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Towards more inclusive electronic tutoring: tutors' experiences of using a data-free mobile instant messenger in a first-year accounting class

Fazlyn Petersen
University of the Western Cape, fapetersen@uwc.ac.za

Ronald Arendse
University of the Western Cape, rarendse@uwc.ac.za

Towards More Inclusive Electronic Tutoring: Tutors' Experiences of Using a Data-Free Mobile Instant Messenger in a First-Year Accounting Class

Fazlyn Petersen, University of the Western Cape, fapetersen@uwc.ac.za
Ronald Arendse, University of the Western Cape, rarendse@uwc.ac.za

ABSTRACT

The use of data-intensive synchronous tutoring options, such as Zoom, can be exclusionary in South Africa where there is limited access to the internet in homes. The literature indicates the following challenges for electronic tutoring in South Africa: a lack of devices, high data costs, network connectivity issues, inadequate digital skills and competencies. To address the challenge of high data costs, a South African data-free mobile instant messenger was tested for electronic tutoring. The research model used the Technological Pedagogical Content Knowledge Framework (TPACK) as the theoretical basis. This research used a case study in a large, first-year accounting course of 496 students with fifteen tutors, at a historically disadvantaged institution. Qualitative data was collected from accounting tutors using a survey and purposive sampling. The data was analysed using thematic content analysis. The findings highlighted Technology Knowledge was key to using a mobile instant messenger to tutor effectively online. Tutors with good accounting Content Knowledge found it easier to use the data-free application to explain concepts. Tutors used their Pedagogical Knowledge to be more flexible and provide support to students after hours. Tutors indicated Technological Content Knowledge as they used the features of the data-free instant messenger students to assist student learning. Technological Pedagogical and Content Knowledge was evidenced by tutors' use of multimodal approaches such as using voice notes and pictures to explain concepts to students at convenient times, even without data. However, students with Apple devices were still excluded. The findings from this study can assist in designing more inclusive student electronic tutoring interventions.

Keywords

Online accounting tutoring, student inclusivity, context, data-free**,** mobile instant messenger, Technological Pedagogical Content Knowledge Framework (TPACK)

INTRODUCTION

"Soon the digital divide will not be between the haves and the have-nots. It will be between the know-hows and the non-know-hows."

— Howard Rheingold

The recent changes in higher education from predominantly face-to-face classroom lectures and tutoring to more blended learning. Blended learning combines face-to-face and electronic learning (e-learning), learning by using technology and the internet (Nurdiani, Rustaman, Setiawan, & Priyandoko, 2019). Blended learning highlighted the need for synchronous learning. Synchronous learning allows students to engage with lecturers or tutors in real-time. Electronic tutoring that combines the use of the Moodle electronic learning platform with a web conference service is evidenced to enhance university success (Barana, Fisssore, Marchisio, & Rabellino, 2018). However, using synchronous options, such as web conferencing services for electronic tutoring (e-tutoring), can be exclusionary due to the high cost of data in South Africa vs the rest of Africa (Healing, 2019). When implementing blended learning for university students, "integration efforts should be creatively designed or structured for particular subject matter ideas in specific classroom contexts" (Koehler, Mishra, & Cain, 2013:61). Thus, the need to consider the context of our students have been highlighted. South Africa has a prevalent digital divide due to only a small percentage of people (10.1%) having access to the internet at home (Statistics South Africa, 2018).

Institutions learning management systems (LMS) may provide some interaction through the use of asynchronous discussion forums but do not allow for real-time engagement (Rambe & Bere, 2013). Given the need to find more inclusive e-tutoring with complements to institutional Learning Management Systems (LMS), the use of a mobile instant messenger (MIM) was considered. The consideration is based on the MIM serving as a complement for a LMS (Pimmer et al., 2019) and the growing number of MIM users, such as WhatsApp, in South Africa (Seyama, 2019).

The use of MIM in education is growing, especially during the Covid-19 pandemic (Muhammad & Annamalai, 2021). Despite MIMs using less data, they will still exclude students who cannot afford the cost of data. Therefore, the use of a data-free mobile instant messenger, Moya (https://moya.app/) was tested (Petersen, 2020). The benefits of using a MIM such as WhatsApp and a data-free MIM such as the Moya application for e-tutoring are compared in Table 1 below.

