ETL, was  $\alpha = 0.78$ .

TABLE 1 The research scales and their reliability.

Scales	No. of items	Test sample	Cronbach's alpha
ETL	8	60	0.80
PTEM	6	60	0.78
FAF	4	60	0.58
COM	4	60	0.72
PTSDS	6	60	0.81

### Faculty assessment and feedback scale

The FAF scale, developed to gather data on online assessment and feedback by faculty. It encompassed items pertaining to the equity of evaluations, promptness of feedback, and transparency of evaluation methods (Rossetini et al., 2021). The FAF scale started with seven items, was reduced to five, and then to four. This small number of items may explain the low internal consistency value of  $\alpha = 0.58$ .

### Course organization and management scale

The COM scale, developed to gather data on course organization and management, began with six items, reduced to five, and then to four as above. The COM scale encompassed items about the arrangement of the course, availability of resources, and the promptness of teachers and support staff in addressing concerns (Atkinson et al., 2022). Again, internal consistency appeared low ( $\alpha = 0.72$ ), perhaps because there were so few items.

### Pre-service teachers' skill development and satisfaction scale

The PTSDS scale measured how participants developed various skills through engaging in online teaching and learning and their satisfaction with this approach. It aimed to assess the attainment of new skills, knowledge, and general contentment with the online learning process. The PTSDS scale consisted of items pertaining to the enhancement of skills, the perceived worth of the program, and the general contentment with the achieved learning results (Alhusban et al., 2023). Its original nine items were reduced on review to eight, then to six. Table 1 shows that it had the highest internal consistency value of the five scales ( $\alpha = 0.81$ ).

## Results

### Participants

Table 2 lists demographic data on the 130 pre-service teachers who participated, showing that the great majority were female, so the two males were removed from the analysis. Ages ranged between 20 and 40+ years ( $M = 2.08$ ,  $SD = 0.671$ ), more than two-thirds being between 25 and 29. As only three participants were over 34, they were also removed from the analysis. Slightly more respondents were married than single. Only two respondents were widowed, divorced, or separated, so again, these categories were removed from the analysis. The great majority of respondents were employed, with only eight being unemployed.

TABLE 2 Demographic data.

Variable	Sub-variable	Percentage
Gender	Male	1.5
	Female	98.5
Age (years)	20–24	13.1
	25–29	69.2
	30–34	15.4
	35–39	0.8
	40+	1.5
Marital status	Single	46.2
	Married	52.2
Employment status	Employed	6.2
	Unemployed	93.8

### Demographic characteristics and academic experiences (research question 1)

#### Perceptions of effective teaching and learning in relation to age, marital status, and employment status

A one-way between-subjects ANOVA revealed a statistically insignificant relationship between ETL and participants' age (20–24, 25–29, 30–34 years):  $F(2, 127) = 0.511$ ,  $p = 0.601$ . The independent-samples  $t$ -test found no significant relationship of ETL with marital status,  $t(128) = -1.591$ ,  $p = 0.114$ , nor with employment status,  $t(128) = 0.243$ ,  $p = 0.808$ . Thus, pre-service teachers' marital and employment status did not influence their online teaching and learning. In conclusion, age, marital status, and employment status did not impact participants' *effective teaching and learning*.

#### Engagement and motivation in relation to age, marital status and employment

The independent-samples  $t$ -test and one-way between-subjects ANOVA revealed no significant association of PTEM with age,  $F(2, 127) = 1.04$ ,  $p = 0.356$ , nor with marital status on PTEM,  $t(128) = -0.164$ ,  $p = 0.104$ , but it was significantly related to employment status (employed:  $M = 23.13$ ,  $SD = 6.01$ ; unemployed:  $M = 25.66$ ,  $SD = 2.95$ ),  $t(128) = -2.17$ ,  $p = 0.032$ . Taken together, these results suggest that teachers' online engagement and motivation was more effective when they were unemployed.

