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The Development of Digital Competencies in Pre-Service Teachers

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ABSTRACT

Even before the Covid-19 pandemic created a historic pivotal moment for teacher training programmes on a global scale, the development of digital competencies has been regarded as a focal point for teachers. Tertiary institutions had just become accustomed to including technology in their curricula when Covid-19 forced a critical re-evaluation of the current practice. In a mere matter of days, the use of technology was not only a point for discussion anymore; it was lived. The ability of teacher educators to teach with technology had a direct impact on student success. Connectivity, access to suitable devices and sustainable training and support were now important considerations for teacher educators. The harsh reality soon became clear: Although some tertiary institutions could support pre-service teachers regarding access, connectivity and suitable devices, many students lacked the digital competencies to use the technology required for academic progress and success. It is evident that, in post-Covid-19 academia, the enhancement of digital competencies will remain a priority for teacher training programmes. The integration of digital competencies with content and pedagogical knowledge is essential for the successful training of future teachers. This article thus reflects on the efforts of a tertiary institution in South Africa to address the inclusion of technology in its curriculum through newly developed content that focuses on the enhancement of digital competency. Recommendations indicate that the effective inclusion of technology and digital competencies does not have to include major curricular changes but should rather become embedded within modules such as teaching practice.

KEYWORDS
Digital competencies; pre-service teachers; teacher training; technology integration.

INTRODUCTION

The Covid-19 pandemic not only changed society but also called for a fundamental shift in the higher education environment. On the 11th of March 2020, the World Health Organization declared Covid-19 a pandemic and in doing so countries across the world reacted with National Emergencies and the lockdown of their respective countries (AJMC, 2021). The President of South Africa, Cyril Ramaphosa, called a national state of disaster on 15 March 2020 (Labuschaigne & Staunton, 2020). The state of emergency called for several new regulations, one of which was that all students of higher education institutions had to leave their respective campuses and rely solely on emergency online learning (Landa et al., 2021, Bamoallem & Altarteer, 2022). This led to a rapid emergence and evolution of teaching and learning with technology. Universities had several initiatives to provide students with devices and supply them with continuous data to access these resources (Hedding et al., 2020). Although universities tried to equip their students with all the resources they needed (Du Plessis et al., 2022; Sonn et al., 2021), in this article, the author argues that epistemological access to use the provided devices in a constructive and meaningful manner started to play a central role in students' success. Many students struggled with how to use the devices and resources available with ease and to their advantage as it became apparent that not all students are digitally competent (Schreiber et al., 2021). For students to succeed, they needed (and still need) good digital competencies to make a success of their studies (Pather et al., 2020; Schreiber et al., 2021).

In this article, I aim to explore and answer the following research questions:

- What do the national documents require in terms of pre-service teachers' digital competencies?
- What are pre-service teachers' needs related to digital competencies?
- What support was implemented to help pre-service teachers develop their digital competencies during Covid-19 for both teaching and learning?

LITERATURE REVIEW

Digital Competencies

Digital competencies can be defined as skills and competencies that utilise digital technologies such as information and communication technology (ICT) skills, technology skills, information technology skills, information literacy, digital literacy and digital skills (Ferrari, 2012; Ilomäki et al., 2011; SA, 2019). Thus, "digital competencies" can be regarded as an umbrella term for the variety of technological advancements that can be used to achieve a specific goal. In the educational realm, these may be skills needed for teaching as well as learning.

Digital competencies are influenced by the society in which pre-service teachers grow up and the access they have to resources, this translates to the digital divide. The digital divide is defined by Soomro et al. (2020) as "access to various dimensions of information and communication technology (ICT) including physical access, motivation, skills, and actual usage

of digital technologies". According to Soomro et al. (2020), the concept of the digital divide is centered on the availability of various digital technologies, including physical access, motivation and skills. The development of skills related to navigating the internet and information literacy is regarded as important factors to the development of digital divides. According to Hanna (2023) the digital divide can be seen between people living in urban areas and those residing in rural areas, educated and uneducated individuals as well as socioeconomic groups and countries. Developed countries have access to digital technology and internet service where developing countries struggle to bridge the digital divide.

