

E-learning experiences during school practicum: views of student teachers in Greece and Spain

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Introduction

PRAC3 project (Digital Practicum 3.0: Exploring Augmented Reality, Remote Classrooms, and Virtual Learning To Enrich and Expand Preservice Teacher Education Preparation) is a European Erasmus+ programme about digital school practicum aiming at designing technological products and solutions for the school practicum to be used by mentors and pre-service teachers in five participant countries, i.e. Spain, Greece, Portugal, Norway and the Netherlands. The present study is part of this project.

School practicums aim to bridge theory with practice and develop prospective teachers' skills and competences as well as their pedagogical knowledge and attitudes to experience teaching profession holistically (Hammerness, 2006; Kaldi & Xafakos, 2017; Korthagen, 2001).

The present study is framed with the TPACK (technological, pedagogical, and content knowledge) theory, i.e. student teachers' understanding, not only of subject matter and expertly selected methods of teaching that subject matter to students, but the use of the various digital technologies available to teach the content and how to best select and integrate these technological resources to impact student learning (Mishra & Koehler, 2006).

The pandemic of COVID-19 forced teacher education programmes to shift into online school practicum internationally. Online teaching activities, the use of different platforms for communication and reflecting upon implementation were some of the urgent actions to adapt to the new dramatic circumstances. Moreover, distance mentoring programmes already in effect were applied in all cases. Consequently, the COVID-19 pandemic has caused a distinct global rise in the need to teach remotely and has subsequently contributed to an increased interest in the use of digital pedagogy (Vääätäjä, 2023).

Distance mentoring programmes have emerged internationally from the need to respond to the provision of educational and professional opportunities to disadvantaged or underrepresented populations (Single & Single, 2005). In the field of teacher education in particular, the distance mentoring relationship with digital media and processes has been utilized internationally and previous research has highlighted its key features and benefits (Bierema & Merriam,

2002; Single & Single, 2005; Smith & Israel, 2010). Also, teacher education programmes must provide the means, models and frameworks to cope with the needs for the new digital forms of teaching and learning in interactive educational environments (Mena & Flores, 2016). In the Greek context, respectively, research studies about the incorporation of advanced digital means in school practicum have not been identified, whilst no comparative study has emerged between different educational contexts internationally. Furthermore, understanding student teachers' views about e-learning could facilitate the creation of appropriate and updated e-learning environments for teacher education programmes of studies.

E-learning and digital means in school practicum

Virtual education (online learning and teaching) or distance teaching and learning is a form of distance education where the learner and the teacher are in separate places and the internet is used to deliver instruction and content of education (Cavanaugh et al., 2009; Watson et al., 2004). Although there are subtle differences in the definitions of e-learning, online learning and distance learning, these terms are used interchangeably and have their roots in distance education (Moore et al., 2011). Singh and Thurman (2019: 302) in their systematic study for 30 years (1988 to 2018) about the number and content of definitions of online learning concluded that online learning can be defined as learning experienced through “the internet/online computers in a synchronous classroom where students interact with instructors and other students and are not dependent on their physical location for participating in this online learning experience” or “internet in an asynchronous environment where students engage with instructors and fellow students at a time of their convenience and do not need to be co-present online or in a physical space”. Synchronous distance learning may include multimedia components such as group chats, web seminars, video conferencing and phone call-ins and participants interact in different places but during the same time. Asynchronous distance learning often relies on technology such as email, e-courses, online forums, audio recordings and video recordings (Littlefield, 2018). In any case, online education turns education to be student-centered, where students take part in the learning process, and teachers work as supervisors for students (Al-Salman et al., 2021).