#### Perceptions of faculty online assessment and feedback in relation to age, marital status and employment

A one-way between-subjects ANOVA found no significant impact of age on teachers' views of faculty online assessment and feedback,  $F(2, 127) = 0.215$ ,  $p = 0.807$ , but the independent-samples  $t$ -test revealed a significant relationship between these views and their marital status (single:  $M = 15.52$ ,  $SD = 2.91$ ; married:  $M = 16.56$ ,  $SD = 2.17$ ),  $t(128) = -2.33$ ,  $p = 0.021$ . Thus, pre-service teachers' views of faculty online assessment and feedback appear more effective among married ones. However, the  $t$ -test found no significant relationship of teachers' views on faculty online assessment and feedback with employment status,  $t(128) = -1.22$ ,  $p = 0.225$ , meaning

employment status did not impact participants' views on faculty online assessment and feedback.

### Perceptions of online course organization and management in relation to age, marital status, and employment

The one-way between-subjects ANOVA found no significant association between participants' age and their views of online course organization and management,  $F(2, 127) = 0.459, p = 0.633$ ; nor did the  $t$ -test find these views to be significantly related to employment status,  $t(128) = -0.120, p = 0.905$ . The only significant correlation of views on course organization and management was with marital status (single:  $M = 15.68, SD = 2.81$ ; married:  $M = 16.69, SD = 1.83$ ),  $t(128) = -2.44, p = 0.016$ . These results suggest that pre-service teachers' views of online course organization and management were more effective when they were married.

### Online skills development and satisfaction in relation to age, marital status, and employment

The same  $t$ -test and ANOVA procedures revealed no significant relationship of PTSDS with age,  $F(2, 127) = 0.811, p = 0.446$ , marital status,  $t(128) = -0.564, p = 0.574$ , or employment status,  $t(128) = -0.300, p = 0.764$ . This indicates that age, marital status, and employment status did not impact participants' views on online skills development and satisfaction.

### Engagement and motivation in relation to effective teaching and learning and to faculty assessment and feedback (research question 2)

A multiple regression was run to predict PTEM from ETL and FAF. These variables significantly predicted PTEM,  $F(2, 127) = 118.367, p < 0.0005, R^2 = 0.651$ . The two variables (ETL & FAF) added significantly to the prediction,  $p < 0.05$ . This means that FAF had a significant effect on PTEM,  $t(127) = 3.56, p < 0.05$ , as did ETL,  $t(127) = 10.41, p < 0.05$ . It also means that with one-unit increase in FAF, the PTEM score increased by 0.280 and with one-unit increase in ETL, it increased by 0.550. Overall, the regression model is a good fit for the data. Therefore, the multiple regression analysis reveals that ETL and FAF as predictors were able to explain 65.1% of PTEM, meaning that as predictors, Effective Teaching and Learning and Faculty Assessment and Feedback explained pre-service teachers' engagement and motivation well (Table 3). The regression equation is as follows:

$$PTEM = 2.406 + (0.283) FAF + (0.549) ETL$$

TABLE 3 Total PTEM by total FAF and total ETL.

Predictor variable	Unstandardized coefficients	$\beta$	$t$	$p$
Total FAF	0.283	0.225	3.563	0.001
Total ETL	0.549	0.659	10.412	0.000

Dependent variable: Total PTEM; Regression is significant at the 0.0005 level.

### Effective teaching and learning, and course organization and management as predictors of skill development and satisfaction (research question 3)

A multiple linear regression was fitted to explain participants' skill development and satisfaction in terms of course organization and management, and effective teaching and learning. COM and ETL as independent variables statistically significantly predicted PTSDS,  $F(2, 127) = 63.456, p < 0.0005, R^2 = 0.500$ . These two variables (ETL and COM) added statistically significantly to the prediction,  $p < 0.05$ . This means that COM had a significant effect on PTSDS,  $t(127) = 3.07, p < 0.05$ , while ETL also had a significant effect on PTSDS,  $t(127) = 5.89, p < 0.05$ . Thus, the PTSDS score increased by 0.388 for every one-unit increase in COM and by 0.455 for each one-unit increase in ETL. Overall, the regression model is a good fit for the data. The multiple regression analysis reveals that ETL and COM as predictors were able to explain 50% of PTSDS, meaning that as predictors, Effective Teaching and Learning and Course Organization and Management explained pre-service teachers' skill development and satisfaction well (Table 4). The regression equation is as follows:

$$PTSDS = 3.584 + (0.388) COM + (0.455) ETL$$

## Summary and discussion

Various factors affect the online academic experiences of pre-service teachers. There follows a summary and discussion of the main results for each research question.