Table 1 Comparison between a MIM using data and a data-free MIM for e-tutoring

WhatsApp	**Moya**
Communication regarding course work and course requirements can be facilitated through the use of unlimited text and voice messages (Sayan, 2016).	Students, tutors and lecturers can send unlimited text messages and voice notes data-free if they are using the following mobile operators in South Africa: Telkom, MTN, Vodacom and Cell C (Petersen, 2020).
Course announcements can be published by tutors and lecturers for items such as assessment due dates (Gasaymeh, 2017).	Moya application allows lecturers to create a read-only site. The group can be used exclusively for distributing important course-related information. The functionality is similar to an Admin-only group on WhatsApp (Petersen, 2020).
Tutors and lecturers can share materials such as photos, pictures and presentations via attachments (Izyani & Mohamed Amin, 2016).	Sending attachments in the Moya application is not data-free. Students will be notified of the size of the attachment, before downloading it (Petersen, 2020).
Tutors and lecturers can post additional website links to topics and resources where students require assistance (Gasaymeh, 2017).	The sending of website links is data-free but students will incur data costs when accessing those resources (Petersen, 2020).
Students can discuss ideas about course work with peers and tutors (Tang & Hew, 2017).	Sending text messengers for discussion with group members and peers is data-free (Petersen, 2020).

Students can form groups (Udenze & Oshionebo, 2020) and organise meetings with peers for assignments and projects required by lecturers (Gasaymeh, 2017).	The creation of groups by lecturers, tutors and students is also data-free (Petersen, 2020).

Current literature indicates the use of WhatsApp can enhance student participation during e-tutoring for students at a rural South African university (Motaung & Dube, 2020). Motaung & Dube's (2020) findings indicate the following challenges for e-tutoring: a lack of devices, network connectivity issues, inadequate digital skills and competencies that may have led to the low levels of engagement. However, the literature on the use of a data-free MIM for e-tutoring is lacking. The research question for this study is, *"what are tutors' experiences of using the data-free mobile instant messenger in a large accounting class?"*

RESEARCH MODEL

To assess the experience of tutors when using the data-free MIM a suitable theoretical model to underpin the study was identified. The Technological Pedagogical Content Knowledge Framework (TPACK) is based on Shulman's concept of pedagogical content knowledge (PCK) (Koehler et al., 2013; Mishra & Koehler, 2006). The TPACK model focuses on the different sets of knowledge required for an effective pedagogy in a technology-enhanced learning environment. For this research, pedagogy refers to e-tutoring. It will describe tutors' experiences of using the data-free MIM to tutor electronically and how students learn when using this technology.

The framework has been used extensively in empirical studies, evidenced by 107 peer-reviewed journal articles (Willermark, 2018). Willermark (2018) indicates that using self-reporting and TPACK identifies teacher activities. However, the "performance evaluations of teaching activities are rare" (Willermark, 2018:315). Ling Koh, Chai, & Tay (2014) highlight the importance of considering contextual factors, such as the availability of technology, when implementing TPACK. The TPACK is displayed in Figure 1 followed by construct descriptions.

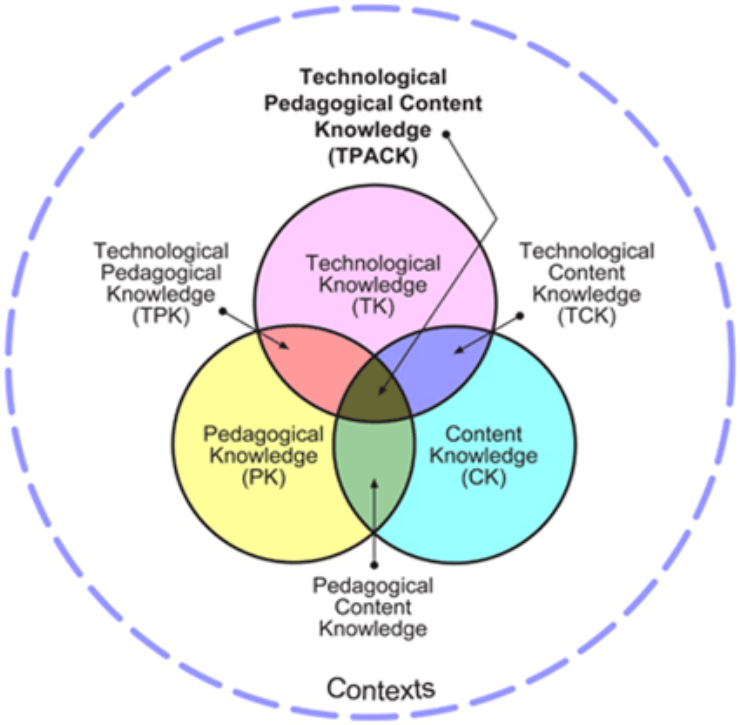

Figure 1 TPACK model

Contexts

Lecturers are encouraged to plan their learning activities before considering technology. Despite the number of studies that have used the TPACK framework it is still important to consider the context in which the technology will be implemented. In the South African context, the digital divide and insignificant inequalities need careful consideration (Statistics South Africa, 2019).

