

The Feasibility of Digitalizing Teaching Practice Through Mobile App Development: Supervisors' Reactions

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ABSTRACT

With the closure of educational institutions during COVID-19, some leadership and management teams resorted to technology for online teaching. However, for the teaching practicum (TP) module, the move to online required specially designed interventions, resulting in a variety of different TP COVID-19 configurations. Fortunately, at the outbreak of COVID-19, a group of academics at a South African Open Distance and E-Learning (ODEL) Institution were on the verge of launching a pilot-study with a TP mobile app solution. To better develop a mobile app, this article reviews recent literature on the integration of online technologies in the contemplation of TP COVID-19 interventions and ask the research question: What were TP supervisors' responses to the feasibility of a TP app? The literature showed an absence of a comprehensive mobile app, while supervisors displayed enthusiasm towards the proposal, but caution against the uncertainties of technological capacity and internet accessibility. Recommendations for the mobile app proposal are suggested.

KEYWORDS

4th Industrial Revolution, Mobile Application, Supervision Assessment, Teaching Practice, Technology Education, TPCK

INTRODUCTION

While teacher education institutions have resorted to technology and online learning to overcome the immediate obstacles that COVID-19 imposed on the education sector, lessons for longer-term sustainable solutions for technology integration should not be neglected. With the closure of physical

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facilities at educational institutions during COVID-19, universities adopted online teaching and assessment as interim measures to deal with the sudden disruption of teaching and learning. However, for the Teaching Practice (TP) module, online transition was not without problems because of the policy requirements that ensure quality outcomes. In South Africa, the policy guiding the TP module is encapsulated in the document: Minimum Requirements for Teacher Education Qualification (DHET, 2018). This document defines TP as “practical learning”, which involves learning both “in practice” and “from practice”. The TP module becomes pivotal to the training of student teachers, and the document stipulates that “learning in practice” should take place in authentic settings, drawing from various learning situations using case studies, audio-visual materials and lesson observation to assist the student-teacher in practice (Buckworth, 2017). Considering the policy that informs the supervision and assessment of this module, it could not proceed as normal under COVID-19 conditions.

In South Africa, teacher education institutions mainly offer two professional qualifications: a four-year B. ED degree and a Postgraduate Certificate in Education (PGCE) (Davids, 2015). Prior to COVID-19, the TP required the presence of the student and supervisor in a classroom, which is referred to as “school-based learning” or “work-integrated learning” (Velzen, Volman, Brekelman and White, 2012). During this period, the student arguably develops the essential five types of knowledge, demonstrated as disciplinary, pedagogical, practical, fundamental and situational learning (DHET, 2015). During the TP sessions, the student teacher moves into a critical learning space where the theory taught in the university lecture room is put into practise under the supervision of a mentor (classroom-based) teacher and the supervisor, who visits the classroom at arranged times. The student teacher is supported by a school mentor or a subject specialist, creating an apprenticeship experience. Any reconfiguration of TP during and post-COVID-19 should, as far as possible, remain committed to the stipulated policy objectives.

During the years of teacher training, the TP student is ordinarily expected to spend substantial time in a classroom (DHET, 2020). The policy stipulates that school-based TP, including supervision and assessments, constitutes an essential part of the B.ED and PGCE programme. A student should spend a minimum of 20 weeks and a maximum of 32 weeks in the classroom over the four-year duration of the B.ED degree and between 8 and 12 weeks for the PGCE qualification (DHET, 2015). During COVID-19, these normal processes could not take place, compelling teacher education institutions to adjust their programmes. Invariably, the rush to develop online platforms became an integral part of their solutions.

While online teaching and assessment are fast becoming normal practice in teacher education, there has been limited experimentation with online supervision and assessment of the TP module. However, COVID-19 accelerated notions of e-practicum for TP purposes (Ersin and Mede, 2020). A plausible explanation for the scarcity of online platforms or mobile app solutions for TP supervision may be that institutions design customised curricula, following national policy frameworks but base these on their local contexts (Davids, 2020). Additionally, teacher educators do not necessarily have the software development skills to respond digitally to their pedagogical needs. During COVID-19, teacher education institutions worldwide devised a variety of TP interventions, integrating online platforms and solutions. Fortuitously, at the outbreak of COVID-19, a group of academics, who are also experienced TP supervisors at the University of South Africa (Unisa), were on the verge of launching a pilot study with a TP mobile app solution. While taking a longer-term view of developing an app to enhance TP at Unisa – especially since COVID-19 witnessed a scramble for online solutions – the authors of this article deemed it prudent to review the recent literature to see how technology was integrated in TP solutions and whether mobile apps were deployed. From this premise, we proceeded to explore the feasibility of a TP mobile app, considering the responses of a group of TP supervisors in a pilot study. While the study was focused on developing an ICT-based solution for an ODeL context, common functionalities of the online platform, such as evaluations, feedback and reflections, may be applicable to face-to-face institutions.