More specifically, previous research has explored instructors' and learners' attitudes about e-learning usage (Liaw et al., 2007) and the

effectiveness of virtual or distance education (i.e. Anastasiades et al., 2010; Liaw et al., 2007) especially during the pandemic of COVID-19 (i.e. Rogers & Sabarwal, 2020; Taimur, Sattar & Dowd, 2021). In particular, research about university students' views and experiences about teaching and learning during COVID-19 pandemic mainly showed positive aspects of online learning associated with: comfort and accessibility, economy (saving time and money), and psychological and medical safety and with satisfaction of the support provided by teaching staff and universities' public relations (e.g., Boca, 2021; Curelaru, et al., 2022). There were also negative experiences of distance learning such as: lack of social interaction (Al-Mawee et al., 2021), unstable internet service (Okyerere, et al., 2022), less effective than face-to-face learning and teaching, data privacy, and security (Almahasees, et al., 2021).

In the case of the internship of student teachers, studies report that this was a very challenging task for teacher education institutions since the internship was not possible (Cho & Clark-Gareca, 2020). When practicum students began teaching in a synchronous or asynchronous manner, during the pandemic, both limitations and opportunities arose during their virtual teaching (Al Malki & Al-Hattali, 2022). Kim (2020) argued that some of the limitations of an online practicum were the limited experiences of practicum students in using ICT. Thus, Kim (2020) recommended that teacher preparation programs should provide extensive ICT courses so that students' technological skills could be developed.

Furthermore, the interest in the educational use of immersive technologies has increased in recent years (see Pellas et al., 2021). Immersive technologies identify a series of digital tools and/or environments ranging from Virtual Reality (VR), to Augmented Reality (AR) and 360° video. A higher number of educators have started embedding them into their teaching practices at different levels of the education system, including primary school, secondary and higher education (Ranieri et al., 2021). Previous and recent research on advanced digital technologies has indicated that VR can be a good way of teaching due to its flexibility in approach, high degree of interaction with the real and virtual world and risk free usability (Holly et al. 2021), 360° videos have positive effects on learning, especially referring to motivation, attentiveness, informa-

tion retention and transfer of knowledge (Ranieri et al., 2021), live remote classroom creates opportunities for preparing STs to teach through authentic practice situations (Ulvik et al., 2023), the use of using digital technology is rather limited especially AR in teacher training (Mena et al., 2023) and that students although expressed favorable attitudes towards VR and AR, they had little knowledge of them (Castaño-Calle et al., 2022).

All in all, there is a need to upgrade student teachers' digital knowledge and skills (a) to adapt smoothly to urgent situations which demand online teaching and learning and (b) to be well prepared for a new technological era in the education field.

E-mentoring and Practicum

Practicum in pre-service teacher education is one of the most important parts of higher education, as it provides professional preparation and development for pre-service teachers, linking the theory and practice of teaching (Grudnoff & Williams 2010; Parveen & Mirza, 2012). Face-to-face mentoring has gradually moved to e-mentoring programmes and initiatives (Bierema & Merriam, 2002). Electronic, online, digital mentoring, telementoring or cybermentoring are often referred as e-mentoring (Bierema & Merriam, 2002; Ensher et al., 2003; Single & Muller, 2001). E-mentoring has grown significantly in recent decades. This is particularly true as social media, text messaging and internet communication, such as chat functions or emails, are quite popular (and sometimes primary) forms of communication, especially among young people (Kaufman, 2017; Shpigelman, 2014). E-mentoring is adequately defined as “a computer mediated, mutually worthwhile between a mentor and a protégé that provides learning, advising, encouraging, promoting, and modeling, that is often boundaryless, egalitarian, and qualitatively different from traditional face-to-face mentoring” (Bierema & Merriam, 2002: 214).

In e-mentoring programmes mentors and mentees interact via text-based communication including e-mail and/or discussion board or forum entries and via online operating platforms (Smith & Israel, 2010). The roles of the mentor are those of supporter, facilitator, assessor, collaborator,

friend, trainer, protector, colleague, evaluator and communicator (Fong et al., 2012). Additionally, according to Clutterbuck and Lane (2004), effective implementation of e-mentoring requires computer literacy, internet access, digital and electronic devices, organizational skills, communication skills, time available, safeguarding of personal data and generally an open environment that inspires safety and honesty.