The digital divide is evident in South Africa. South Africa is considered to be one of the most unequal societies in the world (The World Bank, 2022; Sguazzin, 2021). The digital divide is not only an idea within the South African context, but something that has been well documented and adds to the lack of digital competencies in South African society (Matshoga, 2022; Mlaba, 2021; Rich & Pather, 2020; Tustin et al., 2012). Furthermore, the digital divide is reflected in the challenges students face in accessing and adapting to new technological developments (Naidoo & Raju, 2011; Radovanović et al., 2015). The digital divide in South Africa is put into context when it is viewed in accordance with the digital report by Simon Kemp (Kemp, 2022). In this report, it is indicated that 66% of the residents of South Africa have some sort of access to the internet. In most cases, it is expensive and slow, and it is far below access to the internet in North America (92%), Northern Europe (98%) and South America (75%), to name but a few (Kemp, 2022).

Covid-19 only fast-tracked this problem in the higher education environment with regard to internet access and the use of technology to learn and teach (Matshoga, 2022). Lecturers who previously only referred to the theory of the integration of technology suddenly had to implement it at a fast pace. Students were required to learn, interact and submit assessments in a digital environment. Not only did they have to cope with major changes in their education, but they also had to adapt fast and learn digital skills as a matter of emergency (Azionya & Nhedzi, 2021; Bamoallem & Altarteer, 2022; Dube et al., 2022; Du Plessis et al., 2022; Hedding et al., 2020; International Labour Organization Wold Bank, 2021; König et al., 2020; Landa et al., 2021; Perifanou, 2021 ; Schreiber et al., 2021 ; Sonn et al., 2021, Tamika et al., 2021).

While Covid-19 created urgency regarding the adoption of technology, the need for digital competencies is ongoing. In order for students to keep up the rapid pace of technological change, students must develop the necessary digital skills to succeed in the 21st century and in their studies. This can be done by developing digital citizenship and a more comprehensive range of digital skills (Jackman et al., 2021; König et al., 2020). In this context, it is important to re-evaluate how digital competencies are mastered and taught in order to address not only the development of digital competency but also the larger digital divide.

Digital Needs of Pre-Service Teachers

While digital competencies are essential for teachers and the larger society, using digital tools and skills within the education context may be difficult for some users. This then leads to some

pre-service teachers and teachers using technology simply for the sake of using technology, and not evaluating what can be done with specific programmes and platforms and assessing what may be best to use in what situation (Bertram & Waldrip, 2013; Borsheim et al., 2008; Lederman & Niess, 2000). Despite the increasing importance of digital technology, there is not enough evidence to show that its use leads to a good acquisition of digital knowledge or the ability to use that knowledge to teach (Gisbert-Cervera et al., 2022; Usart Rodríguez, 2020; García-Martínez et al., 2019). Pre-service teachers should be able to evaluate their digital resources and how to best implement them from a pedagogical perspective. Moreover, students should be able to use and integrate technology if they have the resources. In addition, using digital technology can help teachers improve the learning environment for their students. According to the United Nations Educational, Scientific and Cultural Organisation (Unesco, 2023), using technology can help progress in various goals such as improving quality education and reducing inequalities.

As Covid-19 closed education institutions around the world and in South Africa, universities tried to find ways to teach in the online environment. However, it became clear that although the assumption might be that pre-service teachers can use technological devices for learning, that was not the case (Howard et al., 2021; Maher, 2020; Tondeur et al., 2021). In this particular study, it was clear that there were particular aspects with which students struggled. Tondeur et al. (2021) state that no single solution will work in all instances. It is, therefore, important to understand the context and needs of pre-service teachers and what is required of them in reference to the requirements of the government.

Digital Requirements for Pre-Service Teachers

While pre-service teachers have specific needs, as discovered in this research, the education policies of the government should be designed to ensure that students are equipped with the necessary skills to participate in a digital society. This is done by training teachers in digital technologies. The realisation that digital competencies should be developed is not something that the Department of Basic Education only realised due to Covid-19. The White Paper on e-Education was published in 2004 (SA, 2004). Thereafter, the Department of Basic Education and the Department of Higher Education and Training (2011) published the Integrated Strategic Planning for Teacher Education and Development in South Africa, 2011-2025, where they indicated that one of the aims for the development of education is the development of teachers' computer literacy (see Table 1). This reference did not address all aspects that needed to be developed, and so the Department of Basic Education (SA, 2019) developed the Professional Development Framework for Digital Learning to give guidelines for the development of teachers. Within the Professional Development Framework for Digital Learning, the Department of Basic Education (2019) identified 13 competencies that teachers need to develop in order to be successful teachers. Each of these competencies has indicators as a guideline for what teachers need in order to be digitally competent (see Table 1).

