Investigating faculty-based communities of practice for technology-augmented pedagogical practices at Eduardo Mondlane University: A case of innovators and adopters

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COMPULSORY DECLARATION

This research has never been submitted for a degree before, either in its entirety or in part. It is my own creation. Every major contribution to, and quotation from, the work, or works, of others has been credited, mentioned, and referenced in this dissertation.

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ABSTRACT

Institutional inhibiting factors, and lack of motivation and support at the University of Eduardo Mondlane (UEM) result in lecturers not teaching using technology-augmented approaches. This research study investigates how a faculty-based EdTech-UEM professional development model could potentially foster Communities of Practice (CoPs) for technology-augmented pedagogical practices in UEM faculties.

One way of addressing the technology-augmented pedagogical practices is to understand motivations, pedagogical practices, support and barriers of lecturers to adopt them. Lecturers (innovators and adopters: early adopters and late majority adopters) who participated in the four workshops on EdTech professional development, reported instances of innovators exhibiting peer leadership in group-learning activities during the workshops. The CoPs theoretical framework was used to investigate social learning and support among the innovators and adopters.

After the workshops, which coincided with the beginning of the pandemic, 18 lecturer-participants of the workshops were purposefully selected, and semi-structured interviews were conducted with the goal of better understanding the support needs among lecturers (innovators and adopters) after the workshops as well as discussing the best ways to overcome potential barriers and challenges in technology-augmented pedagogical practices and provide a conducive environment for the emergence of CoPs in the adoption of technology-augmented pedagogical practices. The workshops were before the pandemic and lecturers implemented what they learnt during the pandemic. It was serendipitous as the workshops helped them to prepare for ERT even it was not the aim of the initiative that completed before the pandemic started.

The interviews were recorded and transcribed, and the empirical data was analysed through an interpretive approach. The interpretive method looks at how people make sense of their experiences, as well as how they construct and attribute meaning to their worlds. The result of the interpretive analysis was based on the description of qualitative themes formed and related from each other in multiple case studies of both innovators and adopters. The anonymity of their responses was guaranteed.

The results showed that lecturers, innovators and early adopters from the Faculty of Education supported one another after the workshops, and a range of social learning, which related to the 'joint enterprise', emerged. These interactions were substantially different between the Faculty of Education and Faculty of Veterinary. The Faculty of Education demonstrated emergence of a CoP with a 'joint enterprise' and reasonably strong social learning that resulted in redesign of courses and change in pedagogical practices.

The findings of this study could be used to support the EdTech ICT professional development with focus on faculty needs and provide changes in ICT integration at UEM. For this, the study recommends that lecturers should launch their own CoPs, faculties and departments should encourage their lecturers in using ICTs, EdTech should promote faculty development programs to satisfy faculty demands, and the UEM should ensure that training is mandatory.

Keywords: Professional development, Technology-augmented practices; Communities of Practices, Educational technology integration.

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ABBREVIATIONS AND ACRONYMS

CAD	Centre for Academic Development
CHE	Council on Higher Education
CoPs	Communities of Practice
ERT	Emergency Remote Teaching
HE	Higher Education
HEIs	Higher Education Institutions
ICT	Information and Communication Technology
ICT4E	Information and Communication Technology for Education
IS	Information Systems
IT	Information Technology
LCL	Lecturer-Centred Learning
LMS	Learning-Management System
MCTESTP	Ministry of Science, Technology and Higher Education and Technical and Professional Education
MEC	Ministry of Education and Culture
OER	Open Educational Resources
PD	Professional Development
SAIDE	South African Institute for Distance Education
SCL	Student-Centred Learning
SEB	Self-Efficacy Beliefs
TAM	Technology Acceptance Model
TED	Digital-Education Technology
TPACK	Technological Pedagogical Content Knowledge
UEM	University Eduardo Mondlane
UTAUT	Unified Theory of Acceptance and Use of Technology

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

DEFINITION OF TERMS AND CONCEPTS

The following are descriptive definitions of concepts used in this research study:

Apprenticeship – Is "a process in which the apprentice is involved in 'learning by doing' with the 'master' as the major role model" (Guile & Young, 2011, p. 176).

Case study – An investigation of specific issues that seek a variety of evidence from case scenarios in order to answer them (Gilham, 2000).

Champions – Loosely refers to "academics who are known for innovative practice through the creative use of technology" (Gachago et al., 2017, p. 2). According to Howell and Higgins (1990), champions are individuals who help others to learn, and promote both internal and external learning opportunities (p. 317).

Communities of practice – "Are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact with each other regularly" (Wenger, 1988, p.1).

Early adopters – This category of adopters "frequently serves as opinion leaders who can persuade others to adopt the innovation by providing evaluative information" (Rogers, 1995, p. 11).

Information Communication and Technology (ICT) – Refers to "a set of tools enabling, supporting, and reinforcing educational reform" (Kreijnsa, et al., 2014, p. 217).

Innovators – Are the ones who are the first to adopt a new idea and often require a relatively short adoption period after they have become aware of new practices (Rogers, 1961).

Institutional support – One way is whereby university faculty members are offered professional development opportunities or help (Nicolle, 2005). It also encompasses support for community building, as well as provision of institutional resources (Baran & Correia, 2014)

Institutional resources – Academic members of the university are provided with hardware, software, incentives, and other physical resources (Nicolle, 2005).

Late majority adopters – This category of adopters adopts an innovation with scepticism, which makes them only adopt it after the early majority have done so (Pezeshki, 1962).

Professional development – Training that enables lecturers to acquire and use new skills in

order to improve their job performance (Mizell, 2010). It takes place in a sociocultural context and therefore has a profound impact on lecturer learning.

Peer support – In the context of this research, it is a process whereby a person is given individual or group collegial support before he/she decides whether or not to use a new technology (Nicolle, 2005). According to Baran and Correia (2014), "common practice is pairing an experienced online teacher with a novice, or less experienced teacher, and allowing them to build a mentoring relationship to nurture and share their best practices" (p. 99).

Technology-augmented pedagogies – Involve functional improvement in student-centred learning brought about by the introduction of technology. This contributes to the learning process and helps students grasp a difficult topic or make it more engaging in a way that traditional approaches cannot (Best, 2015).

CHAPTER 1 – INTRODUCTION

1.1 Introduction

Ubiquity of Information and Communication Technology (ICT) in higher education (HE) presents challenges and opportunities to lecturers and this has, in turn, resulted in more emphasis being placed on professional development for technology-augmented pedagogies in many higher education institutions (HEIs). Internationally and nationally, HEIs are faced with the challenge of most lecturers not integrating ICTs into the curriculum in a pedagogically sound manner (Kirkup & Kirkwood, 2005; Hu & Webb, 2009; Muianga et al., 2018a). A student-centered approach to teaching is loosely related to a pedagogically competent technique, in which students interact and co-construct knowledge through empirical education, creative outputs, problem-based learning, and collaborative debates (Abe, 2011; Passehl-Stoddart & Monge, 2014; Tom, 2015). The need for professional development, lecturers' inexperience with using ICT as a teaching and learning tool, and lecturers' lack of motivation to teach using educational technologies are all reasons why lecturers are not integrating ICT into the curriculum in a student-centered manner, according to both theoretical and empirical studies (Blin & Munro, 2007; Berni & Sperotto, 2012; Muianga et al., 2018a).

Wilson (2012) indicates that some forms (skills-focused workshops and pedagogy-focused formal courses) of professional development have been introduced at HEIs but have not really supported and sustained the lecturers' intention to integrate ICTs into the curriculum in a student-centred manner. According to Wilson (2012), the development of departmental e-learning champions and department-based professional development tend to promote peer support and communities of practice that, in turn, enhance social learning for lecturers within their immediate context. Related to this, the current research study investigates how the UEM-EdTech professional development model, which is faculty-based, could potentially foster technology-augmented pedagogical practices of innovators and early adopters in two faculties, as well as establish what motivates these lecturers to use educational technologies for teaching. According to Rogers, "Innovators are venturesome individuals; they desire the hazardous, the rash, the *avant-garde,* and the risky. Since no other model of innovation exists in the social system, they must also have the ability to understand and use complex technical information" (1963, p. 253). Early adopters are more data-driven than innovators and have gained metacognitive capacities (the ability to identify what they don't know) (Roger, 1962; Pezeshki,

2016). That is, when they have the knowledge of how an innovation works, they are most likely prone to make decisions to adopt it. In the context of this research, innovators are those lecturers who had used educational technology before the pilot workshops, while the early adopters refer to those lecturers who used technology subsequent to the pilot workshops.

The context and rationale for the study are described in this chapter, which is followed by background information on the research problem. The research topic and the study's framing are also introduced in this chapter. It concludes with a synopsis of each chapter.

1.2 Context and Rationale

1.2.1 Information and communication technology for education (ICT4E) challenges in higher education (HEIs)

Internationally and nationally, HEIs are faced with the challenge of most lecturers not integrating ICTs into the curriculum in a pedagogically sound or student-centred manner (Kirkup & Kirkwood, 2005; Hu & Webb, 2009; Muianga et al., 2018a). Findings from a survey carried out in Queensland, Australia revealed important impediments to ICT integration, including lack of lecturer understanding of ICT use and lack of lecturer professional development and support in ICT integration into teaching and learning (Baskin & William, 2006).

According to Salam et al. (2018), developing countries are no exception because they are also faced with challenges, such as electricity problems, limited ICT infrastructure, and inadequate training opportunities for teaching staff. Economic challenges including limitation of funds to pay for costly infrastructure, an absence of a consistent power supply, insufficient telecommunications infrastructure, limited resources for education, the provision of appropriate basic education programs and reducing the student-to-lecturer ratio to allow an effective learning (Adam, 2003; Uys et al., 2004) are also noted.

The incorporation of rapidly evolving ICTs is one of the obstacles for HEIs' internal development (Kamei, 2015, p. 3). However, the challenges surrounding ICT4E are not only focused on technology, but also on pedagogical attitudes and institutional culture (Kamei, 2015). Ineffective ICT policies, according to Kaino (2004) and Fu (2013), lead to the underuse of educational technologies. Hatlevik and Arnseth (2012) and Rampersad (2011) noted that the teachers' beliefs and attitudes determine whether or not lecturers integrate ICT into their pedagogical practices. Jones (2001) noted that attitudes of teachers towards technology have a

substantial impact on their use of technology in the classroom. He also mentioned that teachers prefer to teach using traditional techniques due to a lack of motivation, acceptability, and readiness to incorporate and adapt ICT into the teaching and learning process. This suggests that teachers should be given training, incentives, and encouragement to integrate ICT into their lessons (Raman & Yamah, 2014).

1.2.2 Information and Communication Technology (ICT) in Higher Education Institutions (HEIs) during Covid-19

The pandemic of COVID-19, that necessitated an Emergency Remote Teaching (ERT) response, emphasized the necessity of lecturers to improve their digital skills (Gewerc, et al., 2020). ERT has become a popular alternative term used by lecturers and practitioners in the field of online education to contrast what many of them regard to be high-quality online education (Hodges, et al., 2020). As a result of ERT, lecturers are being forced to rapidly develop their use of technology in their pedagogical practices (Albó, et al., 2020; Littlejohn, 2020). Hodges, et al., describes ERT as a temporary change in teaching process, involving the use of entirely remote teaching alternatives for teaching and learning that would otherwise be delivered face-to-face or as blended or hybrid courses, with the goal of back to the traditional way once the crisis or emergency has passed.

In Mozambique, the face-to-face lessons were suspended (for a period of 30 days) with effect from the 23rd of March 2020, and the teaching and learning process had to be done using digital platforms, especially in higher education (Ministry of Science, Technology and Higher Education and Technical and Professional Education [MCTESTP], 2020). Subsequently, the government declared a 30-day state of emergency with effect from April 1st (Boletim da República, 2020), as a result, the face-to-face classes suspension has been prolonged from 30th of April 2020 to August 2020. In order to guarantee the continuation of classes, the MCTESTP issued an official letter instructing all public and private HEIs to design activity plans for the 30-day period and to use ICT, such as email, WhatsApp, Skype, Google Classroom and other digital platforms to deliver lessons (MCTESTP, 2020). Studies reveal that there was a multiplicity of platforms used to guarantee the continuity of the teaching and learning process and minimal use of specific online teaching platforms that allowed students to access teaching content in a standardised manner (Baticulon et al., 2020; Krönke, 2020). However, Martins, et al. (2021) note that internet access presented a considerable constraint during this period, but suggest that, despite these obstacles, HEIs in Mozambique should continue capitalising on the

teaching experience based on digital platforms, which can be useful in enhancing teaching and learning.

Related to the above, study findings from Beardsley, et al. (2021) revealed lecturer confidence in teaching with technologies increased since the outbreak of the pandemic of Covid-19. According to them, lecturers' confidence and frequency in using technology in pedagogical practices has risen, as well as their confidence in using it for lesson planning, teaching, assessing and delivering feedback for students. The authors also pointed out that as lecturers' motivation to improve their digital abilities and employ digital technology in their practices increased, so did the need for them to focus on professional development and the creation of their own digital content. In conclusion, these data help lecturers to understand how the remote teaching response to COVID-19 has changed their engagement and motivation to employ digital technology (Beardsley, et al., 2021).

However, ERT transformed lecturers' priorities as everyone was forced to move online (Albó, et al., 2020). As an outcome, more lecturers have been exposed to the advantages of digital technologies in pedagogical practices, and their confidence in their use is likely to have increased (Albó, et al., 2020; Giovannella, et al., 2020; König, et al., 2020).

With the above being said, it is crucial for HEIs to have a sustainable approach to professional development for ICT4E.

1.2.3 Information and communication technology for education (ICT4E) challenges in higher education in Mozambique

Despite the fact that Mozambique's government policies encourage all HEIs to use ICT for teaching and learning, there are still a number of impediments to ICT adoption in higher education (Muianga, et al., 2013; Muianga, 2019). The official "ICT Policy" and "The Higher Education Strategic Plan" claimed that the Mozambican HEIs were still far from achieving the goals set forth in the official "ICT Policy" and "The Higher Education Strategic Plan" (Muianga et al., 2013). The Mozambique ICT policy stated as early as 2000 that some HEIs lacked enough infrastructure and needed to improve their technological capabilities by training lecturers, researchers, and technical staff on how to use ICT successfully in their activities (Muianga, et al., 2013). The authors also noted that student-centred initiatives were part of strategic change plans for many HEIs in Mozambique.

For an effective implementation of ICT in pedagogical practices, certain institutions still need to develop plans of action that emphasise the use of ICT as a key teaching and learning instrument for effective implementation and others have launched professional development in ICT for teaching and learning (Muianga, et al., 2013). However, some HEIs still lack a defined action plan for ICT implementation despite having a strategic plan (Muianga, et al., 2013). A study from Samussone, et al. (2021) which "uses the unified theory of acceptance and use of technology (UTAUT) was conducted to analyse the factors that teachers in public higher education institutions perceive as a determinant in the trend of using ICTs in HEIs in Mozambique" (p. 1). The study found that teachers' perceptions of determining elements for using ICTs, such as performance expectations, facilitating conditions, and expected effort, all contribute positively to the tendency of using ICTs in Manica HEIs (Samussone, et al., 2021).