Several researchers have addressed the advantages and disadvantages of e-mentoring compared to the traditional form of mentoring (Haggard et al., 2011; Redmond, 2015). The advantages of e-mentoring are related, firstly, to the fact that the interaction, the exchange of knowledge and experiences takes place regardless of time and place and allows more people to be reached compared to face-to-face mentoring (Akin & Hilbun, 2007; Hunt et al., 2013) and secondly to reduced travel costs and a certain degree of a less threatening environment, which can encourage mentees to ask questions they are less likely to ask in person (Redmond, 2015).

E-mentoring comes with its own set of challenges. At a more practical level, it requires access to ICT, and technical support for the technology and the digital platform. The technology used must also be accessible to all mentors and mentees, which can be a particular challenge when involving people from specific populations, such as young people with disabilities (Shpigelman, 2014). Ensher et al. (2003) identify five key challenges related to mentoring in an online environment: a) likelihood of miscommunication (through misunderstandings, flaming, coldness of the medium), b) slower development of relationships online than face-to-face, c) requirement of competency in written communication and technical skills, d) possibility of technology malfunctions and f) issues of privacy.

Although e-mentoring has been adopted in various fields, there are few reports on the implementation of e-mentoring in academic internships (Single & Muller, 2001; Tinoco-Giraldo et al., 2022) and particular in the school practicum of student teacher's or in the training of novice teachers. Previous research on e-mentoring has shown some technical difficulties particularly in issues related to classroom teaching and management, assessment, novice teachers' socialization and institutional learning even

though the programme was found effective (Watson, 2006: 175); that the “e-practicum” and “e-mentor” can be useful to pre-service English language teachers in Turkey because it helped them overcome online teaching fears (Ersin et al., 2020); that e-mentoring is an alternative mode of supplementing face-to-face mentoring (a) during the practicum based on an experimental project called “MentorTokou” (Ligadu & Anthony, 2015) and (b) for supporting and advising Greek primary school teachers with low teaching experience and promoting their collaboration and mutual support (Spanorriga et al., 2018).

From the above we can conclude that previous research on student teachers’ views about e-learning and the use of digital means in the practicum seems to be scarce whilst comparative studies across educational contexts are not noticed respectively.

Method

This study aims to investigate prospective student teachers’ views about the enrichment of a distance mentoring system in the context of school practicum with digital media and procedures in two contexts, i.e. Greece and Spain.

The research question is as follows:

What are STs’ views about:

- (A) e-learning experiences during their school practicum?
- (B) the use of online tools during the school practicum?
- (C) e-mentoring opportunities during school practicum?

Participants

The sample of the present research consists of student teachers (STs) in two different educational contexts, namely in a Pedagogical Department of Primary Education of a Greek university (N = 109) and in a Department of Education of a Spanish university (N = 64).

Research tool

For the data collection, a questionnaire on a five-point Likert scale is used and it consists of seven sections that mainly explore the views of STs on the application of a digitized mentoring relationship in future teacher education

programs as well as the incorporation of digital means in the school practicum. Some parts of the tool were taken from the study of Liaw et al. (2007) and were adapted to this study (i.e. parts b, c, d and e). In particular, the following parts were included:

- (a) demographic information,
- (b) operating systems and experience [i.e. to what extend do you have experience with (1) augmented reality, (2) virtual reality, (3) 360° video],¹
- (c) e-learning use / e-learning as an effective learning environment [i.e. to what extend the use of e-learning environment during practicum could (1) improve my problem solving skills, (2) broaden my pedagogical subject knowledge for teaching],
- (d) e-learning as a self-learning environment [i.e. I think that an e-learning environment during practicum will (1) enhance my learning motivation (hypertext online instruction) (2) enable me to find information actively],
- (e) e-learning – e mentoring in practicum (i.e. I think that if using e-mentoring I'm able to communicate more frequently and in agreement with my mentor at different times than the ones at my university),
- (f) matching mentors and ST's (i.e. I think that a good match between mentor and student teacher can be complementary to the mentoring in the physical classroom),
- (g) e-learning as a multimedia training and e-guidance environment [i.e. I would like to experience (1) observing lessons on remote classrooms, (2) an animated online instruction by the mentor] and
- (h) usefulness of online tools in the practicum at schools [i.e. I think that (1) the use of augmented reality in the practicum will reinforce my teaching skills, (2) discussing with my mentor during online sessions will further support me in my teaching].