The pandemic gave rise to a range of flexible online learning modes in distance learning, which – according to Demuyakor (2020) and Toquero (2020) – provide prevention and control over the spread of the virus. For example, social media has become the dynamic gateway for delivering educational information across the globe since the outbreak of the COVID-19 pandemic (Mulenga and Marban, 2020). Mobile learning (m-learning), which combines mobile computing and e-learning, adopts the use of mobile technology such as smartphones, personal digital assistants (PDAs), tablet PCs and laptop PCs to achieve ubiquitous learning, which emphasises learners' mobility and personalised learning (Chee et al, 2017). Furthermore, m-learning – according to Naciri et al. (2020) – is a learning paradigm that is offering some promising alternative learning avenues, capable of providing exciting learning opportunities to students who were unable to attend schools during the COVID-19 pandemic; these would also apply to any future pandemic. Moreover, researchers such as Basilaia and Kvavadze (2020) recommend the use of Edupage, which has most of the functions that are suitable for general education processes with the basic free functionality such as curriculum, timetable, attendance control, homework, assessment, grading and messaging features. In addition, according to Xenos (2018), the virtual classroom, which is a technologically driven classroom that supports self-directed and self-regulated learning, became the other alternative to online learning (Chukwuemeka, 2021).

Some of the following guidelines for the use of virtual environments are prescribed by Huang et al (2020): (i) Build a trustful learning environment by providing continuous engagements so that students can feel a sense of belonging to the group and classroom; (ii) provide timely feedback to students so that they can find answers and acquire a sense of achievement in the virtual classroom; and (iii) allow students to gain a sense of emotional identification and release their desire for competition or performance in the virtual classroom. Continuous engagements with students during Teaching Practice is crucial so that student teachers can master the art of teaching in the various disciplines. Feedback is another form of support for students in ODeL institutions and thus the app would assist them in providing a virtual classroom. There is no doubt that the pandemic has had a significant impact in adjusting the thinking in the educational sector to achieve its objectives. However, TP – as a segment of teacher education – demands its own dedicated solutions to conform to the industry standards.

The context of this study was the University of South Africa (Unisa), the largest ODeL university in Africa, with 116 234 students registered in the College of Education. Of this number, 49 720 were enrolled for TP in 2018 and thus required real, “in-person” visits from TP supervisors. According to Unisa's 2018 statistics, only 14 804 (29,77%) received personal visits from their supervisors, leaving 30,2% plus 17,53% unplaced students without supervisors (Davids, 2020). TP is managed and administered by a Teaching Practice Office (TPO), consisting of administrators and academic specialists. Given the scale of TP at Unisa in comparison with conventional universities, online technology, such as a mobile app for supervision and assessment, should be contemplated as a solution.

With a view to developing a mobile app for TP purposes, this article reviews recently published literature on how online technologies were integrated in contemplating TP COVID-19 interventions and then answers the research question: What were TP supervisors' responses to the feasibility of using a mobile app for TP supervision purposes? Reflective reports based on TP supervisors' responses to the TP mobile app proposal served as data, while technological pedagogical content knowledge (TPCK) was used as an interpretive conceptual lens to develop the findings.

Having introduced this study with an explanation of its background, rationale and context, we will now consider a limited scoping review (Joanna Briggs Institute, 2015) of recent studies relevant to TP during COVID-19, including the mobile app proposal. This will be followed by an explication of the conceptual framework selected for this study. A methodological note explains what we regard as data and how data were gathered and analysed. Thereafter, we present the main findings of the study. A conclusion and recommendations pertaining to the proposal conclude the article.

LITERATURE REVIEW

A selected scoping literature review was conducted, dealing with how teacher education institutions integrated technology and online platforms into their TP COVID-19 plans. This included materials from local and international teacher education journals and official documents from the South African Department of Higher Education and Training (DHET), the Department of Basic Education (DHET) and Unisa. These references assisted in sketching a comprehensive picture of technology integrating COVID-19 TP plans, both locally and abroad.

This section comprises the following subsections: various e-practices “Teacher Choices in Action”; and Unisa’s COVID-19 TP plan. Figure 1 (below) summarises e-practices and their relation to the conceptual framework employed in this study (TPCK). The actual mobile TP app is presented as part of the literature (Davids, 2020).