1.2.4 ICT4E challenges at University Eduardo Mondlane (UEM)

Traditional teaching approaches dominated university pedagogy, according to evaluations of curricular reform in faculties. Example of this is the fact that the majority of programs were structured to transfer material, with memorising learning and the transmission of knowledge as the primary goals (UEM, 1999; Mandlate, 2003; UEM, 2007). These issues were also mentioned in a report published by UEM in 2012, that looked into lecturers' psycho-pedagogical training (UEM, 2012). Both reports emphasised the sole use of conventional teaching and learning methods, a lack of innovative educational expertise among lecturers, and the secondary role of ICT in teaching and learning (Mandlate, 2003; UEM, 2007; UEM, 2012). According to the data, computers were solely used for simple tasks such as word processing, PowerPoint presentations, accountancy, and academic records (UEM, 2012). The internet was mostly used to send and receive emails, as well as accessing websites that were not usually relevant to the classroom's particular subject (Muianga, 2019). The secondary significance given to the use of ICTs in UEM became obvious when it became clear that new teaching and learning methods aimed toward active learning by students were urgently needed (Ministry of Education and Culture [MEC], 2006)]. This was not just viewed as a significant aim for UEM to attain, but also as one of the country's most significant difficulties (MEC, 2006). Another challenge is related to students not adopting the available technology.

Despite the reforms at UEM and the institution's allocation of incentives for faculty and school levels, the lecturers' engagement remains to be a barrier to successful ICT implementation (Muianga, et al., 2018b). Muianga (2019), notes that lecturers continued to teach using

traditional pedagogical strategies with no noticeable differences in how ICT was employed. This implies that faculties need easy, ongoing access to professional development programs that help them in developing those skills (Fleagle, 2012).

In the context of the current research, as early as the 2000s, UEM started integrating ICTs into curricula with one of the main objectives being to enhance student-centred learning (SCL) (Muianga, et al., 2018b). Additionally, UEM provided important initiatives to improve the pedagogical practices using ICT, through developing professional development initiatives, such as the creation of the: (i) Centre for Psycho-Pedagogical Orientation, a support centre for UEM's lecturers and (ii) "University of Pedagogy" (UP), a teacher-training institute that was meant to provide pedagogical training to UEM's inexperienced lecturers in terms of using ICT. In both initiatives, it was observed that lecturers did not take the courses seriously because they perceived participation in the course as merely an institutional and administrative requirement (Mandlate, 2003), rather than a means of professional development, where they could transfer the knowledge and skills they acquired into practice in their own courses. This could have also been exacerbated by the fact that many other conditions for the success of technology-augmented pedagogical practices were not in place yet.

1.3 Problem Statement

Irrespective of the fact that lecturers undergo professional development, HEIs are faced with the challenge of most lecturers not integrating educational technologies into their course curricula in general, and more especially, in a student-centred manner (Hu & Webb, 2009; Doherty, 2011; Muianga et al., 2018a).

Wilson (2012) conducted a study with e-learning administrators from 13 New Zealand technical institutes to find out what professional development approaches could work best, and the findings concluded that:

> *the "shorter the session, the more specific the topic tended to be – training which is linked to what the tutors [lecturers] need to know based on how they're using e-learning, [while] longer-duration professional development components" [such as formal courses leading to a qualification] were generally focused on pedagogy* (p. 896).

The findings further revealed that the objectives for those programmes with some e-learning components, were deemed less relevant to the lecturers' own teaching situations and long-term goals (Wilson, 2012). This might have been the case at UEM as well.

The introduction of the 14 modules focused on the Technological Pedagogical Content Knowledge (TPACK) framework did not lead to lecturers translating the knowledge acquired in these modules into practice, but rather, lecturers attended only to fulfil the administrative obligation and as a way to get the certificate. Furthermore, Doherty (2011) argues that the reason lecturers do not put into practice what they have learnt in the professional development offerings may be that, when the trained individuals go back to their departments, they do not get the necessary support. This deficit of on-site assistance for lecturers using educational technology has also been identified at UEM (Muntaz, 2000; Muianga et al., 2013).

That is, the courses offered may be irrelevant to lecturers' needs or there may be lack of support for those lecturers who participate in professional development initiatives.

1.4 Research Question

This research employs an interpretive method to learn more about lecturers' motivations, technology-augmented pedagogical practices and peer support after they have participated in the EdTech-UEM professional development initiative. The main research question is:

How could communities of practice for technology-augmented pedagogical practices be fostered among innovators and potential adopters through the faculty-based EdTech-UEM professional development model?

The question was chosen in order to obtain a better understanding of:

i. What are the motivating factors for innovators and potential adopters in the Education and Veterinary Faculties to adopt technology-augmented pedagogical practices?

ii. What are the technology-augmented pedagogical practices of the innovators and potential adopters before and after the EdTech-UEM workshops?

iii. How do innovators support technology-augmented pedagogical activities among potential adopters during and after the EdTech-UEM workshops?

iv. How do potential adopters support each other on technology-augmented pedagogical activities after the EdTech-UEM workshops?

v. What are the barriers to lecturer adoption of technology-augmented pedagogical practices after the EdTech-UEM workshops?

1.5 Significance of Study

During the pilot EdTech workshop series with the Faculty of Education (where the researcher was a participant), she observed that there were two different groups of participants; the innovators – those who had been using educational technology for teaching of their own volition, and those who were volunteered by their heads of departments to explore and acquire the related knowledge and skills, loosely referred to as adopters (early adopters and late majority) in this research study. In the workshops, participants reported instances of innovators exhibiting peer mentoring in group learning activities. This inspired this research.

Firstly, investigating the implementation of the EdTech-UEM faculty-based professional development model for promoting technology-augmented pedagogical practices among lecturers (innovators and adopters) from the faculties of Education and Veterinary, who participated in the pilot workshops, allowed the researcher to analyse the effectiveness of this model.

Secondly, understanding how the support process (apprenticeship) worked among participants after the workshops, and discussing the best ways to overcome potential barriers to the adoption of technology-augmented practices, will hopefully help UEM to recognise and provide a conducive environment suitable for CoPs in faculties. It may be possible that the collaborations and support in these communities will be adjusted to the realities identified by the participants, and this can result in different variations of this EdTech-UEM model in the faculties at UEM.

Finally, this research establishes what motivates innovators and adopters to adopt technology-augmented approaches in their pedagogical practices. The extrinsic factors will also inform UEM about what the lecturers perceive as enabling or constraining factors for their practices.

1.6 UEM Potential responses to professional development needs

In 2012, UEM implemented the TPACK model which was introduced for the first time by the Centre for Academic Development (CAD) as a new professional development approach for

technology-augmented pedagogical practices (Muianga et al., 2018). This TPACK model was composed of 14 modules that focused on the combination of pedagogical and technological content. The evaluations obtained from the TPACK associated offerings at UEM (Muianga et al., 2018) and research conducted with UEM lecturers as part of the Digital Education Technology (TED) project (Orth, Otto & Sperotto, 2015) revealed that the lecturers knew how important it was to use technology to make student-centred learning (SCL) possible but had not made reasonable implementation.

The Teaching, Research and Development Department (TIC-EID) is a new department within the Informatics Centre (CIUEM), established to lead the integration of ICTs into the lecturers' activities in a way that has been lacking in the past. It is designed to be a small and well-skilled multi-disciplinary unit which aims to ensure that on the one hand technical and equipment decisions are taken in strict accordance with academic needs, and on the other that the academic community is capacitated to make effective use of ICTs in research and teaching processes. TIC-EID proposed and implemented university-wide plans for awareness-raising, developing and administering training workshops, testing and introducing new ICT tools, and carrying out monitoring and research on its programmes (CIUEM, 2017).

The EdTech-UEM is a project focusing on implementation strategies based on collaborative relations with key UEM actors, such as the Central Library, the Centre for Academic Development (Faculty of Education) and the Pedagogical Directorate, and all 17 UEM faculties and schools within and outside Maputo - teaching and research staff are the principal target groups[1]. The central and faculty leaderships play an important role in promoting changes of attitude among academic staff towards the potential of technologies to enhance and increase the quality of their work.

The EdTech-UEM professional development model, which aims to expand blended learning at UEM, was piloted from February- August 2019, before the pandemic. As part of this institution-wide initiative, a series of four blended workshops were offered to four faculties of UEM, namely, Faculty of Education, Faculty of Sciences, Faculty of Veterinary and Faculty

[1] 17 academic units – Faculties and Higher Schools. Maputo main campus: Agronomy & Forestry, Economics, Education, Science. Social Sciences, Philosophy, School of Sport Sciences; Maputo separate sites: Law, Engineering, Veterinary, Architecture, Communication & Arts, Medicine;
Quelimane Province: School of Marine & Coastal Sciences; Vilanculo: School of Rural Development;
Inhambane Province: School of Hotel & Tourism Services; Chibuto: School of Business & Entrepreneurial Studies. The Science Faculty´s Geology Department is located outside the main campus and is counted separately in terms of needs.

of Engineering. Lecturers from these faculties (including the researcher, lecturer from the Faculty of Education) participated in four face-to-face pilot workshops that were preceded and followed by asynchronous online activities. The themes of these two-week long workshops, each include ICT for Teaching; Course Design and Technology; Blended and Online Teaching; and Creating Resources and Activities. This current model applied Conole's 7Cs learning design framework, where lecturers engaged in authentic activities – conceptualising, designing and developing their blended learning courses (EdTech Report, 2019). The workshops were designed to facilitate integrated learning of pedagogy, technology (mostly Moodle) and learning design by UEM lecturers to ensure well designed blended courses and develop skills in blended teaching (Figure 1.1).

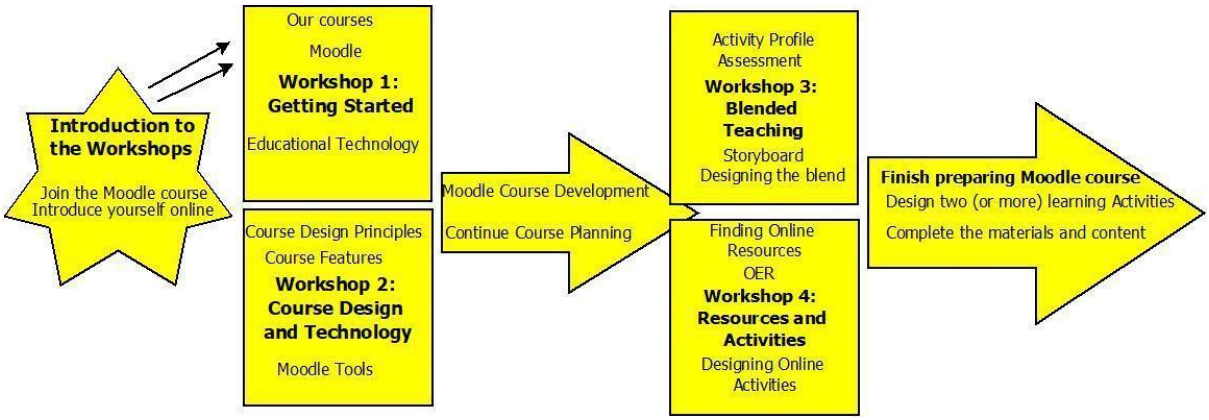

Figure 1.1 - EdTech workshop Plan… Source: EdTech-UEM – Draft Staff Development, 2019

According to Conole (2014), the 7Cs of learning design framework depicts the essential stages of the design process, from early conceptualization of a learning initiative through attempting to implement and evaluating it in practical situations. Conoles' framework consists of the following stages:

"Conceptualise (i.e. What are you designing and why? Who are you designing for?), Capture (in terms of capturing resources to be used and activities around Learner Generated Content), Communicate (mechanisms to foster communication), Collaborate (mechanisms to foster collaboration), Consider (activities to promote reflection and enable assessment), Combine (combining the activities to give a holistic overview of the design and associated learning pathways), and Consolidate (in terms of running the design in a real learning context, evaluating, refining and sharing the design)" (p. 504). The online elements of the courses are hosted on Moodle, the UEM Learning Management System (LMS). The learning outcomes of the workshops were as follows:

Table 1.1 - The EdTech-UEM workshop series learning outcomes

Workshop 1 ● Participants developed a basic a working knowledge of how technology can help in teaching and learning; ● Participants articulated "why" they want to use a Learning Management System (LMS) and other technologies in their courses; ● Participants engaged with examples of Moodle sites used in UEM; ● Participants learnt how to start using Moodle: Login, Browse, Forums and Blog, Set up a course; ● Participants added information about personnel and support systems in UEM.	**Workshop 2** Introduction to the concept of constructive alignment: ● Participants considered their own disciplines through the lens of constructive alignment; ● Participants considered their assumptions about how students learn; ● Participants were introduced to the concept of pedagogical strategies; ● Participants chose as characteristics of their subjects; ● Participants were introduced to the concept of features; ● Participants considered different resources from forums, blogs and WhatsApp in relation to specific learning activities; ● Participants used the Moodle Tools Guide as a practical application of resource analysis.
Workshop 3 On completion, the participant had: ● Reviewed some of the current Moodle courses and decided how to improve their own Moodle course; ● Developed a storyboard for their discipline; ● Considered some key feedback and evaluation principles; ● Learned to use two Moodle Assessment tools; ● Explored its combination and considered possible changes; ● Developed an Activity Profile for their discipline.	**Workshop 4** On completion, the participant had: ● Considered how they improve their Moodle testing discipline; ● Learned about Open Educational Resources (OER); ● Understood Creative Commons' approach to material licensing; ● Learned how to find OER; ● Learned how to assess the quality of an OER; ● Designed at least one combined or online activity; ● Formulated an action plan for their combined discipline.

Source: EdTech pilot workshops series report, 2019

By the end of the 4 workshops participants will have:

1. Knowledge of a course design process
2. Chosen key pedagogic strategies
3. A storyboard for their course

4. Familiarity with Moodle
5. Competence with some important Moodle tools
6. Knowledge of other web-based technologies
7. Ability to source and use open educational resources
8. A Moodle course with a structure and some content and activities
9. Motivation, knowledge and support to continue development of their Moodle course.

The faculty participants consisted of two groups of lecturers: lecturers who already used blended learning (innovators) and those who did not use blended learning but would potentially apply what they acquired in the professional development process, in respective courses and subjects (or, hopefully, become adopters). These are the two sets of participants for the study.

1.7 Outline of Chapters

Chapter 2 – Literature Review

The integration of ICTs into lecturers' pedagogical practices, lecturers' intrinsic and extrinsic motivation, as well as barriers to the adoption of technology-augmented pedagogical practices are all covered in Chapter 2. The chapter also introduces the CoPs framework developed by Lave and Wenger and discusses how it is applied in this study to frame CoPs in teaching and learning contexts, such as faculties, and draws on Rogers' concepts of innovators, early adopters and late majority adopters to mimic apprenticeship of novices by experts, as well as legitimate peripheral participation in CoP. Literature on the role of professional development on lecturers is also covered.

Chapter 3 – Research Methodology

The third chapter describes the research technique and explains why an interpretive research approach was chosen. The chapter further explains how the data was gathered, as well as how the lecturers who were interviewed were chosen and how the interviews were conducted. The chapter also discusses how the transcripts of the interviews were analysed.

Chapter 4 – Findings

The study's findings are presented in Chapter 4 by first describing the demographics of the study's participants, and then demonstrating how the generated themes describe innovators' and

adopters' motivations, pedagogical practices, support for, and barriers to, adopting technology-augmented practices, and fostering communities of practice. The chapter introduces descriptions of 24 structural themes before wrapping up with findings and their discussion.

Chapter 5 – Discussion

The findings in Chapter 4 are linked to Lave and Wenger's Communities of Practice concept, which was covered in Chapter 2. Through support and collaboration reported during and after the workshops, the data are used to reveal the emergence of the joint enterprise, mutual engagement, and shared repertoire between innovators and adopters. That is, in terms of innovator/novice engagement during and after the workshops as well as the support and collaboration among adopters during the workshops.