There are also disparities in the resources available at different South African higher education institutions. The legacies of apartheid resulted in resources being allocated inequitably and inefficiently (Department of Education, 1996). Despite attempts to amend policies this has not translated into improved access, equity and participation in higher education for the majority of previously disadvantaged black people (Mzangwa, 2019).

Technology Knowledge

Technology knowledge (TK) refers to the knowledge a lecturer or tutor has about technologies (Mishra & Koehler, 2006). For instance, do you make use of a pencil and book or do you use the Internet, hardware or software programmes, etc? If so, do you have access to these technologies, and how well do you understand these technologies to incorporate them into lessons? Additionally, with the rapid changes in technology available, especially in education, there is a need to constantly update this knowledge.

Despite the increasing levels of technical knowledge among students, this is not the case for all the historically marginalised students at the University of the Western Cape, where students still require digital literacy skills (Leonard, Mokwele, Siebrits, & Stoltenkamp, 2016). Therefore, lecturers need to consider the accessibility, usability and perhaps suitability of technology options they wish to implement. The literature indicates an interrelationship between accessibility and usability (Wood, 2015). Using a LMS, lecturers can make content available for students online. Given the increasing number of MIM users in South Africa, the accessibility and usability of tools such as WhatsApp show promise.

Content Knowledge

Content knowledge (CK) refers to lecturers' knowledge of the subject that they are teaching (Koehler et al., 2013). For instance, lecturers and tutors must know the concepts and theories they use in classrooms and tutorials (Koehler & Mishra, 2009). Accounting lecturers need to be familiar with requirements from the South African Institute of Chartered Accountants (SAICA) as they are training future accountants. However, content knowledge in South Africa is a contentious issue, especially with calls to decolonise the curriculum (Gleason, 2018).

Pedagogical Knowledge

Pedagogical knowledge (PK) refers to the "deep knowledge about the processes and practices or methods of teaching and learning" (Koehler, Mishra, and Cain 2013:64). For instance, educators look at how students learn the best, and the strategies they can implement to meet the needs of students' learning and development needs. In simple terms, lecturers must understand how students learn and acquire knowledge (Mishra & Koehler, 2009). Lecturers also need to prepare and guide tutors so that students learn the required course content.

Pedagogical Content Knowledge

Pedagogical content knowledge (PCK) concerns the "representation and formulation of concepts, pedagogical techniques, knowledge of what makes concepts difficult or easy to learn, knowledge of students' prior knowledge, and theories of epistemology" (Mishra & Koehler 2006:1027). It requires that lecturers understand the best teaching practices when teaching specific content (Koehler & Mishra, 2009) and which methods to apply to learn content by building on students' existing knowledge.

Lecturers are not only expected to understand the content that they teach well but they also need to understand the ways that will make this content easy for students to understand. Lecturers can apply various techniques such as the

use of class exercises and creative examples. Lecturers need to guide tutors on how to effectively tutor online e.g., how to assist students in completing the required tutorial exercises.

Technological Content Knowledge

Technology content knowledge (TCK) refers to the methods that technology can be used to teach content (Mishra & Koehler, 2006). The use of technology provides functionality to make learning content easier. It requires an understanding of how digital technologies can enhance teaching specific content or more particularly creating new understandings of content taught (Koehler & Mishra, 2009). In other words, by blending digital tools such as MIM into teaching practices, it can transform the way students learn and interact with content which ultimately changes their understanding of concepts, theories, etc.

Online learning provides students with the opportunity to learn at a time and place that is convenient for them, without having to be present on campus. Therefore, it allows students the ability to personalise their learning (Orfanou, Tselios, & Katsanos, 2015). The use of MIM allows students to access educational content, regardless of time and location. However, without data, the use of MIM will not be accessible to all students. The alternative is to use a data-free MIM instead.

Technological Pedagogical Knowledge

Technological pedagogical knowledge (TPK) refers to how technology can enable different methods of teaching and learning (Mishra & Koehler, 2006). It is about using technology in different ways.