Various Technology-Based E-Practices

TP COVID-19 programmes have incorporated technology in a variety of ways. An assortment of e-practices emerged in articles published recently on TP and COVID-19. Descriptive words such as “e-practicum” and “e-tutoring” are used as key concepts in a study conducted in Turkey (Ersin and Mede, 2020). The Turkish study reported how TP was conducted by setting up virtual classrooms of 25 students, with six presenting microteaching lessons to their peers using the Zoom videoconferencing platform. The teacher performed the function of e-tutor and provided feedback as a form of e-mentoring (Ersin and Mede, 2020). While the disciplinary subject knowledge was English as a second language, the e-practicum as an innovative online experience was reported to be useful because it provided opportunities for online teaching and helped students to overcome online fears. In this study, there was a partial integration of online platforms in the TP COVID-19 plan.

A Spanish study reported how TP students were required to prepare videos, tutorials and physical activities to be sent to students, to complete the tasks at home (Varea and Conzalez-Calvo, 2020). Subsequently, the TP students were required to submit their experiences as graphic impressions in which they displayed fear and uncertainty about their future jobs. Technology was used as pedagogy and this study illustrated creative thinking and a willingness of teachers to do physical education virtually (Varea and Conzalez-Calvo, 2020). Another simulation-based TP initiative was reported by Sasaki, Goff and Dowsett (2020). In this study, the viability of a technology-based simulated classroom was created to support the TP experiences of student teachers. The study suggests that technology-based simulated classrooms may supplement and support the TP experience, but owing to the newness of this option, no conclusive findings were offered to promote simulation as a comprehensive solution.

A study conducted in England reported that trainees received online tutorials and an inventory was used to assess students based on existing reports, which formed the basis of the decision to let them pass or send them back to school to finish their outstanding time (La Velle, Newman, Montgomery and Hyatt, 2020). Although there was an increased use of online platforms, TP students were not required to display any practical advancements in online demonstrations. A lesson learnt was that teacher education would, for instance, be concerned with pedagogy to the extent of considering how a lesson would be taught online, in addition to its normal visualisation in a physical classroom (Le Velle et al., 2020).

The above-mentioned studies invariably integrated online technology and subject knowledge in the design of interim COVID-19 TP plans. The distribution of technology and internet infrastructure influenced institutions’ TP plans. The literature mentions various e-based variations and practices that were designed to supplement but not replace TP. These variations included notions of e-practicum, which incorporates e-tutoring and e-mentoring. Simulation of online classroom creations and microteaching lessons were also popular. There is a clear acknowledgement of the technological, pedagogical and content knowledge foci and some degree of technology integration. For example, in the study of Varea and Conzalez-Calvo (2020), physical education was the content knowledge

being taught and technology was accommodated using classroom simulation. In the Turkish study (Ersin and Mede, 2020), the content knowledge was English as a second language. For the students, technology integration introduced them to new experiences in pedagogy.

The following subsection provides a brief review of a dedicated COVID-19 proposal that has been conceptualised by a group of TP academics in South Africa. The initiative is technology-based but offers a comprehensive, credit-bearing module, anticipated for implementation at several South African universities (DHET, 2020).

“Teacher Choices in Action”

Robinson and Rusznyak (2020) reported on how a group of teacher educators in South Africa set about developing materials to constitute a TP module as a supplement to reduced school-based placement. The module sets aside the imperative of situational learning in favour of other kinds of learning associated with school-based learning. Entitled “Teacher Choices in Action” (DHET, 2020), the module consists of seven units, weighted at eight credits (DHET, 2020), which is equivalent to 80 notional hours. It claims to be practice-based, prescribing tasks involving the viewing, analysis and critique of selected recordings, transcripts and appropriate classroom resources (DHET, 2020). The student is expected to submit an e-portfolio to their institution, showing evidence of lesson design as a conscientious response to a set of choices around knowledge, learner support, assessment and action (DHET, 2020). In the final analysis, the proposal claims that under COVID-19 conditions, student teachers were given an opportunity to analyse how key questions are enacted in authentic teaching environments (Robinson and Rusznyak, 2020). As an online module, the project is expected to be implemented at most teacher education institutions in South Africa as from August 2020 (DHET, 2020).

The “Teacher Choices in Action” module is a pragmatic proposal that relies on voluntary adoption by participating and non-participating teacher educational institutions. It makes use of a fully online platform, incorporating video-recordings, open educational resources (OERs) and online support. It is an online TP module, integrating common practices such as simulation and microteaching activities. The proposal employs various e-practices but does not offer a mobile app solution.