Chapter 6 – Summary and Recommendations

The last chapter summarises the main findings, discusses each research question, and explores how the study could help both the researched faculties individually and the institution as a whole. The chapter comes to a close with research recommendations and suggestions for further research.

CHAPTER 2 – LITERATURE REVIEW

2.1 Introduction

The study explored the implementation of a faculty-based professional development model focused on innovators and potential adopters from the Education and Veterinary faculties to foster communities of practice. This chapter begins with a narrative of a traditional approach or lecturer-centred-learning (LCL) approach and student-centred-learning (SCL) approach and explains these different pedagogical practices among lecturers in Higher Education Institutions (HEIs). The role of lecturers has changed and it has also become more demanding, requiring management of a variety of additional responsibilities in addition to teaching.

The next section explores the different motivational factors for lecturers, who teach using educational technologies, followed by the conceptual and theoretical frameworks which provide a lens to adoption, and social learning and support in Communities of Practice (CoP), respectively. The section that follows describes the lecturers' support, professional development and integration of ICT followed by the final which explains barriers to adopting technology-augmented pedagogical practices in HEIs.

2.2 Information and Communication Technology (ICT) Integration into Pedagogical Practices

The primary reason for the lack of integration of ICTs into pedagogical practices is that lecturers lack knowledge of, skills and competence and appropriate attitude towards ICT, as well as ability to incorporate them into pedagogical practices (Thorburn, 2004; Alemu, 2015). In principle, lecturers play an important role in determining how technology is integrated into pedagogical practices (Alemu, 2015). That is, they appraise the suitability and usefulness of current technologies, decide how and when to use them with their students, and choose appropriate resources, learning tools and activities to stimulate, engage, and develop students' ICT literacy (Alemu, 2015). Research and practice show that lecturers use two dominant approaches to technology integration.

2.2.1 Lecturer-Centred-Learning (LCL) approach

The lecturer-centred-learning approach, which is underpinned by the behaviourist approach to learning, is based on the "perspective of knowledge transmission", whereby "teaching is typically associated with a content approach", and students are viewed as "passive receivers of knowledge" (Santos et al., 2019, p. 3). In this context, learning involves remembering and replicating the correct responses, memorising facts as well as mastering performance (Santos

et al., 2019; Weeger & Pacis, 2012). Appropriated pedagogical strategies that foster interaction in class, such as guiding discussions, demonstrations, and labs, are widely employed to help lecturers maintain control over students (Garret, 2008; Edwards, 2004). In lecturer-centred classrooms, lecturers tend to use extrinsic motivation to affect student behaviour and lecturers work with the individual students when they need extra help (Weeger & Pacis, 2012, p.13). The students' role is to assimilate instructional content and demonstrations and apply them to develop performances that demonstrate best thinking acquisition (Weeger & Pacis, 2012).

Students in the LCL approach "interact through initiation–response–evaluation sequences, discuss student-initiated questions, and explore difficult concepts under the teacher's guidance" (Wu & Huang, 2007, 746). In their study, Wu and Huang (2007) found that both LCL and SCL classes used computer simulations, but their role was different in the two instances. In the LCL classes, "simulations displayed the content, provoked student-initiated questions, and allowed students to visualise phenomena", while, in the SCL approach, "simulations were used to negotiate meanings, clarify confusions, examine predictions, and reinforce concepts developed during previous activities" (Wu and Huang, 2007, 746). This implies that students' learning experiences are shaped by these teaching models, allowing students to participate in a wide range of learning activities, such as making reflections, increasing self-confidence toward learning, presenting basic questions, and producing insightful debates about the content they've acquired (Wu & Huang, 2007).

The next section describes factors that motivate lecturers to adopt technology in pedagogical practices.

2.2.2 Student-Centred-Learning (SCL) approach

The notion of a pedagogically sound way of integrating ICTs in pedagogical practices is loosely correlated to student-centred approach, which is underpinned by learning theories, such as constructivism, social constructivism and situated learning. A constructivist teacher is mostly focused on supporting students in dealing with questions and challenges, searching under the surface, experimenting with numerous alternative solutions or explanations, and finally constructing their own knowledge (Ryan & Cooper, 2001). Furthermore, through experiential education, creative outputs, problem-based learning, and collaborative conversations, students engage and co-construct knowledge (Abe, 2011; Passehl-Stoddart & Monge, 2014; Tom,

2015). With the student-centred approach, teaching is viewed as knowledge acquisition facilitation (Kember & Kwan, 2000).

According to constructivist learning theories, the students learn something by being actively engaged in activities, and by doing so, and the capacity to assimilate whatever they have acquired (South African Institute for Distance Education [SAIDE], 2012; Council on Higher Education [CHE], 2014). Based on Vygotsky's social learning theory, it is believed that learning emerges from social interaction. This is established by social relationships, and their elements are social artefacts (Vygostsky, 1929). For this to happen properly, a lecturer must facilitate the learning process (SAIDE, 2012; CHE, 2014).

Hatlevik and Arnseth (2012) and Rampersad (2011) say that, if technology-augmented practice is integrated in the pedagogical practices, students will be able to participate in interactive assignments with a variety of knowledge and abilities. SCL can provide a significantly better level of professional development in terms of intellectual capabilities and competences that are important for both lecturers' personal growth and career advancement as well as increasing their flexibility in devising ways to deliver a course or a program component, as well as in implementing new teaching or research methods (Attard, et al., 2010).

2.3 Motivating Factors for Higher Education Faculty to Integrate ICT into Pedagogical Practices

Findings from studies on the incorporation of technology into pedagogical practices and motivation factors reveal that there is a link between motivation and faculty members' personal decision to adopt a technology innovation (Gautreau, 2011; Gillard, Gillard & Pratt, 2015). These could be intrinsic or extrinsic motivation factors.

2.3.1 Intrinsic motivation factors

Toth (2002) and Cohen (1986), have used questions, such as Why, How and What to explore intrinsic motivation toward a particular behaviour. Such research draws on the intrinsic motivations such as: i) sense of competence and self-determination; ii) attitude or personal motivation towards computers; iii), teacher efficacy, perceived self-efficacy, autonomy, commitment to teaching, competence, and interpersonal connectedness; iv) job satisfaction and empowerment; and v) self-respect, a sense of accomplishment, self-respect and responsibility (Deci, 1975; Bandura, 1982; Ellis, 1984).

According to Deci (1972), "intrinsically motivated behaviours are ones which a person engages in to provide himself with a sense of competence and self-determination" (p. 125). Bordbar (2010) highlighted the ability of lecturers to use technology as a powerful factor of ICT integration in the pedagogical practices. Al-Oteawi (2002) says that lecturers who had an unfavorable or neutral attitude about incorporating ICT in the pedagogical practices, lacked the knowledge and abilities to make "informed decisions" (p. 253).

According to Peralta and Costa (2007), lecturers who have more computers' experience are more confident and more successful in order to use technology. To conclude, Jones (2004) reported that teachers' competence is linked to their confidence and teachers' confidence relates to their perceptions and abilities in using computers in the classroom. Stahlbrost and Bergvall-Kareborn (2011) pointed out that "intrinsic motivation occurs when an individual engages in an activity, such as a hobby, that is initiated without obvious external incentives; this type of motivation refers to the desire to the need to feel competent and self-determined" (p. 301).

Another intrinsic motivating factor that has been thoroughly studied is the teacher's attitude or personal motivation towards technology. Teachers' attitudes towards technology is one of the factors that determine successful ICT integration into pedagogical practices (Hew and Brush, 2007; Keengwe and Onchwari 2008; Buabeng-Andoh, 2012). According to Buabeng-Andoh, (2012) "teachers can easily provide useful information into the adoption and integration of ICT into teaching and learning processes if their views toward the use of educational technology are positive" (p.147).

Berg, et al. (1992) have studied previous research findings to better understand the relationship between intrinsic motivating factor and pre-service teacher perspectives on using technology in the classroom, and they discovered that one influential intrinsic factor for pre-service teachers was a desire to improve their own and their students' quality of life. Mills (1991) suggested that intrinsic motivating factor could also be explained through high state of mind, which means that "in this higher level of well-being and positive motivation, people are energised by an intrinsic interest in what they are doing, not by what others think or what they are trying to prove about themselves" (p. 75). Furthermore, Ellis (1984) concluded that lecturers are most influenced by intrinsic rewards such as self-respect, responsibility and feelings of mastery; these feelings imply passion. According to Curran et al. (2015), passion offers the required resources to participate intensely in an activity that a person enjoys (Verner-

Filion, et al., 2017), resulting in an individual involvement and commitment. Orosz, et al. (2016) assert that when the intrinsic motivation comes to passion, people are willing to engage in the activity of their choice, creating a sense of personal acceptance and eagerness to participate, with 'no strings attached' and no external pressure. In turn, Mylonopoulos and Theoharakis (2020), suggest that perceived enjoyment is important in sparking passions and increasing the ICT use in the pedagogical practices consumption directly.

Other intrinsic factors which can also influence motivation are teacher efficacy, perceived self-efficacy, autonomy, commitment to teaching, competence, and interpersonal connectedness (Bandura, 1982; Ford et al., 2017; Barni et al., 2019). Literature on Self-Efficacy Beliefs (SEB) in the use of ICT tools in pedagogical practices, indicates that SEB is the most significant factor when it comes to use of technology-augmented practices by lecturers in the pedagogical practices (Becta, 2004; Taylor, 2011). Related to these, Bandura and Cervone (1986) concur that there is intrinsic motivation such as self-efficacy, which strongly influences an individual's motivation towards a behaviour. In turn, Hsieh and Schallert (2008) "regard self-efficacy as the beliefs that individuals have about their capabilities to complete a particular task successfully" (p. 2). Gbemu et al. (2020) argue that people's levels of self-efficacy determine their decisions to take on difficulties, their efforts to expand on the challenges, and their resilience in the face of challenges related to the obstacles.

Ford et al. (2017) argue that teachers' desire for progress, and their continued commitment to the profession of teaching, are shaped by self-efficacy, autonomy, and satisfaction. According to the findings of their study, this implies that teacher self-efficacy is strongly associated with teacher job satisfaction and professional dedication. On the other hand, Barni et al. (2019) conducted research on the relationships between teachers' self-efficacy and their values, with the goal of determining how teachers' controlled and autonomous motivations for teaching and learning with technology influence these relationships. The findings revealed that "teachers' self-efficacy is higher when their personal beliefs and work environment features are perceived as compatible by them" (2019, p. 1). Also, lecturers who cared about their students and 'valued' themselves for what they did, were most likely to increase their self-efficacy. Teachers' relationships were stronger when they felt less tension and were more self-motivated to teach with technology (Barni et al., 2019).

Research conducted by Davis and Wilson (2000) investigated the principal empowering behaviours and the data suggested that as principal empowering scores grew, motivation

increased. Research was also done to find out what influences job satisfaction. The findings of this research supported the conclusion of Deci and Flaste (1995) that when individuals are given the opportunity to make decisions, their intrinsic motivation increases. For Ungar (2017), empowerment may be defined as a sense of self-efficacy, a positive self-image, and a desire to achieve and succeed, and ICT has an impact on lecturers' personal and professional self-efficacy when it comes to adopting ICT in education.

Other intrinsic motivating factors for adopting technology in pedagogical practices are incentives derived from the job itself such as a sense of accomplishment, self-respect, and personal growth (Chigona, et al., 2014, p. 2). Intrinsic incentives are more satisfying and motivating than external rewards (Herzberg, 1987; Davis, et al., 1992). Dillon and Walsh (1992, quoted by Shifter, 2000) concluded in their study about faculty participation in distance learning that it has challenges that need to be addressed. The authors pointed out that "… faculty motivation to teach at a distance results from intrinsic [prestige, self-esteem] rather than extrinsic incentives [monetary rewards]" (p. 21)]. According to the authors, in order to be effectively teaching a distance course, faculty must be technically proficient; thus, faculty attendance will be determined by their general comfort level as well as their ability to teach using technology.

2.3.2 Extrinsic motivation factors

Some extrinsic motivating factors are a system of rewards and incentives, sufficient training and support, needs-based training programs, a variety of opportunities, strong support systems, scholarly pursuit, the availability of resources, greater flexibility for students, and reduced teaching loads (Gautreau, 2011; Schifter, 2000). In contrast, workload worries and unpleasant comments from colleagues, lack of training and support and minimal release time provided by their departments, are barriers for faculty members to adopt technologies (Schifter, 2000). According to Deci (1972) extrinsic motivation is the motivation that comes from outside of oneself, such as the "performance of an activity because it leads to external rewards (e.g., status, approval, or passing grades)" (p. 113). External rewards such as job security, salary, fringe benefits, and explicitly or implicitly monetary incentive or recognition by others can activate extrinsic motives, also known as hygiene factors (Hars & Ou, 2002; Herzberg, 1987).

According to Taylor and Todd (1995), attitudes comprise "perceived usefulness", "perceived ease of use", and "compatibility". Davis (1989) developed the Technology Acceptance Model (TAM), which explains users' technology intentions and acceptance. The TAM posits that

perceived usefulness and perceived ease of use influence technology usage intentions by the individual (Davis, 1989). Perceived usefulness is described as “a person’s expectation that using the computer will result in improved job performance” (Davis et al., 1992, p. 1112).

Tornatzky and Klein (1982) discovered that compatibility, relative advantage, and complexity are the most persistent important connections across a wide range of innovative types in their concept of the relation between an innovation's characteristics and its adoption. According to Rogers and Shoemaker (1971), complexity is defined as “the degree to which an innovation is perceived as relatively difficult to understand and use” (p. 154).

When applying motivation theories into TAM, the performance of an activity seen to be instrumental in reaching desirable results that are distinct from the activity itself, such as enhanced job performance, income, or promotions, are examples of extrinsic motivation (Huang, 2007; Davis, et al., 1992). In turn, perceived ease of use is viewed as “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989, p. 320). Furthermore, Davis reported ease of use has been discovered to be a predictor of perceived usefulness (1989).

Brown et al., (2016), conducted a study on the principles of a digital education curriculum and digital education leadership in order to promote digital education in Commonwealth countries. The data revealed that lecturers would experiment with using technology for teaching and learning, and, if the experiment was successful, the lecturers would gain confidence and, over time, their identity of being digital practitioners (digital education champions) (Brown et al., 2016).

According to Deci (1972), extrinsic motivations factors are measured through rewards that make distinctions since a person’s evaluation of different rewards may be different. In turn, “this would lead to different effects on the person’s intrinsic motivation” (p. 113). When verbal incentives are offered as external motives, they may not be experientially distinct from the participants' feelings of satisfaction with the activity, resulting in an increase in the total significant value characteristics linked with the activity (Koch, 1956). As a result, a person's intrinsic motivation will be improved; in other words, “the tendency to perform the activity in the absence of external rewards will be strengthened” (Deci, 1972, p. 113). Pink (2009) says that extrinsic rewards may give a small motivating boost without having negative consequences. Extrinsic rewards can provide a tiny motivational boost without detrimental side effects for ordinary chores that are not exciting or require innovative thought. Because there is

little or no intrinsic desire involved in performing the activity that is being rewarded, rewarding uninteresting tasks will not decrease intrinsic motivation (Pink, 2009).