Analysis

Kolmogorov-Smirnov test of normality of the tool was statistically significant ($p = .000$) therefore for inductive statistics non parametric tests were carried out (Mann-Whitney, Kruskal Wallis tests & Spearman's rho).

¹ In this group of items the authors used the immersive technologies of VR, AR and 360o video which were not mentioned in Liaw et al.'s study.

Findings

The demographic information about the participants of the study is as follows:

160 women, 13 men and 1 other. The majority of STs were between 20-22 years old. 109 STs had four levels/periods of school practicum (Greek participants) and 65 had two levels/periods (Spanish participants). The Greek participants reported that they had four levels/periods of school practicum and the Spanish participants two levels/periods respectively. 114 STs were attending the 2nd level of school practicum and 60 of them the 1st level. 117 STs were trained to become primary school teachers and 57 STs to become early childhood education teachers.

Table 1 shows the composite variables extracted from the questionnaire based on the seven sections of the questionnaire. Most composite variables indicate a very good internal consistency degree (cronbach's α) except the variable of matching mentors with student teachers, therefore, this composite variable will not be used in the inductive statistical analysis.

Table 1. Composite variables of the questionnaire

Composite variable	Cronbach's α	N of items
Operating Systems' experiences	.696	5
E-learning use / E-learning as an effective learning environment	.924	6
E-mentoring in practicum	.824	3
E-learning as a self-learning environment	.835	6
Matching mentors and ST's	.375	2
E-learning as a multimedia training and e-guidance environment	.875	9
Usefulness of online tools in the practicum at schools	.822	6

From table 2 we can observe that the participant STs are rather positive about the use of digital media and processes in the school practicum and the remote mentoring relationship, however they rate in medium levels (between little to frequent) their experiences about various operating systems such virtual reality, augmented reality, 360o videos from classroom scenarios, web browsers etc.

Table 2. Means and standard deviations of the composite variables

Variables	N	Mean	SD
Operating systems	174	2.67	.79
e-learn use (develop lifelong learning skills)	174	3.82	.78
e-learn as self-learn	174	4.00	.57
e-mentoring	173	3.98	.70
Mentors STs match	173	4.05	.56
e-learn multimedia	173	3.81	.57
Online usefulness	173	3.77	.63

Statistically significant differences occurred between the country and the composite variables of e-learning as a self-learning environment, e-mentoring, e-learning as a multimedia training and the usefulness of online tools in the practicum. Spanish STs rank higher the dependent variables compared to the Greek peers (see table 3).

Table 3. Mean rank between country and composite variables
from the Mann-Whitney test

	Operating systems	E-learn use	E-learn as self-learn	E-mentoring	E-learn multimedia	Online usefulness
Greece	92.18	85.00	80.25	77.24	76.61	74.88
Spain	78.18	90.41	98.49	102.52	103.62	106.61
<i>p</i>	.075	.491	.020	.001	.001	.000

Statistically significant differences occurred between the No of practicum levels, i.e. two or four and the composite variables of e-learning as a self-learning environment, e-mentoring, e-learning as a multimedia training and the usefulness of online tools in the practicum. Those with the 2-level school practicum score higher the independent variables (see table 4), i.e. the Spanish STs as they were the participants who reported having only two levels of school practicum.

Table 4. Mean rank between No of school practicum and composite variables from the Mann-Whitney test

	Operating systems	E-learn use	E-learn as self-learn	E-mentoring	E-learn multimedia	Online usefulness
Two levels	78.89	90.99	98.90	103.24	104.57	107.16
Four levels	92.63	85.42	80.70	77.46	76.68	75.16
<i>p</i>	.081	.478	.020	.001	.000	.000

Moreover, statistically significant differences occurred between the level of practicum that STs follow at the time of filling in the questionnaire and the composite variables of e-mentoring, e-learning as a multimedia training and the usefulness of online tools in the practicum. Those who attended the 1st level of school practicum scored higher the three independent variables above compared to those who attended the 2nd level of school practicum. Bearing in mind that the Greek participants filled in the questionnaire in the 2nd level of school practicum we can conclude that the Spanish STs were more likely to have scored higher those variables (see table 5).