In order to evaluate what the guidelines of the Department of Basic Education are, it was important to first determine what aspects pre-service teachers struggled with and see what support and guidance could be implemented to support them. This, furthermore, included the evaluation of the curriculum that was in place before and during the Covid-19 pandemic.

Digital Support for Pre-Service Teachers before COVID-19

At the particular higher education institution in South Africa where this research was conducted, pre-service teachers have one module in their first year to learn technology integration in the classroom. This module, a generic, compulsory module, is the basis for technology integration (Bailey et al., 2022). The problem, however, is that one module in the first year, the first semester, is presented without the pre-service teachers experiencing teaching for themselves or the development of any additional content and pedagogy other than what they experienced during their schooling years. I am of the opinion that this then leads to students using technology only for the sake of using technology, as one cannot use and evaluate technology without evaluating the context or the profession of teaching where they will need to implement these technology skills. This opinion is supported by Lederman & Niess (2000) who make the point that, in some cases, technology is only used because it is there, without improving teaching and learning.

Covid-19 and the integration of technology led to the re-evaluation of technology in higher education and the training of future teachers. I needed to re-evaluate how the digital competency gap of pre-service teachers could be addressed. Another issue identified was the lack of confidence among and expectations from the teaching staff, as stated by Ferdig et al. (2020); UNESCO (2023) and the International Labour Organization World Bank (2021). This suggests that some staff members are not confident in effectively using digital technology and, therefore, not necessarily capable of modelling effective technology integration. For example, suppose that pre-service teachers experience only PowerPoint and YouTube being used in a higher education classroom (Marais, 2021). In that case, they might fall back on PowerPoint and YouTube as the main applications or platforms being used in their classrooms too. This leads to a fragmented idea of the integration of technology, as it can be argued that technology is the main drive in the teaching moment, not content or pedagogy (Yelubay et al. 2022).

According to Tussiime et al. (2019) and Falloon (2020), the development of digital competencies cannot be done in isolation as in a once-off technology module as part of their teacher training. It could therefore be argued that the required digital competencies by the Department of Basic Education should also not be done in isolation or as a once-off technology module. It is essential to include such content in all modules so that it can be used in the context of the curriculum, the content that is being taught and the pedagogy, and thus not only to evaluate technology integration but also to use it to evaluate teaching and the best way to facilitate teaching with the use of technology (Dagdilelis, 2018). At this particular higher education institution in South Africa, it seemed that students struggled with the requirements of learning online as was found in this particular research. They struggled to submit assignments,

access information and join classes, from the researcher's perspective as lecturer, regardless of whether they were first- or fourth-year students.

METHODOLOGY

Case Study

A case study research approach was used to explore and examine, on the one hand, what pre-service teachers' needs are with regard to the development of their digital competencies, combining it with the requirements of the national documents and what support may be put in place to support these pre-service teachers. A case study is a primary method used in qualitative research to gain a deep comprehension of a particular issue, event, or phenomenon within its authentic, real-world setting (Creswell & Cresswell, 2017; Crowe et al., 2011). Qualitative research aims to explore and understand participants' feelings towards and understanding of a particular concept (Creswell, 2013, Creswell & Cresswell, 2017; Creswell et al., 2007; Dodgson, 2017; Butina, 2015). Using a case study as part of a qualitative research design aims to delve deeply into a multifaceted, real-world problem (Crowe et al., 2011). The aim of this study of limited scope was not to generalise to a wider population as elucidated in the methodology, this study explored the lived experience and local knowledge of a small group of participants. Although this can be considered a limitation, the results can also be seen as an indicating the need for additional studies using a larger sample group.

Before any strategies could be implemented to support and develop pre-service teachers' digital competencies, I first had to evaluate what their needs were.

Sampling, Data Collection and Data Analysis Methods

In this research, we employed purposeful sampling to choose a subset of first-year pre-service teachers from a specific higher education institution in South Africa. Purposeful sampling in qualitative research is aimed at pinpointing and selecting cases that are rich in information pertinent to the real-world scenario under investigation (Creswell & Cresswell, 2017; Palinkas et al., 2015). The aim was to understand a smaller group of participants lived experience. A purposeful sampling was used in order to use information-rich cases for an depth analysis of participants narratives.