2.3.3 Intrinsic and extrinsic motivation factors dependency

"Intrinsic motivation has also been investigated using the following extrinsic factors: such as deadlines, evaluation, tokens, expectancy, goal imposition, competition, and avoidance of punishment" (Deci & Ryan, 1985; 1987 cited in Toth, 2002, p. 20). These extrinsic influences, theorists felt, would boost internal motivation and improve individual performance (Davis, et al., 1992).

Autonomy relates to the idea that people are in control of their own actions, and that this desire to still be in control affects a person's level of intrinsic drive (Deci & Flaste, 1995). The authors argue that when a person believes they are being compelled to perform in a certain way, their centre of control switches to the outside world, and their intrinsic motivation decreases.

According to Hennessey, et al. (2015), extrinsic motivation is described as a desire to do something in order to achieve a goal or meet a limitation imposed by others. The authors explain that satisfaction, self-determination and control have been associated with intrinsic motivation factors. In addition, the authors pointed out that environmental constraints, such as expected reward, the imposition of time limits can undercut emotions of self-determination, leading to an extrinsic orientation. However, retaining types of reward, on the other hand, may improve intrinsic motivation through a process known as motivational synergy in some circumstances (Hennessey, et al., 2015).

It is important to know the EdTech workshop participants' motivating factors so that they could be incorporated into the design of an effective professional development model that supports faculty needs. After motivation factors to adopt technology are identified, the next stage is to integrate those factors into designing an effective technology-augmented faculty-based professional development to foster communities of practice for technology-augmented practices adoption.

2.4 Conceptual and Theoretical Framework

This section provides the conceptual and theoretical framework of this research. Rogers, a theorist who coined the concept of 'diffusion of innovations', which has been widely used in the technology-enhanced teaching and learning field. He defined an innovation as "the idea,

practice, or object that is perceived as new by an individual or other unit of adoption", while he defined diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2010; Fleage, 2012). Innovators, early adopters, early majority adopters, late majority adopters, and laggards are the five types of adopters identified by Rogers (1995). These categories represent the rates at which lecturers accept technical innovations, and are based on the rate at which an invention is adopted (Rogers, 1995). Four key aspects of dissemination influence diffusion: the invention itself, the spread of innovation knowledge, time, and the social structure that adopts the innovation (Rogers & Scott, 1997; Gautreau, 2011).

This research study adopts the notion of Rogers' innovators, early adopters and late majority adopters. Innovators are the ones who are the first ones to adopt a new idea and often require a relatively short adoption period after they have become aware of new practices (Rogers, 1961). In the current research, these are lecturers who had been using educational technology for teaching of their own volition and before the workshops. The second group, as described by Rogers, comprises early adopters. For Rogers (1995, p. 11) "early adopters frequently serve as opinion leaders who can persuade others to adopt the innovation by providing evaluative information". They were the first group of lecturers likely to adopt the technology-augmented practices during the workshops. The other group who participated in the professional development programme, is at different stages in adopting what was taught at the workshops, in their own practices, hence, for the aim of this investigation, the notion of 'early adopter' is more appropriate for the lecturer participants in the Faculty of Education. Whereas for the aim of investigation, those lecturer participants in the Veterinary faculty are loosely referred to as 'late majority adopters'. According to Rogers (1995), individuals whose time of adoption is one standard deviation sooner or later than the average are known as later majority adopters. Individuals from this category acquire skills in new technology during the period of time. This is a substantially slower adoption rate than that of innovators and early adopters. Late majority adopters are slower to adopt new technologies and are less likely able to keep positions of power in a system (Rogers, 1962).

The Communities of Practice (CoP) framework of Wenger (1998) and Lave and Wenger (1991) has been identified as the conceptual basis for this research. This framework has the potential to help the researcher understand and describe the social learning process between the lecturers who are integrating technology into teaching and learning. The CoP framework helps the researcher to frame the innovators – potential early adopters' relationship and the social and

situated learning that take place (at varying degrees) in the two faculties. Moule asserts that the CoP model "is viewed as a situated learning theory as it describes learning in social and situated contexts, especially in the workplace" (2006, p. 134). Participants co-construct knowledge through social interactions that are situated in a real-world context (Chan & Pang, 2006).

In their work, Lave and Wenger (1991) emphasise the concept of 'legitimate peripheral participation' (LPP) in CoP, where LPP describes how newcomers or novice practitioners become experienced as a result of apprenticeship by the experts. Lave (1991) "suggests that learning takes place as a result of 'becoming a member of a sustained community of practice' and the knowledge gained as 'mastery' of the subject around which the community has formed" (p. 65). She also says that "learning happens as a result of 'legitimate peripheral participation' in communities of practice" (p. 81). Lave and Wenger (1991) states that partial participation of newcomers "is welcomed and dynamic, with newcomers slowly learning about the shared subject of interest" (p. 37). Lave and Wenger (1991) explain that "as the person learns more about the subject of interest, their membership of the community evolves" (p. 37). They also "argue further that the way in which the CoPs and the artefacts are produced, both need to be transparent for increasing participation by members" (p. 37). Lave and Wenger (1991), suggest that "participation in the practice may well be a condition for the effectiveness of learning" (p. 93). The authors "hold the view that members of a CoP have multiple levels of participation and make diverse contributions to required activities" (p. 93). In the context of this study, these would be the early adopters and innovators.

2.4.1 The Community of Practice (CoP) theory

Wenger (2006) says that "communities of practice are relevant in education, especially in activities which enable professional development. He asserts that communities of practice are formed by people who engage in a process of collective learning in a shared domain of human endeavour" (p. 1). In turn, Wenger-Trayner and Wenger-Trayner (2015) go into greater detail about the qualities of CoPs that set them apart from other communities:

1) The domain: The "community of practice has an *identity defined by a shared domain of interest*. Membership therefore implies a commitment to the domain, and therefore a shared competence that distinguishes members from other people" (p.2).
2) The community: "In pursuing their interest in their domain, *members engage in joint activities and discussions, help each other, and share information*. They build relationships that enable them to learn from each other" ... Having the "same job or the

same title does not make for a community of practice unless members interact and learn together. … But the members of the CoP do not necessarily work together on a daily basis" (p. 2); they could be working in different locations, yet they frequently get together to interact and learn.

3) The practice: A community of practice is not the same as a community of interest, such as people who enjoy certain types of movies. "Members of a community of practice are *practitioners*. *They develop a shared repertoire of resources*: *experiences, stories, tools, ways of addressing recurring problems—in short a shared practice*" (p. 2). This requires time and ongoing interaction [Italics added].

That is, according to Wenger (1998), a CoP defines itself along three dimensions:

Joint enterprise enables a community to go beyond the established bounds and interpretation of practice. Members negotiate their situations through their reactions to them, sharing a similar purpose. The legitimacy and substantiality of the resulting enterprise may theoretically be questioned if there was no sense of joint enterprise (Wenger, 1998).

Mutual engagement is the underpinning for all relationships required for the CoP to work (Wenger, 1998). According to the author, mutual engagement is necessary to negotiate the meaning of practice within a CoP. During this interaction might take the shape of formal meetings or informal exchanges, and it can help to engage people and keep the community together (Wenger, 1998). Drawing on this framework, Moule (2006) claims that an online community requires continual connection and development via email, discussion boards, and virtual classrooms. Further, to support mutual engagement in the context of online community, members from CoP require skills in technology as well as software and hardware resources to support their adoption in technology-augmented pedagogical practices (Moule, 2006; Gillis, et al., 2000).

According to Rogers (2000), "meaning is negotiated in a community through its ***shared repertoire*****"** (p. 388*)*. According to the author, the "repertoire refers to the fact that there is a pool of resources that members not only share but also contribute to and therefore renew" (p. 388). These "resources can be physical, such as e-mail, word processors, a common textbook or they can be intangible, such as a common discourse, a means or methodology for accomplishing tasks" (p. 388). According to Moule (2006), "actions and artefacts have histories of interpretation, though it is suggested that they do not constrain meaning, but allow negotiation of new meaning and dynamic development through sustained engagement in the

community" (p. 293). According to the author, "this aspect of a CoP tends to suggest longevity" (p. 293). Fowler and Mayes (1999) and Moule (2006) assert that the CoP have a lengthy and consistent orientation, which may limit their application in more dynamic learning situations.

Practice, sometimes known as "learning by doing," entails engagement in a group with the purpose of reaching a common goal (Moule, 2006). Moule says that community can be referred to as a space for social learning – "learning as belonging", "where the community is the learning context and has three essential components: mutual engagement, joint enterprise and shared repertoire" (2006, p. 133).

According to Wenger (1998b, p. 72), "practice is the source of coherence of a community" (see Figure 2.1 below).

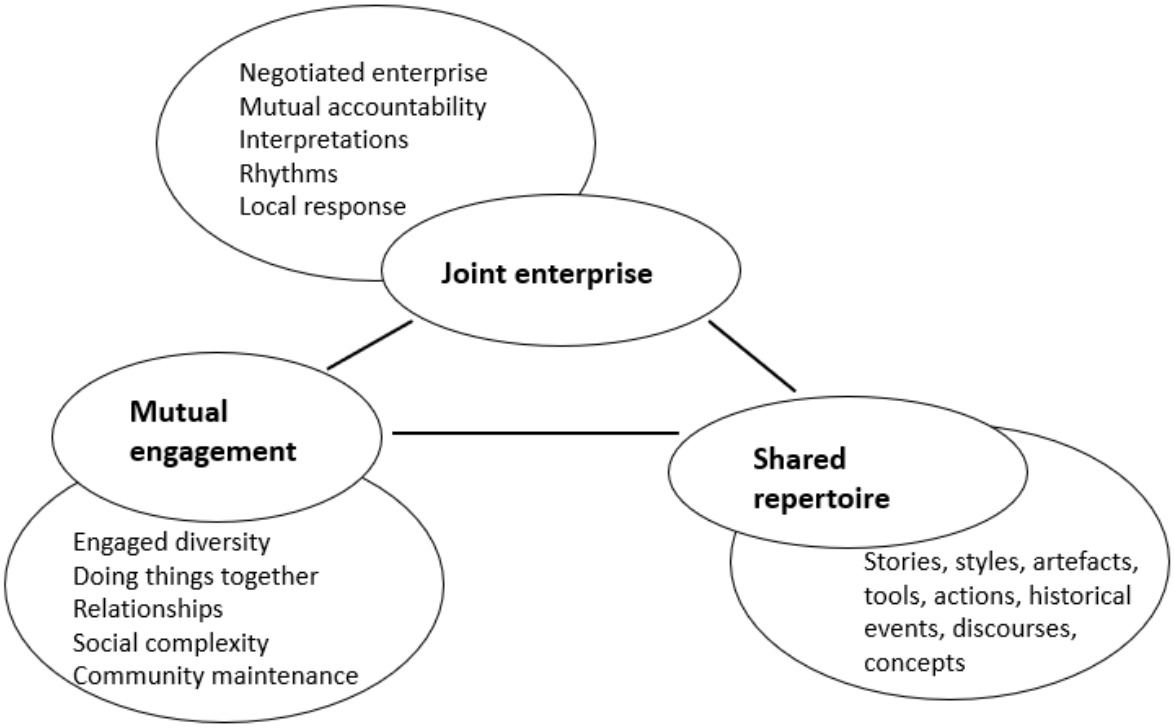

Figure 2.1 - Dimensions of practice as the property of community (Adoped fro Wenger, 1998, p. 73

In the context of this study, the joint enterprise is the development of a blended learning (student-centred) course on UEM LMS, and peer support from innovators to adopters. The mutual engagement is part of support among adopters, and shared repertoire includes producing course elements and technology-augmented pedagogical practices.

Wenger (1998), goes on to say that communities aren't homogeneous, but rather consist of a variety group of people who can impact each other's functioning inside the community by working together. Likewise, Nicolle (2005), in her study about technology integration into pedagogical practices, found that members of a CoP had distinct motivational elements that affected their usage of educational technologies, such as self-satisfaction (intrinsic), institutional, and peer support (extrinsic). Thus, establishing the motivating factors for technology-augmented pedagogical practices of UEM participants was of interest in the current study.

The next section describes social learning in communities of practice.

2.4.2 Communities of Practice and social learning

Lave and Wenger (1991) firstly proposed learning as a situated activity, which came up with the concept of 'legitimate peripheral participation'. In their work, newcomers were considered as members of a community of practitioners who were integrated into the society's socio-cultural practices, earning competence through the acquisition of information and skill development from those positioned as masters. The concept of legitimate peripheral participation (LPP) implies that if newcomers are to learn, they must have exposure to a community of practice, as well as to the artefacts and activities of such group, including "access to a range of ongoing activity, to experienced members of the community, and to information, resources, and opportunities for participation" (Bathmaker & Avis, 2005, p. 50). According to Lave and Wenger (1991), the term 'legitimate' is used to imply involvement in the community of practice's genuine and required activities, whereas 'peripheral' means that there are "fewer demands on time, effort and responsibility than for full participants" (p. 36). The authors also claim that "peripherally can be empowering as a place in which one moves towards more intensive participation, but can also be disempowering as a place in which one is kept from participating more fully" (p. 36).

In his ground-breaking 1998 book, "*Communities of practice: Learning, meaning, and identity*, focusing on workplace learning, Wenger expanded upon this idea of CoP, articulating how social resources shape people's learning trajectories and their professional identity" (Smith & Shea, 2017, p. 211). According to Wenger (1998b), this way of thinking about learning revived the concept of apprenticeship and employed learning which was constructed as a social learning framework with four components: community, identity, meaning, and practice. In this model, the meaning is defined as historical and contextually linked engagement and reification, which

includes learning from negotiated experience and community participation (Wenger, 1998b). Reification modifies experiences and helps to identity formation through the use of things, with identity defined as "learning as becoming" (Moule 2006, pp. 133-140).

Figure 2.2 illustrates these components.