Table 5. Mean rank between the attending level of school practicum and composite variables from the Mann-Whitney test

	Operating systems	E-learn use	E-learn as self-learn	E-mentoring	E-learn multimedia	Online usefulness
1 st level	81.33	87.74	96.90	103.09	103.81	103.75
2 nd level	90.75	87.37	82.55	78.67	78.30	78.33
<i>p</i>	.240	.963	.072	.002	.001	.001

Gender and year of studies did not show any statistically significant differences with the dependent composite variables of the questionnaire.

Spearman's rho test showed that there were statistically significant correlations amongst most of the dependent variables except the knowledge for operating systems which correlated significantly only with the use of e-learning in the school practicum (see table 6).

Table 6. *Spearman's rho correlations between the composite variables*

Variables	1	2	3	4	5	6
1 operating systems	-					
2 E-learn use	-.199**	-				
3 E-learn as self-learn	.062	0.568**	-			
4 E-mentoring	.016	.295**	.457**	-		
5 E-learn multimedia	.115	.227**	.368**	.441**	-	
6 online usefulness	-.018	.394**	.592**	.497**	.663**	-

** p < .001

Conclusions / Discussion

In conclusion, under the framework of TPCK theory the present study investigated student teachers' views about immersive technologies, pedagogical content knowledge linked to e-learning practices that can facilitate the interactions and collaboration in the learning process, so as to enrich school practicum experiences with advanced digital means.

The results of the research show that the prospective student teachers are receptive to the use of digital media and processes in the school practicum and the remote mentoring relationship which is also reported in earlier studies (Akin & Hilbun, 2007; Hunt et al., 2013; Redmond, 2015). The lack of time during daily life and the geographical distance from the university campus causes different challenges in a traditional school practicum which often is a difficult task for STs. Thus, digital tools and e-mentoring processes could serve as an alternative and/or supplementary school practicum in providing basic classroom experiences and enriching the existing ones. In previous similar research e-mentoring and the use of digital tools in school practicum revealed that participants evaluated positively those options and experiences which is

in accordance with the findings of the present study (see Ligadu & Anthony, 2015; Spanorriga et al., 2018; Ersin et al., 2020). In addition, as STs live in a digital era where electronic devices and processes dominate daily life, they seem to prefer to acquire digital skills for future use.

Therefore, STs of this study appear to evaluate online tools and online practicum positively. This might be due to the fact that digital means provide opportunities to meet various needs caused by outer reasons such as the pandemic or by inner reasons such as own difficulties and to adapt to the digital era we experience.

Participant STs seem to be positive about enriching the experiences during practicum via digital means especially in the respect of facing e-learning during practicum as a self-learning process. It appears that STs here recognize the value of e-learning experiences as providers of independent learning. Developing e-learning systems that promote self-learning has been searched in different scientific fields such as in laboratory practice of chemistry (Takeda et al., 2007), in nurses caring for women mobile e-learning programmes (Hsu et al., 2023), in introducing the users in paleography, specifically in Greek pearlscript type paleography of the 19th to the 12th century (Drigas et al., 2005), in investigating interactive behaviors of self-learning management in a web-based Moodle e-learning platform in Taiwan (Liao & Lin, 2011). It is evident that various online tools offer significant opportunities to motivational factors and learning effects for acquiring deeper knowledge and skills in any field. Participants may be engaged in interactive discussions freely and effectively in terms of providing answers, explanations, self-reflections and re-examining viewpoints when evoked by different opinions (Liao & Lin, 2011). Important to note here is the fact that this study seems to contribute to the ongoing research findings about the connection between e-learning experiences and developing self-learning strategies by providing data from the teacher education context and more specifically from school practicum participants in two countries.