A total of 66 random narratives regarding their digital struggles and competencies as part of an assignment were selected from the larger first-year group of 160 to explore and evaluate their perceptions of the digital skills that they had or might need. This group of first-years are between 18 and 19 years of age, from the Faculty of Education. As digital competencies are a skill that can be of value across all school years, these first-year students may study to be teachers for children from the age of 7 to 18. The narratives were chosen through simple random sampling. This method involves selecting a subset from a group entirely at random, ensuring that every individual in the group has an equal opportunity to be picked (Creswell & Cresswell, 2017). These narratives were then loaded into ATLAS.ti, where they were read and

re-read in order to identify relevant themes. The identified themes were coded and are discussed in the following section.

I was not the lecturer of the particular module and only developed support for students in the particular module with regard to digital competence. Ethical clearance was obtained from the institutions ethical committee and students gave consent that their narratives may be used for research purposes.

FINDINGS AND DISCUSSION

Evaluating pre-service teachers' needs regarding their own digital competencies can be difficult, as the standard of digital competency varies if one looks at different professions and what may be perceived as digital competency. For example, the ability to post on social media or watch videos on platforms such as YouTube or TikTok may create the illusion of being digitally competent, while the individual may not be able to use digital resources within the context of teaching and learning. Within this study the following was explored: 1) Pre-service teachers' needs regarding digital competencies; and 2) Interventions for and support to pre-service teachers.

Pre-Service Teachers' Needs Regarding Digital Competencies

The move to teaching and learning in the online environment during Covid-19 led to some students being able to adapt to their new environment, whereas others struggled with not only devices and access to the internet but also the digital skills needed to engage in their learning. Therefore, this article focuses on students' digital skills, and not on their access to devices.

Evaluating pre-service teachers' needs regarding digital competencies suggests that pre-service teachers know that excellent digital skills are an essential part of their journey to becoming teachers.

For example, participant 38, stated: "We are living in the fourth industrial revolution, as a teacher, I must be prepared for any context, and I have to be ready for everything regarding technology." This statement indicates that this particular pre-service teacher acknowledges that good digital competencies are essential, but it also demonstrates that this pre-service teacher may not be sure which technology or digital competencies may be necessary for the teaching profession.

Participant 19, stated: "As a teacher, I need basic skills to operate an electrical whiteboard, projector and how to set out programs on my computer." This statement, on the one hand, illustrates that this participant has an idea of what hardware can be used in the school environment, but the statement about setting out programs on a computer displays, illustrates that this pre-service teacher struggles with not only evaluating what software may be of use but also how to implement and use such software in teaching.

Participant 21, commented that digital skills were non-negotiable for teachers these days. This argument relates to the idea that, nowadays, all children grow up with technology and, therefore, learning is better when teachers use technology in their classrooms. This pre-

service teacher indicated that he or she believed teachers would have to conduct administrative tasks on a computer. Participant 19 and 21 indicated that they will most likely have access to an whiteboard in the schools where they will teach. Participant 21 stated: “I am sure that I will have a data projector and maybe an interactive whiteboard. I hope the school will have a laptop, I don’t want to take mine to school”.

This may not be the case as not all schools have whiteboards in their classrooms. Unfortunately, there is no discussion in their narratives regarding the pedagogy regarding how or why they may use hardware or software. They only have a strong belief that they need to use technology. This resonates with the previously mentioned idea of using technology only for the sake of technology.

Some participants seem to associate digital competencies with the university. Their argument is centered on the idea that the university uses technology to provide them with resources (Participant 22, 49 and 52). Participant 52 stated that: “I did not come from a school that used any technology, the university should help me and teach me what to do as I have no idea. I only use my phone to look up things for my assignment”. Again, the focus is not on digital skills as an integral part of teaching with success but only as a means to gather information. Two unique ways of thinking came forward from their perceptions of digital competencies. On the one hand, students who have experience with the way in which technology was used when they were being taught or knowledge of technology and its use in the educational context. On the other hand, they are building their idea of technology and digital competencies on how the university is using technology at the moment. This indicates that it is crucial to model good technology integration during higher education lectures and that the integration of technology is not only modelled but also discussed with a group of pre-service teachers (García-Vandewalle García et al., 2021).

It was clear from the data collected that, at first, the participants were only focusing on their learning management system (LMS) when finding information on their modules and completing their assignments. However, several students indicated that the LMS was their main platform for learning and engaging with content. Furthermore, it was clear from the data collected that lecturers started using several platforms. These included the LMS and, to a large extent, platforms such as WhatsApp that the pre-service teachers preferred and pre-recorded classes that could be distributed either by the LMS or via WhatsApp.