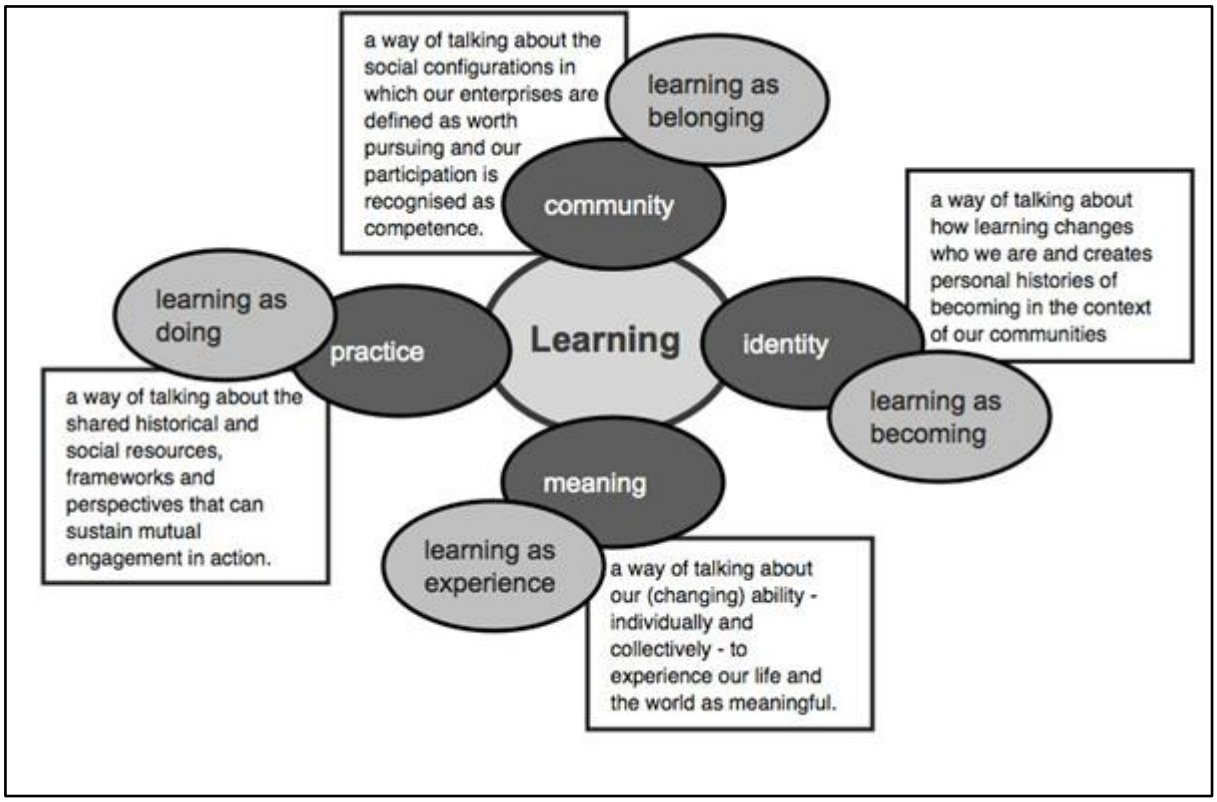

Figure 2.2 - An first inventory of the components of a social theory of learning (Wenger, 1998, p. 5)

The work of Lave and Wenger (1991) is focused on a social theory of learning, which views learning as a socially situated activity that emphasises the social and cultural components that influence learning. According to Wenger (1998b), the social theory of learning supports an understanding of individual experience within a larger social and historical context of action and development. This implies that for Lave and Wenger (1991), learning is "increasing participation in communities of practice" (p. 49). Wenger (1998b) also emphasises that "learning is an integral part of everyday lives. It is part of our participation in our communities and organisations" (p. 8). In the UEM context, the CoPs seem to emerge from the EdTech-UEM professional development approach adopted by the university. It is hoped that this approach may foster mutual engagement among the innovators and adopters and sustain ongoing support in promotion of a shared enterprise within a department or course team. That is, Lave and Wenger's (1991) notion of "a community of practice [being] an intrinsic condition

for the existence of knowledge" (p. 98), where learning is a result of social participation in the CoP, informs the researcher on how the interaction between the innovators and adopters could result in authentic situated learning of the technology-augmented pedagogical practices.

The implication for professional development is that "training departments [need to] move the focus from training initiatives that extract knowledge *out* of practice to learning initiatives that leverage the learning potential inherent *in* practice" (Wenger, 1998b, p. 3). That is, professional development models need to foster mutual engagement among lecturers "who can draw on what [they] do and what [they] know, as well as on [their] ability to connect meaningfully [with] … contributions and knowledge of others" (Wenger, 1998a, p. 76). Wesley and Buysse (2001, p. 118) posit that CoPs are a suitable "means of professional development" for "improving practice" in both schooling and higher education contexts. Wenger (1998b) emphasises that "[for CoP] to be effective, managers and others must work with communities of practice from the *inside* rather than merely attempt to design them or manipulate them from the *outside*" (p. 3). According to the author, legitimising participation, setting their strategic context, being receptive to authentic practices, fine-tuning the organisation, and offering help are all part of the process of developing communities of practice in companies.

The next section describes lecturer support and professional development as they integrate ICTs into teaching and learning practices.

2.5 Lecturer Support, Professional Development and Integration of ICTs into Pedagogical Practices

Lecturers' support is important for the survival of African ICT programs, where many have been abandoned because neither the government nor HEIs have developed preparations to keep them going (Cossa & Cronje, 2004; Clecherty & Tjivikua, 2005; Kozma, 2006; Thomas, 2006). Whereas professional development focuses on a variety of avenues to expand lecturer skills (Gaible & Burns, 2005).

2.5.1 Lecturer support

Kennisnet (2008) distinguishes between two types of ICT-based support for lecturers: pedagogical support and/or technical support. According to Dexter (2008), pedagogical support refers to help with teaching and learning (including basic troubleshooting in and out of the classroom). Lecturers should create intellectual stimulation among themselves, participate in

professional development, and enable initiatives, such as integrating ICT to satisfy their learners' learning goals.

Technical support evaluates installation, maintenance, operation, network administration and security (Nawaz and Qureshi 2010). For these authors, ICT support includes addressing hardware issues, installing software, and assisting users with typical ICT applications in eTeaching, eLearning, and eEducation. Smith (2000) demonstrates that lecturers' ability to integrate technology is aided by institutional supply of required infrastructure and technical support. According to Ho et al. (2001) and Kirkwood and Price (2006), one of the current pedagogical support concerns is a focus on technology issues, and as a result, academic staff professional development has mostly focused on increasing lecturers' technical skills. The current research study advocates for both.

2.5.2 Professional development (PD)

Professional development (also known as "in service" or "teacher education") refers to the training given to lecturers in order to help them advance in a particular field (e.g., technology, reading instruction, topic mastery, etc.). Professional learning and teaching practice take place in a sociocultural context that has a profound impact on an individual learning (Timperley, et al., 2007).

Different strategies are required to assist lecturers. For instance, workshops are a starting point for skills and knowledge development (Cox, 2008). According to Gramsci (1971), "training" as a PD approach must combine theory and practice, allowing lecturers to make decisions about their pedagogical practices in the context of the theory. This type of professional development is more effective than conventional teacher training in terms of teacher learning (Gramsci, 1971). He also mentions that rather than simply supplying instructors with computer knowledge and abilities, it is critical that ICT teacher training be relevant to the integration of ICT for teaching and learning. According to Ghavifekr, et al. (2014) to promote successful ICT integration in the curriculum, teacher training institutes must provide mandatory ICT training as well as ongoing professional development. Parsons, et al. (2012) and Alemu (2015), claim that a significant number of HEIs have established compulsory training for their faculty as a response to this transition. Alemu (2015) argues that compulsory ICT in teaching is also a requirement in universities for lecturers so that they can start their careers as technology experts in the classroom. According to the author lecturers must attend the training and return to their faculties and/or departments and share what they've learned as a group. Despite that training

alone is not sufficient, it is also likely that more significant changes in the overall cultural and social context of university teaching practices would be required. (Blin & Munro, 2008, p. 489). To promote successful ICT integration in the curriculum, teacher training institutes should provide compulsory ICT training as well as professional development of teachers (Alemu, 2015).

Six factors were found by Strudler and Hearington (2008), associated with successful ICT implementation. According to them, the three first are structural features that define the background, whereas the next three are fundamental features that characterise the processes that occur:

"a) The form of the professional development activities refers to the reform type of activities. For example, developing lecturer network or study group which include:

b) The duration of the activity including time per session and number of sessions. The longer the activity the better.

c) Collective participation of groups of lecturers from the same school, department, or grade was found to be more effective than individual participation.

d) Active learning opportunities were associated with effective professional development.

e) Content focused teaching strategies were found to be better than generic teaching strategies not tied to particular content areas.

f) Coherence, which refers to the degree to which the activity is tied to school goals, policies, and standards; the greater the coherence for lecturers, the more effective the professional development" (pp. 583-584).

In turn Bali and Caines (2018) claim that, in order to encourage future growth relevant to their unique requirements, schools should consider introducing more flexible possibilities that provide lecturers to choose their courses, engage in constructive discussion, and promote collaboration beyond the community in order to stimulate appropriate individual needs. This type of PD can help designers to find potential areas to modify and meet certain goals, which can aid decision-making for course construction and revision (Gachago, et al., 2020). It can also be used to analyse courses, which may lead in to model changes as well as, it can assist

lecturers in envisioning the future of a course and what they want to accomplish, such as paving the way for open, creative, collaborative networked PD (Gachago, et al., 2020).

2.5.3 Training/Workshop for the integration of ICTs into pedagogical practices

According to Guskey (2000), workshops, seminars, and other large-group sessions are common ways to give training. The authors claim that workshops in technology-augmented pedagogical practices courses are common in traditional types of faculty development or teacher professional development. These training approaches highlight the distinction between how the knowledge is acquired and where it will be applied (Guskey, 2000). These sorts of training are unsuitable for developing the deep understanding that lecturers require in order to become intelligent pedagogical users of technology (Fleage, 2012). According to Guskey (2000) there must be additional follow-up activities or sessions, like peer observations or follow-up sessions when members participate again to assess the impact of the newly taught skill, must be included.

2.5.4 Communities of practice (CoPs) and lecturer professional development for the integration of ICTs into pedagogical practices

According to Sterrett et al., (2015) as they learn about and become enculturated in their discipline, lecturers can build a CoP. The authors claim that lecturers can engage in their courses with other lecturers who share the same interest and experience through mutual engagement, joint enterprise, and a shared repertoire. A community usually involves a network of relationships and the network relationships allow participants to commit to activities that involve joint enterprise or domain (Wenger, et al., 2011). According to Lomos, et al. (2011), network relationships come from the professional collaboration among lecturers, which results in actions carried out by a group of people with the same purpose in mind, such as improving teaching and learning procedures. It includes the various chances for teachers to communicate with one another and to take action in terms of instructional decision-making and their own practice (Reeves, et al., 2017). Becoming a member of a community allows for learning and development and formation of an identity (DeMatteo & Reeves, 2013, pp. 27-33).

Kirkwood and Price (2006) also argued that “the [professional development] activities need to go beyond the individual teacher and address departmental, faculty and institutional views of teaching and rationales for incorporating ICT into course programmes” (p. 6). This means that implementing new teaching and learning approaches necessitates an institutional approach to professional development to accommodate the various degrees of lecturer support. Related to

this, Wilson's (2012) findings revealed that department-based professional development and the use of departmental e-learning champions, be it a formal or informal arrangement, tend to promote communities of practice and peer support within departments. By the same token, Barran and Correia (2014) developed a framework for lecturer transition into online environments: The framework demonstrates a clear relationship between the individualised professional development, a community of practice encapsulated with peer support, and organisational support (Figure 2.3). According to them, "creating [a] community of practice with a special focus on peer support has the potential to extend learning communities outside of formal professional development programs" (p. 99).

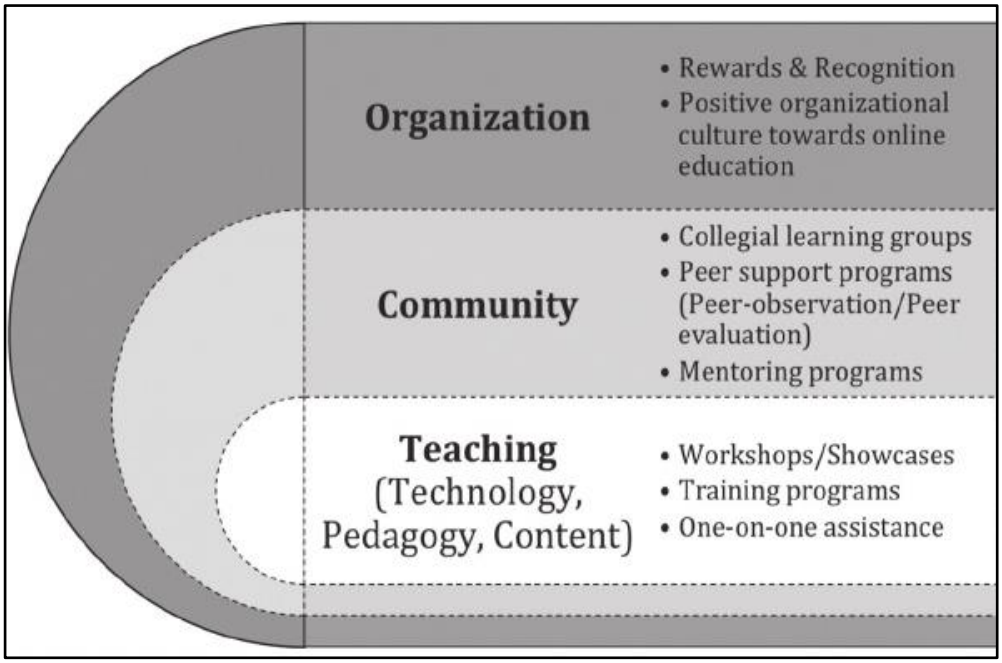

Figure 2.3 - Professional development framework for online teaching (Barran and Correia, 2014, p. 97)

At UEM, the EdTech-UEM model is an institutional approach where lecturers attend a faculty-based workshop series to support them to redesign their courses. This group of faculty lecturers, which may be created as a result of a development of a shared enterprise, is loosely referred to as a 'community of practice' (Wenger, 1998). The aim of the faculty-based workshops is to initiate CoP that can live beyond the workshops.

The next section describes factors that motivate lecturers to adopt a technology innovation, such as technology-augmented pedagogy.

2.6 Barriers/Challenges in Adoption of Technology-Augmented Pedagogical Practices

The factors (barriers) that inhibit lecturers from using ICT are divided into three categories such as "teacher-level, school-level, and system-level barriers" (Buabeng-Andoh, 2012, p. 136). According to the author, teacher-level constraints include a lack of ICT skills and confidence in using ICT for teaching and learning (p. 136). "Educational level, age, gender, educational experience, proficiency with the computer for educational purposes, and attitude toward computers are all other teacher level factors that can influence technology adoption" (Schiller, 2003 as citied in Buabeng-Andoh, 2012, p. 137). In a HE context, Raman and Yamat (2014) pointed out challenges related to the older and more experienced lecturers' resistance to adopt technology in teaching and learning.

According to Buabeng-Andoh (2012), school-level barriers include "absence of ICT infrastructure; old or poorly maintained hardware; lack of suitable educational software; limited access to ICT; limited project-related experience and lack of ICT mainstreaming into school's strategy" (p. 148) From a HE context, Nicolle (2005) identified institutional factors, such as lack of time, lack of hardware and software, lack of funding, few support services and inadequate facilities (p. 36). Therefore, having access to computers, as well software and hardware, is critical for successful adoption and integration of technology into pedagogical practices (Plomp, Anderson, Law & Quale, 2009).

Traditional education systems' rigid structure, traditional assessment, restrictive curricula, and restricted organisational structure are all related to system-level limitations (Buabeng-Andoh 2012). In addition, Kaino (2004) and Shan Fu (2013) point out inadequate ICT policies that result in underuse of technology in teaching and learning.

2.7 Summary

This literature reviews firstly introduced the ICT integration into practices and discussed the lecturer-centred-learning and student-centred-learning approaches. The review showed the intrinsic and extrinsic motivations that compete in technology adoption and, then, how the Communities of Practice Framework can be employed to guide the faculty-based augmented-technology practices among innovators and early adopters from the Education and Veterinary faculties through their pedagogical practices and support in adoption. The chapter concluded with a brief discussion on the barriers to adoption in HEIs and in the University of Eduardo

Mondlane, as well as the different research approaches employed in studies that looked into professional development in ICT integration.

CHAPTER 3 – METHODOLOGY

3.1 Introduction

The research methodology used in this study is described in this chapter. It outlines the study's purpose, formulates the research question, and provides a description of the study orientation and epistemological research approach. This is followed by a detailed explanation of the data collection and data analysis steps, as well as how the participants were purposefully selected. The chapter ends with a discussion of the validity and dependability of the findings, as well as an outline of ethical issues and the study's potential limitations.

3.2 Objective of the Study and Research Question

The objective of this study is to establish how communities of practice (CoP) for technology-augmented pedagogical practices could be fostered through part of the faculty-based EdTech-UEM professional development model.