Synchronous engagement may be more suitable for students who require immediate responses and feedback. Synchronous engagement allows for real-time interaction and can be implemented by tools such as Google Meets and Zoom. However, the use of synchronous engagement comes at the expense of higher data costs and may result in students being excluded especially those who have data challenges.

Technological Pedagogical and Content Knowledge

Technological Pedagogical and Content Knowledge (TPACK) refers to the "understanding that emerges from interactions among content, pedagogy, and technology knowledge" (Mishra & Koehler, 2006:64). In its simplest form, TPACK represents skilled teaching using technology. The TPACK framework is about understanding how different digital technologies can be utilised when teaching specific content. It also "allows teachers to address the challenges involved in integrating technology in teaching and learning" (Willermark, 2018:315) and how they can reduce the challenges students face to acquire knowledge. TPACK is used as a basis for effective teaching and learning with technology (Koehler & Mishra, 2009).

RESEARCH DESIGN AND METHODOLOGY

A case study was used in this research as it tested the use of a specific data-free MIM in a specific group of accounting students and tutors at a higher education institution (Zainal, 2007). Qualitative data was collected using an online survey. Purposive sampling was used to collect data from the fifteen tutors of a large, first-year accounting course of 496 students.

Five tutors responded, despite multiple reminders, representing a 33% tutor response rate. Based on Malterud, Siersma, & Guassora (2016), a smaller sample size can be used when a sample holds more information regarding the subject. In this case, the small sample size of tutors who responded was each responsible for tutoring a group of 30 students, using the data-free Moya instant messenger. The sample, therefore, represents the data of tutors for 150 students. Comparatively, another case study of peer tutoring implementation at a university only used a sample of 8 students and 6 tutors (Moumoulidou, Karadimitriou, & Pliogou, 2014). Interviews were not conducted due to social distancing restrictions during Covid-19 and the high cost of data to use interview tools such as Zoom.

The online survey was designed with open-ended questions that were developed by the authors. A pilot survey was completed before sending the online survey to tutors. The pilot was used to check whether the questions were understandable and clear to reduce potential ambiguity in the responses. The following questions were included in the online survey:

- TK1. How did your technology knowledge affect your ability to implement or use the intervention?
- CK1. How did the course content influence your implementation and use of the intervention?
- PK1. How did the intervention allow you to adjust your tutoring based on what students needed?
- PK2. How did the intervention allow you to assess students in different ways?
- TCK1. How did the intervention affect your tutoring of the course content online?
- PCK1. How did the intervention influence your approaches to guide student thinking and learning?
- TPACK1. Describe how you tutored lessons that appropriately combine course content, technologies and tutoring approaches.

The online survey allowed qualitative textual data to be saved in a spreadsheet. The spreadsheet was converted to a pdf format and imported into Atlas.ti software. The data was analysed using thematic content analysis using the themes identified in the research model. The research followed the ethical and professional guidelines as specified by the University of the Western Cape's research ethics policy. No responses were used unless consent was provided. All identifying information was removed to ensure anonymity.

FINDINGS

The findings commence with the analysis of demographic information. Most of the tutors were females (80%) with the remaining being male (20%). All tutors were under 25 years old and full-time students. The majority spoke English (80%) with the remainder speaking Xhosa (20%). Western Cape was the residence for most tutors (80%) and 20% lived in the Eastern Cape. Equal amounts of tutors connected via prepaid cell phones (40%) and contract cell phones (40%) with 20% using WiFi.

Subsequent sections provide findings for each construct in the research model.

Technology Knowledge

Tutors indicated that they had the necessary knowledge to use a data-free MIM for e-tutoring as they were using WhatsApp regularly. The finding is supported by the following quotes:

"I make use of technology every day, so it was not a major problem using the intervention" and
"As I have been using instant messaging apps for a long time, it was easy to come to grips [with] how this app works".

Ease of use was the most highlighted factor (6 quotations) including statements such as, *"It was quite easy for me to use the intervention to conduct online tutoring"* and *"It was very easy to adapt and make use of the intervention."*

Content Knowledge

Tutors indicated that having course content knowledge made it easier to conduct e-tutoring, *"I had great knowledge of the course. So, it was not difficult to use the intervention [Moya] to tutor"* and "*The course content was easy to use."*

Pedagogical Knowledge

A tutor indicated that it was easier for students to learn face-to-face, *"Students learn better when they can see exactly what is being done when concepts are being explained"*.