For live sessions, the pre-service teachers preferred Zoom, Google Meet and Microsoft Teams on occasion. This can be due to data usage as evident by the substantial requests for data the institution received, 23 267 in total that indicated that they struggle with cell phone data for their classes (NWU, 2020). For a one-hour session, these platforms have different amounts of data. Microsoft Teams use 450 megabytes per hour, Google Meet 500 megabytes per hour and Zoom 540 megabytes per hour (Singh, 2021). They had a number of classes, and the university only provided them with 10 gigabytes data to use during the day and 20 gigabytes per night per month. It can be argued that most students would have liked to use Microsoft Teams,

as it uses less data, but they had to adhere to what the lecturers used, and the pre-service teachers experienced problems logging into Microsoft Teams. Participant 24, stated: “I would rather just use Zoom. It is easy to use and I only have to click on the link. With MS Teams I struggle to join. I am not sure what I am doing wrong.”

When it came to communication during this period, at first, lecturers only made use of the communication portals of the LMS, which included announcements and chatrooms. Furthermore, the pre-service teachers used e-mail as their primary means of communication. Participant 14 stated that: Most lecturers only send us announcement on eFundi, but I miss those and my emails is a mess. I keep correcting my email with the university, but the emails go to some other email that I do not check. I wish they would all just use WhatsApp, I get their message on my phone”. However, as it became clear that regular classes would not return soon, lecturers started to adhere to students’ requests to make use of WhatsApp and Telegram groups. Most of the pre-service teachers indicated that they preferred WhatsApp. This is supported by data from the South African digital report by Kemp (Kemp, 2022). According to this report, WhatsApp is used by 95,4% of internet users aged between 16 and 64, with Telegram only being used by 41,8% (Kemp, 2022). The reasons why students preferred WhatsApp were stated by participant 14 in particular: “We can talk to them instantly, ask questions and even the other students help where they can. We are all struggling with the same things”.

Due to Covid-19, assessment changed as well. Several lecturers moved to students having to write online tests by creating videos, sound files and infographics. This in itself was, according to the pre-service teachers, difficult. Not only did they not know how to make videos, sound files and infographics, but converting and compressing these files were difficult. Participant 55, declared: “I am so stressed. I have to hand in tasks but do not know how to do them. I tried to create a video with PowerPoint as the lecturer asked, but I could not upload it as it was tremendous. I don’t think I will get all the marks. She wanted a video of me with the PowerPoint, but I just don’t know how to do it.”

This was the case with many pre-service teachers, leading me to make sense out of it as follows: Firstly, lecturers need to support pre-service teachers with their digital skills for learning and teaching. Secondly, lecturers need to communicate with pre-service teachers on platforms they are comfortable with and can access. Lastly, lecturers cannot assume that pre-service teachers have digital competencies or can search for solutions themselves on the internet.
Therefore, I needed to address the gap between pre-service teachers’ digital skills and aim to become teachers, while also adhering to the requirements of the Department of Basic Education. This is crucial, not only during Covid-19 but, more importantly, also after the pandemic, as this will enable pre-service teachers to function within the fourth industrial revolution.

Interventions for and Support to Pre-Service Teachers

In order to address the problem discussed above, I realised that it was necessary to create an intervention to address pre-service teachers' digital competencies that was aligned with not only the needs of students but also the requirements of the Department of Basic Education. I wanted to align these skills with the art of teaching, and so, incorporated a support platform within the compulsory teaching practice that all pre-service teachers must complete as part of their Bachelor of Education degree. This support was implemented in stages as part of the support provided during Covid-19, but the digital competency support has become a standard inclusion for all year groups that are completing their teaching practice.

As illustrated in Table 1, the researcher aligned the needs of pre-service teachers with the requirements of the Department of Basic Education. The pre-service teachers indicated that they struggled the most with accessing the different platforms and applications that they needed for submitting assessments. This included creating videos of lessons, experiments and sound files. Furthermore, they found it difficult to work with PDF documents, such as exporting their Word documents to PDF format, splitting PDF documents and especially combining PDF documents when they completed cooperative learning assignments. Participant 35 commented: "The lecturer said I am only allowed to give in a pdf. I typed it in word, she was angry at me, but I do not know how to type in pdf". Participant 22 on the other hand stated: "He wants me to remove some pages from my pdf. I can't delete it, I tried everything".

The university has subscriptions for Microsoft 365 and Google accounts for its students. However, the pre-service teachers struggled to access these and use them on their different devices. Participant 3 stated, "I don't know how to get my Word working. They keep saying I have it for free but I can't get it. Then we have teams classes and the lecturer keeps telling us it is part of Microsoft Office, but I cannot find it", The narrative included several statements that were similar to this. Therefore, it was important to go back to the basics, such as knowing where one should find a link, what one's password is and how various students could work collaboratively in documents.