### Research question 1

The results of the current study indicate that pre-service teachers' engagement and motivation in online education are more effective when they are unemployed. This finding of a positive relationship of engagement and motivation with employment status is consistent with some studies (Ogbonnaya et al., 2020; Malabanan et al., 2022) but inconsistent with others. For example, Gussen et al. (2023) concluded that many pre-service teachers have negative attitudes toward research and lack the motivation to conduct it, while Ye et al. (2021) found that pre-service teachers demonstrated better motivation than beginners, except for a few factors like intrinsic value and teaching skills. These discrepancies imply that motivation levels may vary over a teacher's tenure. Meanwhile, Calderón et al. (2019) and Plak et al. (2022), for example, found no significant correlation between these variables.

TABLE 4 Total PTSDS by total COM and total ETL.

Predictor variable	Unstandardized coefficients	$\beta$	$t$	$p$
Total COM	0.388	0.503	5.89	0.003
Total ETL	0.455	0.659	10.412	0.000

Dependent variable: Total PTSDS; Regression is significant at the 0.0005 level.



The current finding that views of faculty online assessment and feedback were more effective in married pre-service teachers is consistent with [Chibisa et al. \(2022\)](#) and with [Yildirim and Tekel \(2023\)](#), who found that married pre-service teachers reported a positive impact of online assessment on their academic performance, crediting their stronger engagement in online education to the comfort of their home environment. Conversely, [Nikoçeviq-Kurti \(2023\)](#) found no significant effect of marital status on positive aspects of online teaching and quality of teaching activities. Other studies, such as [Elshami et al. \(2021\)](#) and [Saribas and Çetinkaya \(2021\)](#), did not specifically seek correlations of assessment and feedback with marital status, but suggest that pre-service teachers' analysis of feedback is extremely important whatever their marital status.

Current results also suggest that pre-service teachers' views of online course organization and management were positively correlated with their marital status. While no studies address this relationship, some do address perceptions of the management and organization of online courses. Thus, [Kulal and Nayak \(2020\)](#) and [Vakaliuk et al. \(2022\)](#) emphasize the value of teachers' development and technical proficiency. Conversely, [Hulda \(2022\)](#) and [Tao and Gao \(2022\)](#) emphasize teacher preparation programs and classroom management techniques, while [Estaji and Zhaleh \(2022\)](#) and [Moore and Hong \(2022\)](#) note that social presence, explicit training, and instructional design can help manage and structure online courses.

We found no literature consistent with our finding of no significant association of effective teaching and learning in online education with pre-service teachers' age, marital status, or employment status. Nevertheless, some studies reveal factors influencing online teaching effectiveness generally, such as effective communication ([Liu et al., 2022](#)), self-confidence and technology use ([Teoh et al., 2023](#)), challenges ([Nikoçeviq-Kurti, 2023](#)), and support ([Pourdavood and Song, 2021](#)). Although demographic characteristics may not have a substantial impact on the efficiency of online teaching and learning for pre-service teachers in this study, research conducted in other locations on in-service teachers, such as in the Philippines ([Sacramento et al., 2021](#)), indicates that the factors impacting the success of online education can fluctuate depending on the specific setting. Therefore, it is crucial to consider geographical differences and modify online education approaches to cater to the individual needs of various groups of learners.

Similarly, no existing research appears to focus on the relationship between pre-service teachers' engagement and motivation in online education and their age and marital status, which we found to be statistically insignificant. However, some studies support a positive relationship between motivation and engagement in online learning contexts ([Zapata-Cuervo et al., 2021](#); [Malabanan et al., 2022](#)).

Our finding of no significant relationship of pre-service teachers' views of faculty online assessment and feedback with age and employment status is again not addressed in the literature, although some studies consider how online testing affects the emotional states of pre-service teachers ([Yildirim and Tekel, 2023](#)) and how pre-service teachers find online teaching effective but not for evaluation ([Saha et al., 2022](#)).