Research question:

How could communities of practice for technology-augmented pedagogical practices be fostered among innovators and potential adopters through the faculty-based EdTech-UEM professional development model?

The above research question was chosen to help a better understanding of:

i. What are the motivating factors for innovators and potential adopters in the Education and Veterinary Faculties to adopt technology-augmented pedagogical practices?

ii. What are the technology-augmented pedagogical practices of the innovators and potential adopters before and after the EdTech-UEM workshops?

iii. How do innovators support technology-augmented pedagogical activities among potential adopters during and after the EdTech-UEM workshops?

iv. How do potential adopters support each other on technology-augmented pedagogical activities after the EdTech-UEM workshops?

v. What are the barriers to lecturer adoption of technology-augmented pedagogical practices after the EdTech-UEM workshops?

3.3 Research Design

This section describes the research design of the study.

3.3.1 Research orientation

This research study follows an interpretivist orientation. According to Merriam (2002), interpretivism is concerned with how people make sense of their experiences, construct their worlds, and assign meaning to their experiences. In the interpretivist viewpoint, "people are deliberate and creative in their actions, they act intentionally and make meanings in and through their activity", in the second, people actively construct their social world – "they are not 'the cultural dopes' or 'the passive dolls' of positivism" (Ahmed, 2008, p. 4). Further, "the social world is studied in its natural state without the intervention of, or the manipulation by the researcher" (Hamersley & Atkinson, 1983; Ahmed, 2008). In addition, Cohen et al. (2002) promotes the usage of interpretivism, claiming that: "(1) individuals are unique and largely non-generalizable"; "(2) there are multiple interpretations of, and perspectives on, single events and situations"; and "(3) situations need to be examined through the eyes of the participants, rather than the researcher" (p. 22). An interpretive method examines how actors transform social realities into texts, narratives, and discourse, which are then used to guide organisational decisions (Putnam and Banghart 2017). "It underscores the power of naming or labelling in creating social situations and it focuses on the interrelationships among symbols in developing patterns and constructing meanings" (Putnam & Banghart, 2017, p. 3).

This study adopted an epistemological view of social constructivism, which claims that meaning is created via interactions with others rather than discovered (Crotty, 2003). The epistemology fits this study since lecturers' instructional practices, motivations, and support are used to generate new meanings of technological effect on both faculties.

3.3.2 Epistemological perspective

Crotty (2003) asserts that "an epistemology is a way of understanding and explaining how we know what we know" (p. 3). According to the author, epistemology is "concerned with providing a philosophical grounding for deciding what kinds of knowledge are possible and how we can ensure that they are both adequate and legitimate" (p. 8). The epistemological stance used in this study is social constructivism. Constructivism is defined by Crotty (2003) as "the view of all knowledge and therefore all meaningful reality as such is contingent upon human practices, being constructed in and out of interaction between human beings and their world and developed and transmitted within an essentially social context" (p. 42). As a result,

meaning is constructed instead of discovered. The following are the reasons why constructivism is the epistemological stance of this study:

Firstly, the researcher is attempting to answer the question "How communities of practice could be fostered through the EdTech-UEM professional development model based on motivations and support among lecturers from Faculties of Education and Veterinary" by presenting case studies of two faculties that piloted the EdTech-UEM workshops series for blended learning at UEM; and secondly, according to Ahmed (2008, p. 3) "the construction of meaning is transmitted within an essentially social context that is shown in the interviews". Finally, constructivists believe there is no such thing as a right or valid interpretation.

3.3.3 Case study

This study's research design is a case study with a qualitative approach. The study adopted interviews to understand what motivated lecturers from both faculties to adopt educational technology and how they support one another and collaborate. According to Merriam (1998), qualitative case studies in education are usually structured using concepts, models, and theories. Theoretical assumptions are then supported or challenged using an inductive process (Merriam, 1998). Because "meaning" is so important to the qualitative approach, the focus is the participants' perspectives on their own conceptions of practice (Bogdan & Biklen, 2003). As a result, the framework presented in this thesis encourages participants to evaluate their own opinions (Bogdan & Biklen, 2003). Qualitative methods involve:

> *learning how individuals experience and interact with their social world, and the meaning it has for them. The main premise behind qualitative research lies in the notion that meaning is socially constructed by individuals while interacting in their world. Reality is not the fixed, single, measurable phenomenon that it is assumed to be in quantitative methods* (Merriam, 2002).

Cohen, Manion and Morrison (2000) state that case studies "provide a unique example of real people in real situations, enabling readers to understand ideas more clearly than simply presenting them with abstract theories" (p. 181). According to Yin (2003), "a case study design should be considered when:

(a) the focus of the study is to answer 'how' and 'why' questions;

(b) you cannot manipulate the behaviour of those involved in the study;

(c) you want to cover contextual conditions because you believe they are relevant to the phenomenon under study; or

(d) the boundaries are not clear between the phenomenon and context" (p. 7).

Rather than generating normative assertions, it is focused with describing real-life phenomena According to Brewer and Hunter (1989) a case study's characteristics enable the researcher to focus on an individual's activities, attributes, and interactions These characteristics of a case study allow the researcher to concentrate on an individual's actions, attributes, and interactions

This case study used multiple cases approach (Yin, 2003) or collective (Stake, 1995). Yin (2003, p. 46) describes a multiple case study as "the same study contains more than a single case". This methodology is especially useful when implementing a professional development program (PD) for technology-augmented blended learning, with impact on the lecturers within two faculties. A case study allows the inclusion of a diversity of perspectives from different actors (Yin, 2003), and that is important to provide a broader context to the PD implemented. Applying the case study approach in this research is more appropriate because it will be able to capture and expose in depth the individual participants' perceptions and concerns in a real-world context.

3.4 Methodology

In this section, a brief overview of the site selection, the participants of pilot EdTech-UEM workshop series, the sampling technique used, the participant selection procedure, as well as an explanation of the data collection process are all included.

3.4.1 Site selection

The study was situated in the University of Eduardo Mondlane, and it was focused on lecturers from the Faculties of Education and Veterinary who attended at least one of the workshops from the pilot EdTech-UEM workshop series. The researcher's choice was also motivated by faculty differences in terms of geographical locations and contexts that seemed to help explain the lecturers' motivations for EdTech-UEM professional development, and their practices and challenges within both faculties. For instance, on-site support is more likely to be available on the main campus, where the Faculty of Education is based, but not in the other ones that are located outside the main campus.

3.4.2 Participants of the pilot EdTech-UEM workshop series and their selection for the study

According to the EdTech-UEM Report for the pilot workshop series evaluation, the participants who attended the workshops were 25 of which 13 are from Education and 12 from Veterinary.

All 25 prospective participants received an email invitation to participate in the research study attached to an information letter for participant (see Appendix A) and further asked them to complete the consent form, sign (using their name or a pseudonym) and send it back to the researcher (see Appendix B for the consent form).

To determine who of these EdTech-UEM Workshop participants were innovators or adopters, the first step was to contact them by text message and invite them to take part in the study and seeking their response about who was using educational technology for teaching of his/her own volition before the workshops (loosely referred to as innovators) and also who started to use/adopt the technology-augmented practices during the workshops (loosely referred to as adopters).

3.4.3 Sampling strategy

A purposive sampling technique was used, whereby all lecturers from the Faculties of Education and Veterinary who attended the workshop in educational technology were invited to participate in the research. When a researcher selects a sample from which the most can be learnt, this is known as purposeful sampling (Merriam, 1998).

The criteria used to select these lecturers was attendance of at least one workshop of a series of four workshops in educational technology. The intention of the researcher was to include as many lecturers as possible and not limit the study to lecturers who attended all four workshops. The EdTech-UEM Report (2019) shows that, from 13 participants who attended the workshops[2] from the Faculty of Education, 10 completed the course, two participants concluded workshops one and two, and one participant attended only one session of workshop one. In the Faculty of Veterinary, from 12 participants who attended the workshops, two participants completed the course. Three participants attended two workshops; one participant attended three workshops and the first session from workshop four; one participant attended one workshop and one session; Two participants attended a single session, two went to three sessions, and one person went to two sessions.

According to Patton (2002), the benefit of purposeful sampling is that puts it, “Any common patterns that emerge from great variation are of particular interest and value in capturing the core experience and central, shared dimensions of a setting or phenomenon” (p. 235). In the Faculty of Education, the prospective participants were 10 participants: five innovators and

[2] Two sessions for each workshop (EdTech Report, 2019).

five EAs. In the Faculty of Veterinary, the prospective participants were eight: one innovator and seven EAs.

3.5 Data Collection

Semi-structured interviews with selected participants were used to collect data. The interview schedule was first piloted with four lecturers from the Faculties of Engineering and Sciences.

3.5.1 Semi-structured interviews

An interview is a dynamic data collecting strategy that provides for multi-sensory communication through verbal, non-verbal, spoken, and audible communication (Cohen, et al., 2007). According to the authors, the interviewer can manage the conversation while still allowing for spontaneity, and the interviewer can press for complete answers as well as responses to complex and deep problems. Laing (1967), assert that "interviews allow participants – whether interviewers or interviewees – to discuss their perceptions of the world they live in and convey how they view circumstances from their own perspective" (p. 66). In this sense, the interview is more than a technique for acquiring information about life; it is a part of life itself, and it is impossible to prevent the emotional dimension (Cohen et al., 2000).

The interviewee is given the option to elaborate or supply more pertinent information as the interview develops (Fox, 2009) if (s)he opts to do so.

This study interviewed all participants through a semi-structured interview approach to evaluate the design of the professional development concept, their motivating factors and how they support one another in the CoP.

3.5.2 Piloting the interview schedule

Before the lecturers' interviews took place, four pilot interviews were conducted with four lecturers from the Faculties of Engineering and Sciences. These faculties have similar geographical characteristics to the Faculties of Education and Veterinary. The Faculty of Engineering, as the Faculty of Veterinary, is located outside of the main campus of the University of Eduardo Mondlane, and the Faculty of Sciences, as the Faculty of Education, is located inside of the main campus. The goal of the pilot interviews was for the researcher to hone her interviewing skills and to fine-tune the interview process that would be used during the interviews with the lecturers. The interview protocol, as well as the contextual question, is provided as Appendix E and Appendix F.

Conducting four pilot interviews with one innovator and one early adopter from the Faculty of Sciences and two adopters (one early adopter and one late adopter) from Engineering enabled the interviewee to give the researcher comments on how the interview was done The researcher also used that knowledge to improve the interviewing process. The pilot interviews were recorded and transcribed, but the data result was not analysed or included in the study's findings. The researcher adapted some questions that were unclear to the pilot group, such as adding prompts to the question about intrinsic and extrinsic motivators as well as questions related to barriers.

3.5.3 Participant interviews

After the prospective participants had responded to the researcher's email, the next step was to contact them to schedule the date, time and modality (phone, Skype or Zoom) of the interviews. In the Faculty of Education, of the 10 participants, six participated in the interview by phone, three by Zoom and one by Skype. In the Faculty of Veterinary, of the eight participants, six participated by phone and two by Zoom. The Zoom and Skype interviews were conducted off-camera (Table 3.1 and Table 3.2). Cohen et al. (2017, p. 365) say that "it is frequently the non-verbal communication that gives more information than the verbal communication" – a limitation of not conducting in-person interviews.

Following the conclusion of the 18 interviews, each participant was given a pseudonym as follows: name of faculty. followed by Innovator, Early adopter or Late majority adopter plus the number according to their turn in the interview process. For each faculty, the interviewee was allocated Education Innovator 1; Veterinary Innovator 2; Education Early Adopter 1, Veterinary Late Majority Adopter 2, and so on.

The rationale for this choice was that being able to allocate the number according to their turn in the interview process would make it easier to determine the order of the interviews, and knowing the gender of the interviewee would allow the words 'he' and 'she' to be used correctly when referring to the interviewee.

These were as summarised in Table 3.1 and Table 3.2:

Table 3.1 - Pre-allocated pseudonyms from Faculty of Education

Interviewee	Pseudonym	Gender	Interview modality
1	Innovator 1	Female	Zoom
2	Innovator 2	Male	Phone
3	Innovator 3	Male	Zoom
4	Innovator 4	Male	Phone
5	Innovator 5	Female	Zoom
6	Early adopter 1	Male	Phone
7	Early adopter 2	Female	Skype
8	Early adopter 3	Male	Phone
9	Early adopter 4	Male	Phone
10	Early adopter 5	Male	Phone

Table 3.2 - Pre-allocated pseudonyms from Faculty of Veterinary

Interviewee	Pseudonym	Gender	Interview modality
1	Innovator 1	Male	Phone
2	Late majority adopter 1	Male	Phone
3	Late majority adopter 2	Female	Phone
4	Late majority adopter 3	Female	Phone
5	Late majority adopter 4	Female	Phone
6	Late majority adopter 5	Female	Phone
7	Late majority adopter 6	Female	Zoom
8	Late majority adopter 7	Female	Zoom

Personal interviews were done in the early stages of the research with the purpose of determining the relevant elements to be included in the study. A total of 18 questions for potential adopters and 19 questions for innovators were administered with the participants. All statements for early adopters and innovators were found relevant for the study, hence two items were reformulated from for the study and were added the biographical details like age and gender.

For both groups of innovators and potential adopters, the first questions aimed to collect participants' ages. The first category of sub-questions was seeking motivating factors (intrinsic and extrinsic) for innovators and potential adopters in the Faculties of Education and Veterinary to adopt technology-augmented pedagogical practices. The second category of sub-questions was related to pedagogical practices of the innovators and early adopters before and after the EdTech-UEM workshops. The third category of sub-questions aimed to ascertain the level of innovators' support provided to potential adopters during and after workshops as well as the support amongst potential adopters after workshops. The last category of sub-questions was related to barriers and challenges inhibiting lecturer adoption of technology-augmented pedagogical practices after the EdTech-UEM workshops.

3.5.4 Data management

The responses were captured on recorder devices for phone, Skype and Zoom; they were recorded in real time. For all modalities of interviews, besides being recorded by the devices for phone, Zoom and Skype, interviews were also recorded using the UX560F Digital Voice Recorder UX Series model. This kind of recorder was chosen since it could save the recording as a digital file and transferred to the PC in digital format.

After each interview, the recorder was connected to a computer via USB cable, and the file from the recorder was transferred to a computer running Microsoft Windows. This means that the mobile interview was immediately available in digital format, enabling the recording to be backed separately from the digital recorder, and that these digital recordings were saved in the named folder as the innovators' and EAs' interviews. An interview control sheet was used to record the date of the interview, as well as the start and end timings.

The interviews were transcribed in two steps. The first step was using a program called *Dictade* to produce a Microsoft Word document of the recorded interview and it was saved in a folder. The second step was based on full transcription, seeking the answers for the specific questions asked during the interviews by the researcher to reduce the transcription according to the

specific questions of the research. During this process, it was necessary to go back to the recorder to capture everything that was said by the interviewers. The final and individual document was saved in two different folders named Transcription Faculty of Education and Transcriptions Faculty of Veterinary, respectively. In both folders were two sub-folders called Innovators and Early adopters.

In the end, the transcripts were translated from Portuguese to English, with the assistance of a reputable private company.

3.5.5 Data source

The data collection method resulted in the interviewing of all lecturers from the faculties of education and veterinary who confirmed their participation in the project, resulting in 18 recorded interviews and transcripts.