Another need that clearly came forward was the need to use presentation software such as PowerPoint or Prezi. The pre-service teachers were familiar with using PowerPoint as an application to create slides. However, they needed to create simulated lessons as part of their work-integrated learning assessment. These included not only the content on the slide but, more importantly, also a video and the sound of the pre-service teachers as they present the content. Participant 61 stated: "I don't know how to make a movie from PowerPoint and Google is of no help". Participant 19 stated: "One of the other students made this cool zooming presentation on present or Prezi or something. It is so cool, but I don't even know where to start". Reading comments like these lecturers need to support students and train them in how to record themselves on a PowerPoint slide while they present and how to export these lessons to mp4 format so that the lecturers could assess these lessons.

These needs of students for support are supported by the requirements of the Department of Higher Education, as the department aims to develop teachers' computer literacy as set out in Goal 16 (see Table 1) (SA, 2011). Within the Professional Development Framework for Digital Learning (SA, 2019), the 13 competencies are clearly aligned with the need that the researcher needed to address (see Table 1).

Table 1.

Pre-service teachers' needs, requirements and support (see Appendix)

In guiding the pre-service teachers with documents and videos to address their needs, the technology support were able to deal with several digital competencies as set out by the Department of Basic Education. The pre-service teachers were supported in recording PowerPoint presentations, which led to their professional growth (Digital Competency 1), as they had to explore the technology and develop an informed opinion on the need and use of PowerPoint in this regard. It also required the pre-service teachers to be reflective regarding the challenges that they have indicated in Digital Competency 2.

The approach to developing pre-service teachers' digital competencies feeds into their development of teacher identity. They had to evaluate their role as a teacher and how their own digital competencies might influence their role as a teacher. Digital Competency 5 is one of the competencies we aimed to develop with the pre-service teachers. These included the production of assignments in written documents, delivering presentations by using multimedia, and communication and collaboration with the development of Google Suite and Microsoft 365. The development of these skills led to the creation of content, graphics and learning activities with digital tools.

The assignment that the pre-service teachers had to complete required the use of digital tools and was aligned with the curriculum requitements of the work-integrated learning modules. In doing so, we aimed to align the use of digital tools with the curriculum and model what might be good practices for them to use as required by Digital Competencies 6, 7 and 8.

This intervention was focused on two key aspects of digital competencies as required by the needs of the pre-service teachers and the requirements of the Department of Education. I approached these by, on the one hand, developing the pre-service teachers' competencies to navigate learning in an online environment and their digital competencies to complete their assignments. We called it "Technology for Surviving" (see Figure 1).

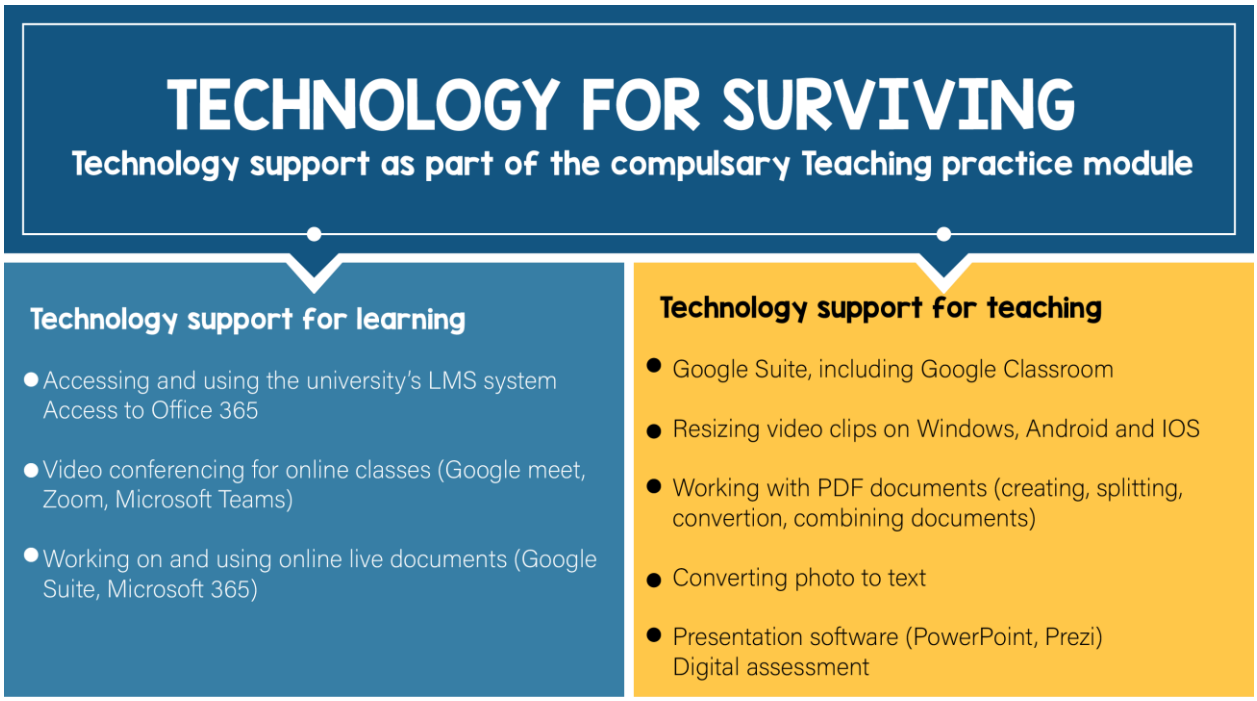
As indicated in Figure 1, several fundamental aspects of learning online and teaching are covered in these foundational aspects of digital competencies. These are by no means the only important aspect of developing digital competencies, but I felt that it was a starting point. For example, it can be used to support students to understand how to access online classes and complete basic tasks for teaching practice and their degree.