UNISA’s COVID-19 TP Plan

During the initial few months of the lockdown period, Unisa’s TP Office was inundated with requests from students for guidance and assistance. During this time, the staff were at a loss as to how to support their students who contacted them telephonically and via e-mail. Unisa uses the myUnisa learning management system (LMS) as an online teaching and learning platform. The system provides for announcements and discussions with back-up possibilities in the form of SMSes and the Microsoft-generated myLife e-mails. Online communication between staff and students could be maintained during the initial few months of the pandemic, but fortunately this stressful situation ended with the receipt of clear guidelines from the college’s management when the special COVID-19 TP plan was announced.

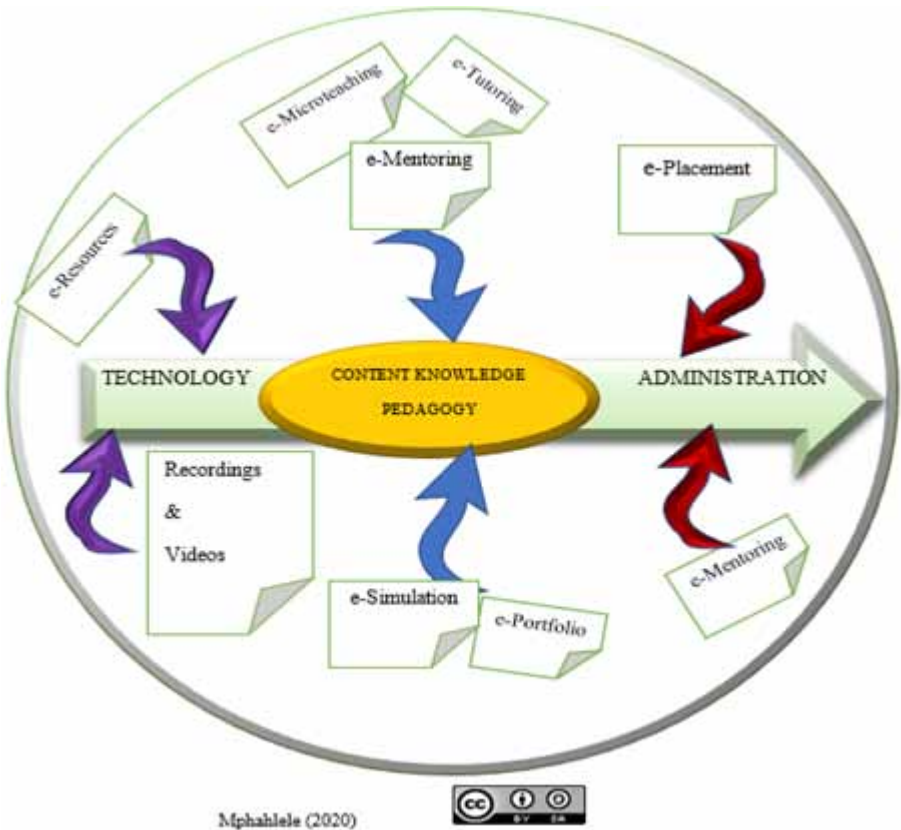
While there was uncertainty as to how COVID-19 would evolve, the move to lockdown level 2 (18 August 2020) introduced a gradual phasing-in of schooling, which provided light at the end of the tunnel. An initial circular from the DHET (dated 30 March 2020) provided a framework for teacher education institutions to reduce their normal TP sessions and improvise with technology to devise their COVID-19 plans for TP. The Unisa teaching community received a clearer perspective in the form of a special COVID-19 strategy, as explained below.

Based on a special memorandum (Unisa, TP COVID-19 strategy, 30 July 2020), Unisa’s TPO published their COVID-19 guidelines for stakeholders. The Unisa COVID-19 TP plan was primarily informed by a document issued by the Director-General in the Department of Basic Education (letter dated 24 June 2020), making the following recommendations: TP should not take place before September 2020, or until the provincial education departments deem it appropriate; universities

must liaise with the provincial education departments to identify schools where students can do their TP; TP will be prioritised for final-year (4th year) B.Ed and Postgraduate Certificate in Education (PGCE) students; and simulated classroom environments (e.g. microteaching, peer teaching, use of avatars/virtual teaching) may be used in partial satisfaction (for up to 2 weeks) of TP requirements. No more than two weeks of the required school-based TP time should be accommodated through these alternatives.