Moreover, STs of this study want to have a match between their own and the mentor's profile in order to have more qualitative mentoring experiences, however this is not statistically significant in this study. Possibly matching or mismatching STs' and mentors' profile in the school practicum does not seem to be an identifiable aspect for the participants, so as to assess the value of it.

Spanish STs appear to be more positive about the incorporation of digital tools and have an e-learning environment in school practicum compared to the Greeks participants. A possible explanation of this outcome could be provided by the level of online learning experiences that each group of STs have in their higher education context and more specifically in the school practicum

component of their studies. It may be the case where the Spanish participants have further experiences with digital technologies in the school practicum and programme of studies.

It seems to be interesting that the participants did not rate above frequent the use of immersive technologies such as VR, AR and 360° video and this may be the reason why there were not any statistically significant differences found with the independent variables of the research tool as well as only this composite variable (operating systems) and views about e-learning use to improve procedural skills and knowledge correlated significantly. This outcome is in accordance with the findings of previous research (Castaño-Calle et al., 2022; Mena et al., 2023) where participants had little knowledge about those advanced digital tools. Thus, STs in the digital era need to develop advanced technological skills to be prepared for technology rich educational environments.

The limitations of the present study lie in the small number of participants and the use of only one research tool such as a self-constructed questionnaire. Further research could expand the number of participants and the research tools applied.

Finally, the implications of this study could be (a) the need to upgrade STs' advanced technological skills, support them become active, capable and independent learners through the use of online tools, (b) designing enriched teaching experiences with the aid of advanced digital tools, (c) moving towards effective e-learning design of school practicum supplementary to the traditional one and (d) providing e-mentoring experiences in meaningful ways so as to cover STs' cognitive, social and instructional aspects of school practicum.

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Περίληψη

Η παρούσα μελέτη αποσκοπεί στη διερεύνηση των απόψεων των υποψήφιων εκπαιδευτικών σχετικά με τον εμπλουτισμό της σχολικής πρακτικής άσκησης με ψηφιακά μέσα και εμπειρίες ηλεκτρονικής μάθησης σε περιβάλλοντα εκπαίδευσης εκπαιδευτικών σε δύο χώρες (Ελλάδα και Ισπανία). Η ανάγκη για τη μελέτη προκύπτει από την υλοποίηση ενός ευρωπαϊκού έργου (ερευνητικό πρόγραμμα Erasmus+) και την έλλειψη συγκριτικών ερευνητικών μελετών σχετικά με την ενσωμάτωση εξελιγμένων ψηφιακών μέσων και εμπειριών ηλεκτρονικής καθοδήγησης στη σχολική πρακτική άσκηση. Υποψήφιοι εκπαιδευτικοί από ένα ελληνικό και ένα ισπανικό πρόγραμμα εκπαίδευσης εκπαιδευτικών συμπλήρωσαν ένα ερωτηματολόγιο σε πενταβάθμια κλίμακα Likert, το οποίο αποτελείται από επτά ενότητες. Τα αποτελέσματα δείχνουν ότι οι υποψήφιοι εκπαιδευτικοί είναι δεκτικοί στις εμπειρίες ηλεκτρονικής μάθησης ως ευκαιρία για ένα περιβάλλον αυτοδιδασκαλίας και τη χρήση ψηφιακών μέσων και διαδικασιών στη σχολική πρακτική άσκηση, ωστόσο ισχυρίζονται ότι έχουν περιορισμένη εμπειρία από εξελιγμένα ψηφιακά μέσα, όπως η οικονομική πραγματικότητα και η επαυξημένη πραγματικότητα. Τα αποτελέσματα αναδεικνύουν την ανάγκη περαιτέρω ανάπτυξης των ψηφιακών δεξιοτήτων των υποψήφιων εκπαιδευτικών ώστε να ανταποκριθούν στη νέα τεχνολογικά επαγγελματική εποχή.

Λέξεις-κλειδιά: ηλεκτρονική μάθηση, ψηφιακά μέσα, σχολική πρακτική άσκηση, υποψήφιοι εκπαιδευτικοί, Ελλάδα, Ισπανία

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