Our results also suggest that age and work status do not significantly influence teachers' perceptions of online course management. While the literature appears not to address this, [Tao and Gao \(2022\)](#) offer insights into online teaching and learning,

highlighting the importance of efficient class management tactics and addressing anxiety and satisfaction factors.

We failed to find a significant effect of age, marital status, or employment status on pre-service teachers' online skill development and satisfaction. Again, we identified no consistent prior findings, although other studies found online classroom management ([Taghizadeh and Amirkhani, 2022](#)), 21st-century pedagogical competencies ([Malabanan et al., 2022](#)), and interest in job choices ([Shen and Chee Luen, 2022](#)) to be relevant factors in pre-service teachers' online skill development. These findings suggest that demographic factors do not significantly impact online skill development.

## Research question 2

The current results indicate that effective teaching and learning and faculty assessment and feedback predict pre-service teachers' engagement and motivation, consistent with [Li et al. \(2022\)](#) and [Rojabi et al. \(2022\)](#). The latter identifies gamification as an online teaching strategy effective in boosting motivation and student involvement. Similarly, by increasing motivation through rewards and enhancing the quality of training, institutional support can increase faculty satisfaction with online instruction ([Basbeth et al., 2021](#)). However, studies inconsistent with our finding imply that the accessibility and caliber of educational technology tools may impact the functioning of online courses ([Hayat et al., 2021](#)). The degree to which new teachers believe they are competent at teaching online may vary, and students' technical proficiency may partly determine their online performance ([Stewart and Baker, 2021](#)). Further research into these factors would help to make online teaching and learning and faculty assessment and feedback more effective at fostering pre-service teachers' engagement and motivation.

Various studies show that pre-service teachers' engagement and motivation can be predicted through faculty assessment and feedback, that realistic learning experiences and evaluation tools are crucial for effective online teaching ([Hayat et al., 2021](#)), and that feedback on instructional strategies can increase motivation and engagement ([Bradley and Kramer-Gordon, 2023](#)), as can effective online instruction and participation in online classrooms, making inexperienced teachers who receive support and training more motivated and at ease, boosting their interest in online education ([Tanguay and Many, 2022](#)). Successful online teaching depends on the use of authentic learning experiences, assessment tools, and feedback systems to increase the involvement and motivation of pre-service teachers ([Byrka et al., 2022](#)). Research conducted by [Hunukumbure et al. \(2021\)](#) has demonstrated that offering feedback on teaching tactics substantially enhances students' motivation and engagement in the learning process. Additionally, faculty calibration and the utilization of instructional rubrics are acknowledged as efficacious approaches to strengthen the caliber of feedback and assessment in educational environments ([Gosselin and Golick, 2020](#)). Moreover, studies have emphasized the significance of utilizing online feedback systems to foster transparent conversations between students and teachers, encouraging meaningful feedback exchanges ([Hidayah, 2020](#)). Thus, the success of online teaching practices relies heavily on faculty attitudes toward motivational principles, the utilization of

online feedback systems, and the incorporation of experiential learning.

### Research question 3

Effective teaching and learning and course organization and management were found to be good predictors of pre-service teachers' skill development and satisfaction, consistent with much existing research (Atmaca, 2023). A vital predictor of self-assurance and effectiveness in online instruction is self-efficacy in instructing (Naz et al., 2021). Using technology in online instruction positively impacts the development of pre-service teachers' skills and satisfaction (Şahin and Şahin, 2022; Teoh et al., 2023).

Previous research findings have indicated that effective teaching and learning, as well as course organization and management, are essential factors that strongly influence the skill development and satisfaction of pre-service teachers in online education. Ogbonnaya et al. (2020) emphasized that online learning's adaptability enhanced students' motivation to study, demonstrating a favorable influence on the teaching and learning procedure. Also, Pourdavood and Song (2021) highlighted the significant impact of social and cultural aspects on the teaching practices of mathematics teachers in online education. They underlined the crucial role of course organization and management in meeting the different demands of learners (Pourdavood and Song, 2021). In addition, Rafiq et al. (2022) provided evidence of the efficacy of a program designed to enhance pre-service teachers' Technological Pedagogical Content Knowledge (TPACK) in the context of online education. Their findings revealed a favorable relationship between the organization of the course and preparedness for online instruction. Paetsch and Drechsel (2021) provided additional evidence by demonstrating that the perceived quality of teacher training during the online semester significantly impacted students' intentions to utilize digital learning materials. This highlights the importance of effective course organization in influencing teaching methods.