As in the case of studies abroad, the DBE's guidelines also encouraged the inclusion of simulated classroom environments and "virtual" teaching, implying online learning. The DBE's document provided a framework for the Unisa TPO to make provision for the use of e-practices such as simulation, e-portfolios, e-assessment and e-support. For practical reasons, Unisa decided to reduce the period of compulsory TP to allow 4th-year B.Ed and final-year PGCE students to do their practicals in a classroom environment. Alternative TP activities equivalent to no more than two weeks of school-based TP may include two of the following options: 1 week of simulated classroom and/or one week of online learner support and/or one week of learner support in catch-up programmes and/or one week of service learning (Unisa, TP COVID-19 letter, 2020). Included in the e-portfolio should be evidence of one week of simulated classroom and/or one week of online learner support and/or one week of learner support in catch-up programmes and/or one week of service learning. By implication, students are also expected to be fully conversant with online literacies and have internet access. The Unisa case study enriched the range of e-practices that are demonstrated in Figure 1 in relation to its association with TPCK (Keating and Evans, 2001; Koehler and Mishra, 2005).

Figure 1. E-practices, teaching practice, and TPCK



A critical review of the literature shows a dominant trend towards a greater reliance on technology and online platforms in an assortment of e-practices (Ersin et al., 2020; Varea and Conzalez-Calvo, 2020; Sasaki et al., 2020; La Velle et al., 2020; Robinson and Rusznyak, 2020; Unisa, TP COVID-19 strategy, 2020). The authors of this article have not come across fully developed TP mobile app solutions in the literature, other than the mobile app proposal reported on below (Davids, 2020). The authors are, however, aware of commercialised online platforms that offer general teaching and learning packages, but not a stand-alone TP mobile app. What follows is a description of a customised TP mobile app designed for use in an ODeL context.

A TP MOBILE APP PROPOSAL FOR AN ODEL CONTEXT

After a period of employment in a TPO at a teacher education institution, the first author became deeply engrossed in TP as a specialised domain in teacher education (Davids, 2015; Davids, 2016; Davids, 2017 and Davids, 2020). Exposure to the Unisa TP system as a supervisor and trainer led this author to compile a draft proposal for a mobile app. Funding was received from the institution's research and innovation department. The mobile app design was a partnership between a software developer with knowledge of the Unisa ICT infrastructure and the first author (project leader). It was agreed that the framework for the mobile application would consist of three components: technical infrastructure, software tools and a three-tier system architecture. The system will be hosted on one of the leading public cloud providers as the Unisa server currently has limited storage capacity. The mobile app will facilitate placement, supervision, evaluation and student support. The app will create an interactive digital platform between the TPO, student, supervisor and mentor-teacher.

This section of the article is based on the publication of the proposal in a handbook on digital classroom technologies (Davids, 2020). The proposal takes cognisance of the Unisa TP architecture to administer and manage TP. Open-source software (OSS) was used to reduce costs and to add usable plugins to enhance the functionality of the app, such as Google Maps and location detection. Microsoft Word will be used to facilitate system documentation, as required by the Unisa TPO. An Ionic framework will be used to create a hybrid development platform to facilitate interactive communication and multi-platform applications (Davids, 2020). An Ionic framework is an application development platform used to build mobile applications with ease (<https://ionicframework.com/framework>). WordPress, a free and open-source content management system (CMS), will be incorporated into the system design to cater for plugin architecture, allowing users to extend the features and functionality of a website. An exciting feature of the system will be the use of webinar technology (also OSS) for the purpose of real-time and delayed communication between student and supervisor. Because Unisa is using MS Teams as a videoconferencing platform, the app will be configured with the institution's active directory to allow participants to access the system, using their login username and password.

In an unprecedented way, COVID-19 caused videoconferencing technologies and webinar tools to proliferate, thus enhancing online learning and bringing life to interactive digital platforms in real-time, virtual communication (Mobo, 2020; Wang and Hsu, 2008). Although webinar technology is relatively new, as a component of an application, studies show that student-trainers using webinar technology in pedagogy are satisfied with webinar-facilitated delivery of their lessons (Wang and Hsu, 2008). All universities use computer-mediated communication (CMC) systems, such as Moodle. Data will be routed towards an institutional repository that will archive reports, documents and evaluation sheets (Davids, 2020).

The mobile app, which is the focus of this article, will use an architecture based on a three-tier distributed environment, with the tiers being capable of communicating with one another across a network (Davids, 2020). This app is specifically designed to support clients with high-function web application and enterprise servers. A typical three-tier architecture consists of a user interface or client tier containing logic related to the presentation of information through a browser. At the business-level tier, there is a transactional interface to the business domain, which supports the needs of the

user interface model. The persistence data tier, isolates the client from changes in the database, where data are organised so that they can be easily accessed (Davids, 2020).