Together with the module owner I included a number of tasks within the portfolio of evidence for their teaching practice that included these skills. This was and still is a fundamental aspect of developing digital competencies – building tasks that challenge their competencies

and force those who struggle not only to look at the resources given but also to try and retry these aspects.

Figure 1.

Technology integration in the teaching practice modules



At first, most of the pre-service teachers struggled, but with the help of university staff who kept on referring them to the support created, the group not only was able to hand in their assignments but also developed their digital skills within the context of the content they had to teach.

CONCLUSION AND RECOMMENDATIONS

From the evaluation of the participants data, it was clear that Covid-19 created problematic circumstances for many students concerning using technology to teach and learn. The pandemic required students to know and develop digital competencies that several pre-service teachers did not have. University staff had to adapt to an environment where they could not only talk about the integration of technology but also had to implement it at a fast pace and model using technology to teach to pre-service teachers.

The more significant impact of digital support in this manner was difficult to examine, as such resources became part of the public domain and pre-service teachers could share these resources with whomever they want once they had downloaded them. Still, some university staff and in-practice teachers who asked for the resources not only to use themselves but also to give to their students if needed.

From this research it is recommended that the development of digital competencies cannot be taught in isolation but needs to be part of pre-service teachers' curriculum and their development as future teachers. Furthermore support should be given to pre-service teachers

not only in a compulsory module that all of them have to complete but integrated in all their modules.

As this study was of limited scope it is recommended that from the results a larger sample group is consulted as to see if pre-service teachers continue to struggle and to disseminate how the support develops their digital competencies.

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APPENDIX

Pre-service teachers' needs	National documents	Support supplied to pre-service teachers as a means to support them immediately
• Accessing and using the LMS of the university • Assessing and using Office 365 as supplied by the university • Accessing and using video-conferencing software • Using live documents such as Google Suite and Microsoft Office 365 • Creating and resizing videos for assignments • Working with PDF documents (resizing, splitting, joining and compression of documents) • Presentation software such as PowerPoint and Prezi • Digital assessments	***Integrated Strategic Planning Framework for Teacher Education and Development in South Africa: 2011-2025* (SA, 2011)** ○ "Goal 16: Improve the professionalism, teaching skills, subject knowledge and **computer literacy** of teachers throughout their entire careers" ***Professional Development Framework for Digital Learning* (SA, 2019)** ○ **"Digital Competency 1: Professional growth and knowledge** ▪ Adapt the habit of an enquiring mind regarding the educational value of using digital tools and resources ▪ Conduct self-initiated research on how technologies can help to enhance the role of an educator ▪ Conduct research on how digital tools and resources can influence teaching and learning in a subject or phase ▪ Be willing to explore opportunities and not feel threatened by the use of digital tools and resources ▪ Develop an informed opinion on the value of digital tools and resources for enhancing the achievement of lesson objectives" ○ **"Digital Competency 2: Be reflective about challenging current digital learning and teaching practice** ▪ Pause for thought about the effectiveness of learning after each session in which you have used digital tools and resources ▪ Share the outcomes of your lesson reflections (successes and challenges) with others and consider their feedback ▪ Evaluate your options if you have identified a need for a different approach ▪ Implement ideas about new approaches to teaching and learning using digital tools and resources that you have selected ▪ Use a variety of techniques to identify your developmental needs" ○ **"Digital Competency 3: Understand the role of the teacher, the learner and digital resources during digital learning** ▪ Be aware of different approaches to teaching and learning that you can use strategically to facilitate learning ▪ Set curriculum learning objectives before identifying media and resources, digital or not ▪ Identify appropriate digital tools and resources, and know when using them will be distracting or ineffective ▪ Plan learner engagement that will be enhanced by the use of digital tools and resources" ○ **"Digital Competency 4: Participate in local and global professional learning communities** ▪ Attend workshops and conferences as much as your circumstances allow	Guiding documents and instruction videos on how to complete tasks set out in pre-service teachers' needs.