Other less consistent findings include face-to-face instruction as the most effective way to build critical thinking skills, indicating that some skills are more appropriate for traditional classroom settings (Gómez-Parra (2021), while Pei and Wu (2019) found online and offline learning to have similar outcomes in terms of knowledge and skills. Finally, students' engagement, lack of interpersonal skills, and curriculum modifications are among the difficulties teachers encounter when switching to online teaching (Leech et al., 2022).

### Conclusion and limitations

This study has shown that pre-service teachers' online engagement and motivation are stronger when they are unemployed, while their views of faculty online assessment and feedback and course organization and management are more effective when they are married. Additionally, online effective teaching and course organization significantly impact pre-service teachers' skill development and satisfaction. Factors such as course structure, technological integration, motivation, teaching activities, and

satisfaction with online learning environments shape these experiences and outcomes. Teacher education programs should consider these factors and provide appropriate support and resources to ensure the effective development of pre-service teachers' skills and overall satisfaction with the online learning experience. Moreover, the perceived value and quality of the course, the platform, website support, and expected achievement all affect how satisfied pre-service teachers are with their online learning experiences; thus, providing an excellent, user-friendly online learning environment can aid in the skill development and overall satisfaction of pre-service teachers.

The study has some limitations that should be considered. Firstly, the sample utilized in the study was unrepresentative of male teachers, participants being overwhelmingly female. The gender disparity may lead to the introduction of bias in the findings. Additionally, very little literature directly addresses the associations of age, marital status, and work status with characteristics of the online academic experiences of pre-service teachers generally and within the UAE particularly.

In order to overcome these constraints, further studies should consider a broader range of participants, encompassing a more varied and inclusive selection of individuals with an equitable distribution of both male and female educators. In addition, researchers should investigate alternate techniques of data gathering that go beyond relying solely on self-reported surveys. This will help reduce biases and enhance the accuracy of the findings. Furthermore, additional research is necessary to explore the connections between demographic characteristics and the online academic experiences of pre-service teachers, particularly in the distinct environment of the UAE.

### Recommendations

The study concluded that various factors have an impact on pre-service teachers' online engagement, motivation, views of faculty assessment, course organization, effective teaching, and overall satisfaction. From this conclusion, several meaningful insights and policy lessons can be derived to improve teacher education programs. Firstly, it is recommended that teacher education programs should offer specialized assistance and resources to employed pre-service teachers to improve their participation in online activities. Furthermore, teacher education programs should investigate methods to integrate components that align with the experiences of married adults to enhance the efficiency of online evaluation and course structure for all pre-service teachers. Moreover it is imperative for teacher education programs to focus on the augmentation of online teaching excellence and course arrangement to guarantee favorable results in skill advancement and overall contentment among pre-service teachers. Finally, teacher education programs should prioritize the optimization of elements, such as the organization of courses, the incorporation of technology, the level of motivation, the teaching methods employed, and the level of satisfaction with online learning environments in influencing the experiences and results of pre-service teachers, to establish an online learning environment that is conducive to skill development and satisfaction for pre-service teachers.

## Implications

While much research addresses online education in general and pre-service teachers' experiences in particular, especially since the COVID-19 pandemic, there is scant research on the association of online education with demographic characteristics, particularly age and marital and employment status. Future studies should address this lacuna, seeking insights into factors potentially influencing the success and involvement of students in online courses, particularly pre-service teachers. Investigating the correlation between demographic characteristics and online education among pre-service teachers has significant social implications for fostering inclusivity, practical implications for improving teaching strategies, and policy implications for successfully integrating online learning into teacher education programs.

## Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## Ethics statement

Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

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