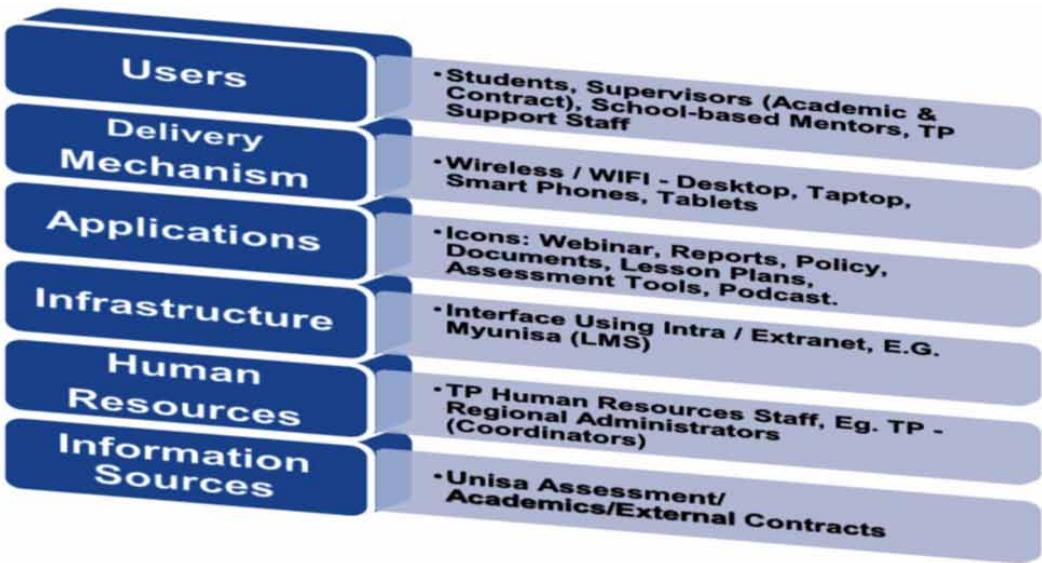
Figure 2 depicts the flow of information from the university students' system database, coming together where hard- and software integrate via the applications, such as reports and documents. Each level identifies the main components, accompanied by a description of each in terms of its main features. Figure 2 simplifies the technical functioning of the mobile app, showing the link between its soft- and hardware relations.

Six teams, each consisting of three participants (supervisor, student and mentor-teacher), three Unisa TPO administrators and two ICT support staff (part of software developers), are preparing to launch the first pilot study, which will be followed up with feedback to improve the app's functionality. After a second pilot run, the prototype will be presented for consideration as a supplementary TP tool. Should the prototype receive favourable reports, an accompanying website for training purposes is envisaged.

Theoretical Framing: TPCK

When technology is applied in an educational setting, a new component is added to the learning environment. This has conceptual implications for the participants and technology must therefore be taken into consideration as an extra element of learning. Whereas teaching and learning might have previously focused on the content and pedagogical knowledge (CPK) (Shulman, 1987), the use of technology adds another dimension to the context. In an extension of Shulman's theory, scholars added the "technological" component by adding the "T" to refer to TPCK or TPACK (Keating and Evans, 2001; Koehler and Mishra, 2005). TPCK explains the convergence of knowledge content, pedagogy and technology in educational settings. Educationists may generally be familiar with the notion of CPK, with its focus on teaching "what", i.e., content knowledge (subject) and "how", indicating the pedagogy used to transmit the knowledge. With the incorporation of technology, a new dimension is added. TPCK is divided into technological knowledge, which is based on knowledge of hardware and software, including internet connectivity; pedagogical knowledge; and content knowledge. TCPK allows for systematic planning, implementation and evaluation of TP content when employed in teacher education. At the heart of TPCK is the view that technology is not a vehicle that simply

Figure 2. Teaching practicum web portal (Davids, 2020)



delivers information; it also facilitates acquisition of cognitive tools that amplify students' cognitive processing – such as critical thinking and problem-solving (Kramarski and Michalsky, 2010). In this project, TPCK provides a comprehensive conceptual framework to explain the variables and practices related to each of the constituent concepts: content, pedagogy, technology and internet connectivity.

The above explains the conceptual framework used in a study that investigates how a sample of TP supervisors responded to the feasibility of a TP mobile app proposal. The following section describes how data were collected.