Evidence indicates that tutors also needed time to adjust to using Moya for e-tutoring, *"Not being able to conduct face-to-face tutorials was a challenge at first, but you begin to get to grips with it"* and *"I am more of a face-to-face kind of tutor so adapting was challenging".*

Using the Moya MIM, however, allowed students to have access to work at a convenient time *"Students could go over the work afterwards as the messages are still there as opposed to face-to-face classes".* It also allowed for more flexibility and fun, *"I made myself available outside of the prescribed tutoring times as well as consultation hours to be there for the students with whatever questions they might have"* and *"Even in the time of a pandemic it made me more flexible and a fun experience for students."*

Pedagogical Content Knowledge

A tutor indicated that e-tutoring was easier when they have content knowledge, *"Relaying the tutorials in an understandable manner was made a lot easier with this knowledge [about the course work]."*

Technological Pedagogical Knowledge

Tutors used a variety of features on Moya to assist with e-tutoring. Tutors indicated that the use of voice notes and pictures assisted students in learning concepts, *"The use of voice notes and pictures was needed to explain the content. As the course requires a lot of understanding, voice notes are very helpful while pictures help with the calculation in the work"* and *"I was able to use long voice notes to explain the work".* However, the use of pictures would require data.

Using WhatsApp for e-tutoring previously also assisted tutors in using the Moya MIM, *"In 2019 I used to conduct consultations via WhatsApp. So, it was as if I have been doing this for a long time."*

Technological Pedagogical and Content Knowledge

All tutors indicated that their expectations for using Moya MIM were met. The use of the Moya MIM for e-tutoring received mixed reviews, although most were positive. The following positive statements were evidenced, *"Due to the different methods I could use, voice notes, messages, videos and pictures, I was able to help each learner think about all the different things affected in the content"* and *"It assisted me greatly as it was then easier to explain and elaborate the content to the students."*

A tutor indicated that using the Moya MIM was more inclusive, *"I could easily explain the course content and make sure that no student was left behind."* Tutors used the Moya MIM to track participation, *"I was able to see who is online, who participates and who views the messages but does not participate."*

However, it was also viewed negatively by two tutors, *"Tutoring accounting is quite difficult when it has to be done through a platform as the intervention [Moya]".* A tutor indicated that there was a lack of participation from the students in his groups, *"Most of my students did not make use of the intervention but for those who did it assisted [them] greatly."*

DISCUSSION

The findings indicate that TK, CK, PK, PCK, TCK, TPK and TPACK were all important factors in using the data-free Moya MIM for e-tutoring. For TK, ease of use is identified in the literature as an important criterion for e-tutoring (Motaung & Dube, 2020). Moya MIM was easy to use and this assisted tutors in using it for e-tutoring. Regular users of WhatsApp and previously using WhatsApp for consultation also aided the use of Moya MIM (Tang & Hew, 2017).

Having CK assisted tutors in using the Moya MIM to explain content without being face-to-face. The finding is supported by a study of 24 primary school teachers in Singapore which found that CK when designing technology lessons (Ling Koh et al., 2014).

PK was successfully used as tutors were more flexible and provided support to students after hours. Tang & Hew (2017) refers to this as temporal affordances. PCK is topic-specific (Deng, Chai, So, Qian, & Chen, 2017), therefore, e-tutoring Accounting for a first-year course may differ from implementing e-tutorials with more senior tutors with more technological experience (TCK) in post-graduate courses (Malik, Rohendi, & Widiaty, 2019).

TPK and TPACK were evidenced by tutors' use of multimodal approaches such as using voice notes and pictures to explain concepts to students at convenient times, even without data (Tang & Hew, 2017). Using multimodal approaches is also supported by another study at a South African University of Technology (Bere & Rambe, 2013).

The lack of participation from students was also highlighted as a concern by another study on e-tutoring in a rural South African university (Motaung & Dube, 2020).

CONCLUSION

The research aimed to understand tutors' experiences of using the data-free mobile instant messenger in a large accounting class. The findings indicated that the use of the TPACK model could be used to explain tutors' experiences. The findings from this study can assist in designing more inclusive student electronic tutoring interventions. The limitations of this qualitative research and the small sample size do not allow the results to be generalised.

The next phase of this study will analyse students' results to create more inclusive e-pedagogies, especially in large classes at low-resourced higher education institutions. Further research is required to support generalisability. The findings are meant to inspire further investigation on the use of data-free technologies in higher education to create more inclusive e-tutoring and online learning environments.

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