Pre-service teachers' needs	National documents	Support supplied to pre-service teachers as a means to support them immediately
	▪ Engage in dialogue with colleagues at your institution about the integration of digital tools and resources ▪ Develop an online professional learning community of people with similar educational interests" ○ **"Digital Competency 5: Select appropriate digital tools and resources when fulfilling the roles of an educator** ▪ Produce written documents ▪ Process numerical data ▪ Deliver presentations using multimedia ▪ Communicate and collaborate ▪ Create, publish and share content ▪ Design graphics ▪ Design interactive learning activities"	
	Curriculum Focus ○ **"Digital Competency 6: Integrate digital tools and resources to enhance learning objectives in various learning environments** ▪ Plan the strategic use of digital content resources before, during and after the lesson ▪ Plan learner-centred access to digital tools and resources as and when appropriate ▪ Address the diverse needs of all learners and provide equitable access to appropriate digital tools and resources ▪ Provide learners with the opportunity to share knowledge and skills using digital platforms" ○ **"Digital Competency 7: Develop learners' global awareness and understanding using digital communication and collaboration tools** ▪ Design learning that addresses real-life issues aligned to the curriculum ▪ Design learning activities that require interaction or collaboration between your learners and the local or global community ▪ Design learning in your class in which learners use digital communication and collaboration tools" ○ **"Digital Competency 8: Transform learning through the innovative use of digital tools and resources** ▪ Explore new uses for established digital tools and resources ▪ Explore opportunities offered by new digital tools and resources ▪ Facilitate learning that was not possible before the introduction of digital tools and resources ▪ Understand the impact of digital tools and resources on the nature of learning" ○ **"Digital Competency 9: Enhance class management, assessment and feedback processes through the use of digital resources** ▪ Use digital productivity tools to create and administer tests, examinations and assessment tools ▪ Use digital communication and collaboration tools, where appropriate, to support dialogue between learners and their teacher	

Pre-service teachers' needs	National documents	Support supplied to pre-service teachers as a means to support them immediately
	▪ Use digital tools and resources to design diagnostic assessment tools ▪ Organise and monitor learning activities using online resources similar to a blog or learning management system" ○ **"Digital Competency 10: Integrate learners' skills development in terms of digital literacies with curriculum-based learning** ▪ Design integrated activities that develop learners' information skills while pursuing curriculum goals ▪ Design integrated activities that develop learners' digital literacy skills while pursuing curriculum goals ▪ Design integrated activities that develop learners' media literacy skills while pursuing curriculum goals ▪ Promote and model the safe, legal and ethical use of digital information resources"	
	Leadership ○ **"Digital Competency 11: Demonstrate commitment to the vision for digital learning in the province, district and school** ▪ Implement the key ideas of the Professional Development Framework for Digital Learning ▪ Apply the provincial digital learning guidelines to your planning ▪ Implement the school's strategy for digital learning" ○ **"Digital Competency 12: Accept responsibility for planning and implementing digital learning at the school** ▪ Participate in the formulation of school digital learning planning at your institution ▪ Evaluate your role in implementing digital learning strategies at your institution ▪ Be a leader in managing change related to learning using technologies ▪ Build on capacity in colleagues to accept responsibility and implement digital learning" ○ **"Digital Competency 13: Initiate peer support and collaborative, work-place learning** ▪ Engage peers in exploratory conversations about using digital tools and resources ▪ Support peers in their implementation of new ideas about and approaches to using digital tools and resources ▪ Share knowledge and experiences of using digital tools and resources with your peers"	