METHODOLOGY AND DATA COLLECTION

As background to the limited use of mobile apps in TP, the literature demonstrates a trend to integrate technology and online platforms, but not the use of fully developed apps. To answer the research question about the responses of TP supervisors to the feasibility of a mobile app solution for TP, five qualitative reflective reports of TP supervisors were analysed to assess their expectations and concerns regarding the use of a TP mobile app designed to be piloted in an ODeL context. Most participants were introduced to the concept of a TP mobile project when they agreed to become part of an innovation grant application under the auspices of Unisa's Research, Innovation and Commercialisation Directorate. The project operates under ethical certificates from the College of Education, Institutional Ethics Committee (Ref #: 2019_RPSC_013) and the Gauteng Department of Education. The proposal was shared with the participants through publications (Davids, 2017; Davids, 2020), presentations and discussions. For the purpose of data collection, participants were requested to reflect on the proposal and their knowledge of the project, and submit their responses as a reflective report.

The data, in the form of TP supervisors' reports, were analysed to identify emerging patterns of meaning in response to the research question (Denzin, 2012). The patterns were developed into themes that became the main findings of this study presented below.

FINDINGS AND DISCUSSION

In this section we will highlight what emerged as common TPCK (Koehler and Mishra, 2005) in the supervisors' reflections. The findings are presented as responses by the TP supervisors to the mobile app proposal.

Rapid ICT Capacitation and Transformation

The immediate demands that COVID-19 imposed on TP /accentuated the absence of a mobile app solution at this moment in the 4th IR. The necessity of operating at a digital level in education was obvious when Unisa supervisors realised that the TP module needed a customised solution, different from the ordinary online delivery platforms. The scale and distance between TP stakeholders influenced their responses significantly. Regarding the immediate need for a mobile app, one supervisor stated the following:

It will transition TP from manual to digital by reaching all or most students, given the scale of TP students at UNISA, with approximately seventy thousand (70,000) student registrations. An app will provide updated technology and training. There is currently a lack of supervisor technology knowledge, low ICT capacities and a lack of internet and devices in most schools.

Another supervisor noted that the accompanying training would serve as a catalyst for upgrading computer literacies and stimulate creative ways to support students, as the supervisors would be following a learning curve in new learning environments:

It is envisaged that the TP app project will bring about creative and innovative ways of supporting the many students registered for TP modules. This will bridge the distance gap that currently exist. However, given that most people are still resistant to technology and related changes, there might be challenges. The project team will need to design ways of mitigating these challenges.

The introduction of a mobile app as the medium of teaching and learning will enhance ICT capacitation, especially in untransformed sectors of the educational system.

Accelerated Communication and Feedback From Supervisors

The webinar and videoconferencing feature of the mobile app will facilitate pre- and post-lesson communication and feedback, which is essential for the student to develop content knowledge and professional skills. The interactive platform will also facilitate the sharing, saving and storage of evaluations and feedback reports. Often, the manual submission of reports requires photocopying or carbon paper, which is time-consuming and unreliable. Electronic storage and feedback are immediate, more effective and promote reflexivity. One of the supervisors made the following comment:

I believe the App will improve the way we do things, the way we assess and communicate with our students during their teaching practice. There will be direct communication between the students and the university. When there is open communication, students will feel supported. In addition, supervisors will be able to assess students in real-time and give them immediate feedback. Often, students do not receive feedback on their teaching practice. This hampers their development as teachers. Furthermore, the App will provide students with the opportunity to reflect on their teaching. Since they can go back and watch their lessons, they can be able to see where they went wrong or what they could do to improve their teaching.

Building a Cyber (Online) Community of Practice

Open lines of communication will enhance collaboration across distances and unite individuals in remote areas. An online solution will promote disciplinary and pedagogical sharing among the students, resulting in their discovering common interests and recognising the value of teamwork. Loneliness, which is often associated with online and distance education, will be reduced through an interactive mobile app. A supervisor explained this as follows:

The App will promote collaboration among students, students can share their lessons with their peers, and they can comment on each other's work ... in this manner they will learn from each other. Collaboration will break the isolation and loneliness that most of our students are experiencing.

These reflections indicate the potential of the app to build cyber communities that are mutually beneficial. Online communities share their expertise, knowledge and skills and improve the quality of teaching practice.

Anxieties and Fears About Connectivity and Data Costs

The mobile app will fail unless it provides support to students and supervisors who have anxieties and fears due to lack of computer skills, internet connectivity and high data costs. Supervisors therefore raised the issue of the necessity of providing training and support to allay these anxieties and fears associated with the transition to online supervision. A supervisor made the following comment to highlight the notion of “digital immigrants” and “digital natives” to describe the uneven distribution of computer literacy skills in need of nurturing among the supervisors and students:

As academics we are faced with ever-increasing demands to integrate technology in our teaching with the expectation that technology will improve the quality of education we offer. However, some academics are 'digital immigrants' they still need to learn technological skills and how they can integrate technology in their teaching. In the same vein, we take it for granted that our students are 'digital natives' that have different orientations to learning and to knowledge but there are exceptions to this as some are battling to use internet affordances for their studies.