Summaries of metadata of the interviews conducted are presented in Tables 3.3 and 3.4 below:

Table 3.3 - Summary of the interviews conducted with Faculty of Education participants

Interview	Pseudonym	Date	Duration (Minutes)	Transcription (Words)
1.	Innovator 1	04/05/2021	32:18	1211
2.	Innovator 2	03/05/2021	36:05	1153
3.	Innovator 3	03/05/2021	32:21	1147
4.	Innovator 4	03/05/2021	35:01	765
5.	Innovator 5	05/05/2021	35:37	1185
6.	Early adopter 1	04/05/2021	32:13	1150
7.	Early adopter 2	04/05/2021	36:14	1126
8.	Early adopter 3	04/05/2021	45:01	1346
9.	Early adopter 4	03/05/2021	39:37	903
10.	Early adopter 5	04/05/2021	38:28	1061

Table 3.4 - Summary of the interviews conducted with Faculty of Veterinary participants

Interview	Pseudonym	Date	Duration (Minutes)	Transcription (Words)
1.	Innovator 1	26/04/2021	31:17	1320
2.	Late majority 1	27/04/2021	32:14	1266
3.	Late majority 2	26/04/2021	44:28	1171
4.	Late majority 3	27/04/2021	36:04	1224
5.	Late majority 4	26/04/2021	29:10	1140
6.	Late majority 5	28/04/2021	38	1095
7.	Late majority 6	29/04/2021	32:14	975
8.	Late majority 7	27/04/2021	40:50	1168

The empirical data source for the qualitative data analysis phase was these 18 interview transcripts.

The next step in the process was to analyse the empirical data collected.

3.6 Data Analysis

Bogdan and Biklen (2003) define qualitative data analysis as a process of "working with the data, organising them, breaking them into manageable units, coding them, synthesising them, and searching for patterns" (p. 147). In case study research, Yin (2003) discusses the need to explore the data for "patterns" that could explain or identify causal linkages in the database discussed. During this process, the researcher focuses on the entire data set first, then attempts to split and reassemble it in a more relevant way. Braun and Clarke's (2006, 2012) steps are used to describe the process followed for this study. A short description of each step is also provided below.

Step 1: Data organising

The researcher is introduced to the empirical material by reviewing and correcting faults in the transcripts, which is known as data organising.

The first step of the data analysis phase is converting each individual transcript document (in Portuguese) to plain text in order to remove any unnecessary formatting added by the transcription program. Each one of them was then summarised in order to transcribe only the answers to the questions asked by the researcher and later, they were read several times to become familiar with the final written transcript. Following that, the recorded interview was listened to while the transcript was read and any transcription errors were repaired. After that, the recording was re-listened to, and punctuation was added to the transcript document to better reflect the spoken words' context. Commas, periods, and punctuation have been used to denote pauses and breaks in the conversation. This corroborates with Cohen, et al. (2017) when they mention the capture not only of what was said by the interviewers but others signals.

This phase resulted in the production of 18 Microsoft Word 2016 documents, shared with each participant by email to check, rectify or update their answers. The last output, containing a verbatim transcript of each interview was sent for translation from Portuguese to English.

Step 2: Familiarisation

This step involves making notes of all relevant elements from all respondents and listening to the interviews.

During this phase, I immersed myself in the data by reading and re-reading textual data (interview transcripts) and listening to audio recordings. I kept track of what I have been listening to and reading. According to Braun and Clark (2012), this phase involves making notes on the data as the interviewer read – or listen – to emphasise areas that may be of interest (annotating transcripts, writing comments on the electronic and individual transcripts, and underlining pieces of data).

The goal of this step was for the researcher to become intimately familiar with the dataset's content and to start noticing elements that were potentially relevant to the research issue. According to Braun and Clarke (2012), the researcher should read through their entire dataset at least once – if not twice – until they until the interviewed feel confident in their understanding of the data content.

Step 3: Generating initial codes

Through coding, this phase starts the methodical analysis of the data.

According to Saldana (2009) coding is a method that enables you to organise and group similarly coded data into categories or ‘families’ because they share some characteristic – the

beginning of a pattern (p. 8). Strauss and Corbin (1998), define coding as “the analytic process through which data are fractured, conceptualised, and integrated to form theory” (p. 3). The goal is to recognize, develop, and connect the concepts that are the foundation of theory. For coding, Excel was used to provide a frame for the data analysis process. Each row represented an individual participant's interview questions, while each column contained the answers to a specific interview question. An additional column after individual respondents contained their data codes.

The codes were generated through highlighting similar patterns of the respondents' answers in each question. The researcher employed words and phrases that drew attention to issues or areas of interest in the study. This is noted and reported in a few words, resulting in very close codes to the participants' language use. According to Allan (2003) the brief descriptor phrase is a code, which describes this process as 'coding.' The author believes that coding should be done with an open mind and without preconceived notions.

This process was repeated throughout each data item, and the entire dataset and coded material were revised from the start, as the researcher's codes were developed during coding and the data pertinent to each theme was codified.

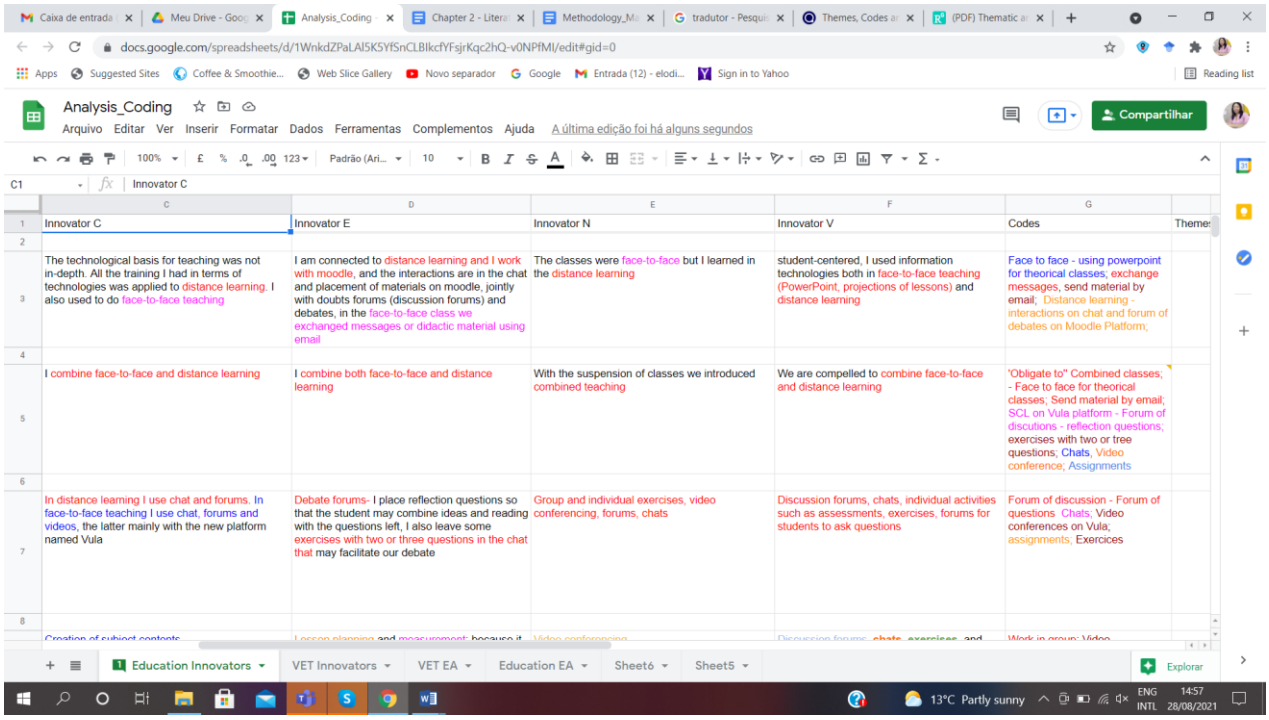

Figure 3.1 - Microsoft Excel spreadsheet with mixed methods data and codes

Step 4: Searching for themes

In this phase, generated analysis begins to form as the researcher moves from codes.

According to Braun and Clarke (2006) a theme "captures something important about the data in relation to the research question, and represents some level of patterned response or meaning within the data set" (p. 82). According to the authors, this phase entails going over the coded data to see if there are any areas of overlap or similarity between the codes, as well as any broad topics or issues that the codes cluster around. To express and define a cohesive and relevant pattern in the data, the basic approach of constructing themes and sub-themes, which are sub-components of a theme, entails collapsing or grouping together codes that appear to have some unifying feature. In my data, I noticed codes clustering around sub-questions of research questions in my data, and I counted how many comparable responses there were.

Examining these in detail, I constructed one theme using all the codes relating to each research sub-question.

Another important component of this stage was beginning to investigate the relationships between themes and how they may be used to construct a story. With the creation of 24 themes, this phase came to a conclusion.

Step 5: Reviewing the potential themes

This phase compared to the coded data and the entire dataset with the emerging themes.

The first stage was to check my themes against the collated extracts of data, and explore whether the theme 'works' in relation to the data and discard some codes or relocate them under another theme. When these tweaks did not work well, I discarded my theme altogether and started again without "forcing'' my analysis into coherence (Braun & Clarke, 2012).

Step 6: Defining and naming themes

In this step I describe what makes each theme unique and distinct.

According to Braun and Clarke (2012), this step is about "selecting extracts to present/analyse and then setting out the 'story' of each theme with or around these" is the first phase (p. 9). Each excerpt provided a vivid, convincing illustration of the analytic insights I was making. According to the authors, rather than using simply one data item to indicate the theme's 'coverage,' it's better to use extracts from all of your data items.

Step 7: Producing the report

The last phase is a theme comparison, which includes explanations of each theme's distinctive characteristics as well as descriptions of similarities between themes.

In this phase, the researcher detailed each theme, utilising verbatim quotations from the transcripts to demonstrate each subject's unique features. These descriptions and comparisons are detailed in detail in Chapter 4 – Findings.

3.7 Validity

To ensure validity, the interview questions were piloted with four lecturers from the Faculties of Sciences (one innovator and EAs) and Engineering (two EAs), both faculties attended the EdTech workshops, and have similar geographical characteristics with the Faculties of Education and Veterinary. Pilot testing helped in reworking two of the research sub-questions and fine-tuning the interviewing process, as well as measuring and addressing difficulties with the research instrument's reliability.

After the transcription was done, member-checks were conducted with the interviewees. This allowed them to double-check the participants' responses by returning the themes or specific descriptions to ensure the exact mean of the responses. In instances where gaps were identified, this process involved individual follow-up interviews in the form of email, to which three participants replied.

3.8 Reliability

The participants' native language, Portuguese, was used to translate the information sheet, consent form, and interview questions.

In-service lecturers' experiences with technology-augmented innovations, as well as their motivations and perceptions of the challenges that prevent lecturers from adopting technology-augmented in pedagogical, were explored using a validated interview. After the pilot data was obtained, the responses were entered into a database and cleaned. The questions were reviewed, and any that were badly phrased were rewritten.

Common descriptors of pedagogical practices before workshops, intrinsic and extrinsic motivation in adopting technology-augmented practices, and support and challenges were carefully determined by reading each open-ended response.

Verbatim quotations were used to give more details, enhance validity and dispel biases, preconceptions, perspectives and theoretical orientation of the study during reporting the findings.

3.9 Ethical Considerations

The research was subjected to ethics approval at the School of Education, University of Cape Town. The second step was to send a request letter of authorisation seeking permission from the Directors of the Faculties of Education and Veterinary to interview lecturers, who confirmed that they would participate in the research (see Appendix C and Appendix D). The third step was to send an email to all participating lecturers with an information sheet and the consent form provided in Appendix B. Eighteen lecturers were confirmed; 10 and eight from the Education and Veterinary faculties, respectively.

It was ensuring the protected participant's identity through pseudonyms and ensuring the confidentiality of their answers. To deal with the aporia of identity transgressions, the researcher assured participants that she would not discuss their participation in the research with anyone and made use of negotiated pseudonyms. This aporia reflects the unexpected way in which research subjects could, and did, compromise the protection of their own identity (William, 2009). The participants from the study were also not exposed to any risk and all the data provided by them remained confidential throughout the study.

To protect and reassure the participants, a confidentiality agreement was issued. There was no involuntary personal identifiable information collected during the survey.

An informed consent form was provided to each participant at the beginning of the survey as well as an agreement that the interviews were to be recorded (see Appendix B), which was signed by them.

Despite the fact that participants were selected through a representative sample and thus approached to participate in the study, they were given the option to decline without judgement. Participants were also made aware that they could leave the study at any time.

After the interview was completed and transcribed, a copy of the transcription was emailed to each participant, allowing them to see exactly what information will be used in the research and to address any issues they had about the transcription.

The researcher also clarified biases once she attended the four workshops. The researcher did not consider her personal viewpoints so they did not create an element of bias or a factor that could influence the participants, the data collection and the data interpretation but being also a lecturer from the same university and from the one of the Faculty mentioned in the study, the researcher have a relationship with most of the participants and she also have familiarity with the aspects that are being researched. To address her positionality, during the interview the researcher remained neutral and she did not share her own experiences but in turn, she allowed the participant to ask her questions related to the topic of the discussion, to create a relationship between them. Being familiar with the topic of the research, made the research develop more the lines of questioning to get a richer description and detail of the discussion .

3.10 Summary

This chapter outlined the research paradigm on which the research study is built to explain the worldview assumptions that shape the research. The research design, approach, and strategy, as well as the sampling, and instruments, were all given and explained. The data collection process and the research instrument used, as well as primary data sources and data analysis and interpretation techniques and processes, were all thoroughly discussed. The significant information provided by the pre-test results in this study helped to refine the research instrument and the manner in which it was finally presented to the study participants.

This study employed a qualitative method to analyse semi-structured interviews as part of an interpretive case study research strategy. The chapter explained how semi-structured interviews were performed to gather data from 18 lecturers from the faculties of Education and Veterinary who were purposely chosen to take part of this study, as well as the drawbacks of not conducting in-person interviews. The chapter ended with a summary of the ethical, validity, and reliability problems that were evaluated and implemented in order to offer credibility to the research study.

CHAPTER 4 – FINDINGS

4.1 Introduction

This chapter deals with the analysis of data collected in the study. The main objective of the study is to investigate how the EdTech-UEM professional development model could potentially foster a community of practice for technology-augmented pedagogical practices among innovators and potential adopters in the Education and Veterinary faculties. This research question was tackled by analysing the intrinsic and extrinsic factors that motivated innovators and potential adopters to adopt technology-augmented pedagogical practices, their technology-augmented pedagogical practices, how innovators supported and collaborated with potential adopters as well as how potential adopters supported and collaborated with each other on technology-augmented pedagogical activities during and after the EdTech-UEM professional development workshops. Furthermore, barriers inhibiting lecturer adoption of technology-augmented pedagogical practices were elicited.

With respect to the presentation of data in this section, the research questions are used to present the data. The data reveal that from this sample of lecturers, there are innovators and early adopters in the Education faculty and innovators and late majority adopters in the Veterinary faculty. The researcher makes a comparison between innovators, early adopters and late majority adopters. Codes from the qualitative data are quantified and presented in tables. The numbers denote the appearances of a code and not the participants, as a participant is more likely to mention more than one aspect in their responses. References, such as the following, are included with verbatim responses extracted from the interview transcripts: Faculty, pseudonym, line number in the transcript; for instance, (Education Innovator 1 or Early Adopter 1, line 13 and Veterinary, Innovator 1 or Late majority adopters 1, line 13). This indicates that the excerpt is from the interview with a faculty of Education or Veterinary innovator, early adopter or late majority adopter, followed by the number according to their turn in the interview process with the quote found on line 13 of the associated transcript.