Internet access and cost of data highlight the social inequalities and the digital divide in South Africa. South Africans recently became increasingly aware of the fault-lines of the country's inequalities, exposed by the fragile ecosystems of the poor being violently shocked into meltdown (Sayed and Singh, 2020). Soudien (2020) calls for every child to be equipped with a device so that they can connect in more resource-challenged environments, thereby giving them access to qualified teachers, classrooms and nutritional support. Given the large number of students that register at Unisa to become teachers, the institution cannot ignore the cost of data and access to the internet as essential enablers to operate a mobile app effectively. A supervisor raised the following point:

Our students come from different environments, in some cases there is infrastructural problems such as access to internet where they live even in schools that they intend to do their teaching practice at. This could affect the use of the app as they need to be connected to be able to enjoy the benefits of the app ... In addition, some students do not have smart phones, laptop or tablet to be able to connect to the internet. Data is another serious problem for most of the students as downloading documents and the app itself could consume a lot of data.

Supervisors also mentioned the need to consider the provision of hardware and access to the internet as critical for the success of any long-term mobile app solution.

Paradox of Institutional ICT Policy and Realities in Practice

Notwithstanding the presence of digital transformation policies, a mobile app for TP may not succeed without the support of academic and administrative staff at all levels of the institution. One supervisor noted that technological innovation potentially threatens job security and may lead to resistance to transformative practices on the ground:

We all assumed that the young generation are technological savvy and it is expected of them to embrace the initiative once it's introduced. However, I have discerned some reluctance from administration staff to the digital placement form introduced at the beginning of 2020. Any initiative requires buy-in and understanding the pros and cons and how it will benefit the users before embracing it. Fear and anxiety experienced may be that the digital tool will require fewer people and thus lead to job losses despite assurances that there are more advantages than disadvantages, using the app or any other form of technology.

Despite Unisa's commitment to increase its digital footprint, the TP mobile app project will not be feasible without the support of management and ICT in terms of software maintenance and upgrades.

CONCLUSION AND RECOMMENDATIONS

Developing a mobile app as a comprehensive TP solution may appear to be progressive and desirable, especially in the wake of COVID-19, but it does not come without challenges. While the literature demonstrates a common tendency to integrate technology into TP (see figure 1), there seems to be limited examples of fully developed mobile solutions to carry out core TP functions such as placement,

supervision, mentoring, student support and assessment. The paucity of mobile solutions is indicative of the challenging nature of the TP landscape, which is characterised by customised curricula and shaped by institutional demographics and resources.

While there is sufficient evidence from the supervisors that the digitalisation of TP may be feasible, they also cautioned against pushing ahead without considering the economic and physical ravages caused by the pandemic (Soudien, 2020) and its impact on teacher education. Therefore, there needs to be a careful assessment of student needs, as the students will play a decisive role in social and economic transformation.

Considering the eagerness of teacher education institutions to integrate technology and TP and the mixed responses of TP supervisors, the following recommendations are suggested to proceed with the project: Firstly, that the pilot study be conducted with a follow-up study be conducted after the pilot study to improve the functionality of the mobile app. Secondly, that the app be a supplementary device to facilitate TP and not a substitute. After the second pilot study, full college and institutional support should be elicited before propelling the project on to its next phase. Thirdly, that a task team be appointed to implement, monitor and research the activities related to the app. This task team should make short- and long-term plans to monitor the project's implementation. Fourthly, that the app be phased-in with small groups before expanding it to larger groups. And finally, that sufficient training and support be provided to participants before the small-scale rollout begins.

Critical scholarship warns against an overestimation of the role that open, distance and e-learning (ODEL) institutions can play, based on concerns about the quality of the product, sustainability, high student attrition and its association with "one-dimensional learning" (Prinsloo, 2016). While the mobile app is regarded as a supplementary but necessary innovation at an ODeL institution, it will never be able to replace the real experience of engaging the student in the classroom. As for its immediate benefits to Unisa, the app will be able to establish relationships with all students, despite their geographical location. At the least, those student teachers who have never been visited in their classrooms by TP supervisors will be able to be observed by and communicate with a supervisor, albeit on a digital platform, via a mobile app.

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