4.2 Biographical Data

The research had five innovators and five early adopters from the Faculty of Education and one innovator and seven later majority adopters from the Faculty of Veterinary. In terms of age, one of the innovators from Education is under 30 years, two are between the ages of 30 to 40 years and two are between the ages of 40 to 50 years. In Veterinary, the innovator is between

the ages of 30 to 40 years, from the seven late majorities, one under 30, one is between the ages 30 to 40, four are between 41 to 50 and one is above 50.

Table 4.1 - Summary of participants' age composition

Faculty	Group of respondents	Number of respondents	Age (range)
Education	Innovator	1	<30
	Innovators	2	30-40
	Innovators	2	40-50
	Early adopters (EAs)	5	30-50
Veterinary	Innovator	1	30-40
	Early adopters (EAs)	1	<30
	Early adopters (EAs)	1	30-40
	Early adopters (EAs)	4	41-50
	Early adopters (EAs)	1	>50

The data did not reveal any relationship between the participants' age (including the participant above 50 years of age) and their use of technology for teaching and learning, although the participants did refer to their colleagues' age as a potential barrier to adoption of educational technology (see Section 4.6).

Considering that the innovators were already engaging in some forms of technology-augmented pedagogical practices before the EdTech-UEM workshops and these EAs followed suit after the workshops, it was of interest to understand what motivated them to adopt such practices.

4.3 Factors Motivating Lecturers to Adopt Technology-Augmented Pedagogical Practices

When participants were asked what their intrinsic and extrinsic motivators were, they responded as described below.

4.3.1 Intrinsic motivators for adopting technology-augmented pedagogical practices

The themes related to intrinsic motivators include personal motivation towards technologies, and self-empowerment on using educational technologies. Most participants had personal

motivations towards technologies, including the passion for technologies, enjoyment of using technology, interest in technologies and positive perceptions about technology. With respect to the participants' interest in empowering themselves on using educational technologies, participants said that they were motivated to adopt technology-augmented pedagogical practices because of the will to acquire skills to use educational technology, as well as to enrich their professional life in terms of using educational technologies and conduct research on educational technologies. Table 4.2 illustrates these intrinsic factors.

Table 4.2 - Intrinsic motivators for lecturer adoption of technology-augmented pedagogical practices

		Education		Veterinary	
Themes	**Codes**	**Innovators**	**Early adopters**	**Innovator**	**Early adopters**
Personal motivation towards technology	Passion for technologies	3		1	1
	Enjoy using technology	1			1
	Interest in technologies		1		
Self-empowerment in using educational technologies	Enriching my professional life in terms of using educational technologies	1			2
	Conducting research on educational technologies	1			
	The will to acquire skills to use educational technology		2		

The data reveal that the primary intrinsic motivator for both the innovators and adopters to adopt technology-augmented pedagogical practices was their personal motivation towards technology.

Personal motivation towards technology

One of the innovators from the Faculty of Education, who was quite passionate about technology said:

> *I have a particular passion, preference for the use of technologies. I like using computers* (Education Innovator 3, line 28).

Another innovator from the Veterinary faculty said: "*My fondness for using the computer [is] to teach*" [Veterinary Innovator 1, line 22].

As can be seen above, the most prominent intrinsic motivation to adopt technology-augmented practices among participants was based on personal motivation towards technology and computers.

Self-empowerment in using educational technologies

Adopters mostly viewed the adoption of technology-augmented pedagogical practices as an opportunity for self-empowerment in using educational technologies. With respect to empowerment, a late majority adopter from Veterinary shared that she "*enjoy[ed] learning new technologies and do[ing] new things that can help [her] in [her] daily life*…" (Veterinary, Late majority adopter 4, line 20) and one from Education was more specific to teaching practices: "*The more I use it, the more I learn. I was afraid to access it before on Moodle but not anymore* …" [Education Early Adopter 1, line 23].

They were further asked about how they could be better motivated to make more use of technology for teaching and learning, and they highlighted extrinsic factors, such as improving pedagogical practices experiences, provision of technological infrastructure, and technical training and support, instigating policy on teaching and learning with technology, and implementation of the UEM vision to keep up with global trends and reduced teaching load.

4.3.2 Extrinsic motivators for adopting technology-augmented pedagogical practices

The seven themes generated were: improving teaching and learning experiences; provision of technological infrastructure; provision of technical training; provision of support; completing the academic year; implementation of the UEM vision to keep up with global trends; and reduced teaching load. With respect to improving teaching and learning experiences, which was the theme with the highest numbers, there were expressions about the improvement of the teacher and student interaction, and independence and autonomy of students. The participants reported that they were also motivated by the availability of technological infrastructure, such as improved internet quality, internet connectivity for lecturers, free access (zero-rating) to the platforms for students, computers for lecturers and students, as well as technical training and support for both lecturers and students, through institutional technicians who would support lecturers after trainings, and innovators to support their colleagues. There were five instances where the participants reported that they adopted technology-augmented pedagogical practices to help them complete the academic year, two where lecturers believed that they implemented

the UEM vision to keep up with global trends, and another two where lecturers perceived the use of technology for teaching as a means of reducing teaching load to allow them to focus on other things, such as their own research (Table 4.3).

Table 4.3 - Extrinsic motivators for lecturer adoption of technology-augmented pedagogical practices

		Education		Veterinary	
Themes	**Codes**	**Innovators**	**Early adopters**	**Innovator**	**Early adopters**
Improving teaching and learning experiences	Improvement of the teacher and student interaction	1	5	1	4
	Independence and autonomy of students	2		1	
	Availability of information/material		1		1
	Record classes, attendance and participation, optimise time		1		1
	Connect any time		1		2
	Perceived usefulness of technology	1	2		2
Provision of technological infrastructure	Improved internet quality	4	2		4
	Provision of internet connectivity for lecturers	2	2		
	Free access (zero-rating) to the platforms for students				1
	Provision of computers for lecturers	3	2		
	Provision of computers for students		1		
Provision of technical training and support	Technical training for lecturers	2	2		3
	Technical training for students	2	2		3

	Institutional technicians to support lecturers after trainings				1
	Innovators' availability to support others				1
Completing the academic year	Completing the academic year	1	2	1	1
Implementation of the UEM vision to keep up with global trends	Help the UEM in technologies adoption	1			
	Current trend	1			
Reduced teaching load	Technology as a replacement for teaching effort Increase research time/reduce teaching time				2

The data reveal that the primary extrinsic motivator for both the innovators and adopters to adopt technology-augmented pedagogical practices was the goal to improve teaching and learning experiences followed by the need to complete the academic year, the implementation of the UEM vision, and the possibility of reducing their teaching load.

Improving teaching and learning experiences

Two innovators from the Faculty of Education talked about how the empowerment and autonomy of students were brought about by technology, and one said:

> *It forces the student to research more* as well as the lecturer and *they can have access to a countless bibliographic collection[s] and the autonomy that is given to the student to study and research more*; ... It also allows them *to actively participate in the teaching and learning process* [Education Innovator 5, line 25].

Furthermore, in terms of the improvement of the lecturer and student interaction, an innovator from the Faculty of Education emphasised:

> *Interaction improvement between the teacher and the student. Concept assimilation of the student-centred teaching and the technologies have emphasised this..., and information flow between the lecturer and the student* [Education Innovator 3, line 35].

And an early adopter from the same faculty, who also had a positive perception about technology (perceived usefulness of technology), said:

> *I have found out that face-to-face teaching, although student-centred, is not as comprehensive as the current approach with technology and I am the protagonist of allowing the process to occur with the use of technology. This is an opportunity for lecturers to position themselves in this new way of doing things* (Education Early adopter 3, line 32).

Also, a late majority adopter from the Faculty of Veterinary highlighted that he was motivated by the affordances of technologies that enable synchronous and asynchronous interactions. He said:

> *[T]he student can learn from where he is (in the kitchen, lying down, in the living room) and they can save money on transportation. As I try to get the student's feedback, if they suggest a platform for the class, I adapt to it; the student can explore different libraries to answer a question that has been raised by the lecturer* [Veterinary Late majority adopter 1, line 38].

The data reveal that both innovators and adopters were primarily interested in improving the interaction between lecturers and students.

Provision of technological infrastructure

Improving internet quality was a critical element for the participants' adoption of digital pedagogical practices. Four innovators and six adopters expressed the need for improved internet quality. One early adopter from Education reported that *"it [the internet] is greatly unstable"* [Education Early Adopter 1, line 38]. Another participant went further to the extent of seeing it as a global problem: *"[I]t seems to me to be a global problem"* [Education Innovator 2, line 38]. Furthermore, the data reveal that the Education lecturers were concerned about technological access. They highlighted that provision of computer access and internet connectivity would motivate them more to adopt technology-augmented pedagogies. One of them said:

> … *offer the minimum material for the lecturers, such as a computer* [Education Innovator 5, line 48].

One of the four lecturers (an innovator) from Education, who expressed the need for internet connectivity for lecturers, suggested that the institution subsidises home internet connectivity

as most lecturers were teaching remotely. Also, two adopters (one each from the two faculties) highlighted the need for student technological access, elaborated as follows:

> *Providing subsidised internet for students so that they can access the platforms and participate in classes … UEM should create partnerships with mobile phones companies to facilitate access to digital platforms for students* [Veterinary Late majority adopter 7, line 36].

The technological infrastructure, specifically the improved quality of the internet was identified by the participants as the most enabling factor for them to adopt augmented-technology.

Provision of technical training and support

Technical training for both students and lectures was primarily advocated for by the adopters, while two innovators from Education only raised the need for training students. One of them said "… *training students to use the Moodle/Vula platform, for example; the students have no training on how to upload a file, an assignment, or someone who may solve their problems in terms of access, etc.*" [Education Early Adopter 2, line 38].

In terms of lecturer training, one innovator from Education felt that EdTech-UEM had to intensify training for experienced lecturers as well as for those who are not experienced. He said "*Reinforce the lecturer's training in the use of digital platforms for teaching*" [Education Innovator 4, line 23].

Furthermore, one of the three late majority adopters from Veterinary, who advocated for lecturer training, emphasised that the training needs to be campus-based: "…*ongoing trainings within the faculty and without any need to move from one place to another to benefit from this support*" [Veterinary Late majority adopter 4, line 42]. This arose because the Faculty of Veterinary is located away from the main campus where the training is mainly conducted.

With respect to technical support, two late majority adopters from Veterinary expressed that technical support would motivate them to adopt technology-augmented practices. Late majority adopter 4 believed that it would be ideal for technicians to provide technical support to lecturers "*at least in the beginning, either individually or in small groups*" [line 40].

In addition, another late majority adopter from this faculty suggested that technical support from innovators would motivate her:

The colleagues once made themselves available...I think it is a good way of motivating [us] [Veterinary Late majority adopter 5, line 25].

Both innovators and adopters could be motivated by training and support in educational technology for them as well as for students.

Completing the academic year (meeting deadlines)

Two innovators and three EAs implemented hybrid technology-augmented pedagogical practices to complete the academic plan during the pandemic. For instance, the innovator from Veterinary felt that the implementation was an obligation: "*The obligation arising from Covid-19…"* [Veterinary Innovator 1, line 27] and EA from Education said, "…*the pandemic, because somehow, I had to operationalize what I had already planned to do in my subject after attending the workshops by designing my subject in the hybrid model"* [Education Early adopter 2, line 30].

The above demonstrates that both the innovators and EAs used technology-augmented teaching approaches to help them complete the academic year.

Implementation of the UEM vision to keep up with global trends

One innovator from Education expressed eagerness to implement the UEM's educational technology vision in order to uplift the university rankings. He said:

Within the framework of implementing this new vision of UEM, enhances the use of educational technologies *… adds value to the course and the university itself and in the international rankings and for our university to be better positioned ... I feel I have a duty to help the University implement its new vision* [Education Innovator 2, line 23].

Another innovator from Education expressed that he adopted technology-augmented pedagogical practices because *"[i]t's the current trend and that's where things are heading*" [Education Innovator 4, line 10]. While an early adopter from Education felt that she was obliged to use educational technology to meet the expectations of the university. She said: *"[T]he university is the right institution to use the technologies …, my obligation as a lecturer is to introduce the technologies to students"* [Education Early adopter 3, line 38]. Also, a Veterinary late majority adopter said: *"Train students in these skills because it is the global trend"* [Veterinary Late majority adopter 3, line 28].

The above excerpts imply that participants are concerned about placing UEM at the forefront of global trends and the use of digital platforms for pedagogical practices.

Reduced teaching load (Technology as a replacement for teaching effort)

Two late majority adopters from the Veterinary faculty were eager to incorporate technologies into their pedagogical practices because they believed that this could buy them time to conduct their own research. One of them elaborated, saying that technology integration provided them *"independence to do other things such as research; reduced time with students and increased the time I would have to do other things"* [Veterinary Late majority adopter 3, line 22].

A colleague shared the same sentiment, reporting that *"it is multifunctional: at the same time that I am teaching a class, I can also do research simultaneously"* [Veterinary Late majority adopter 1, line 30].

The above implies that the two Late majority adopters are motivated to adopt technology-augmented pedagogical practices as a way of reducing teaching time and increasing their personal research time.

4.4. The Pedagogical Practices of Lecturers before and after the EdTech-UEM Workshops

The aim of this question was to determine the lecturers' pedagogical practices and, more so, to establish how the practices changed (if at all) after the lecturers underwent professional development. It is important to note that the start of the Covid-19 pandemic coincided with the end of the pilot EdTech-UEM workshop series. To answer the second research sub-question, lecturers were asked how they used educational technology in teaching and learning before the workshops and Covid-19; how they taught in a typical class, what types of learning activities they had their students participate in using educational technology, and how they implemented what they learnt from the workshops.

4.4.1 Pedagogical practices before the EdTech-UEM workshops

The data reveal that the innovators of both faculties used both approaches, lecturer-centred-learning (LCL) and student-centred-learning (SCL), before the EdTech-UEM workshops, while the adopters from both faculties primarily used LCL approaches as opposed to SCL approaches. The LCL strategies include using PowerPoint presentations for theoretical classes, sending learning material by email to students, seminar discussions, sharing materials on Google Classroom, and placing learning materials on Moodle, while SCL strategies include interacting with students in chatrooms and discussion forums on Moodle, and students watching YouTube videos.

A summary of the analysis of pedagogical practices from innovators and adopters is presented in Table 4.4.

Table 4.4 - Innovators and adopters' pedagogical strategies before workshops and Covid-19

Pedagogical strategies before workshops and Covid-19		Education		Veterinary	
Themes	**Codes**	**Innovators**	**Early adopters**	**Innovator**	**Early adopters**
Lecturer-centred-learning (LCL)	Face-to-face (PowerPoint for theoretical classes)	2	5	1	5
	Send material and clarify doubts by email	1	5	1	1
	Theoretical and practical classes and seminar discussion				1
	Placement of materials on Moodle	1			
	Give recommendations and sharing materials on Google Classroom			1	
Student-centred-learning (SCL)	Interaction in Moodle chatrooms and forums	1			
	Watch YouTube videos			1	

Pedagogical strategies before workshops and Covid-19

The data reveal that the innovators leaned more towards SCL when compared to the adopters, and the innovators from Education tended to differentiate the strategies they used for their contact teaching and distance learning.

For instance, two innovators (one from each faculty) shared how they used both strategies. The innovator from Education said:

> *... the interactions are in the chat ..., jointly with doubts forums [discussion forums] and debates, in the face-to-face class we exchanged messages or didactic material using email* [Education Innovator 3, line 7].

And the one from the Veterinary faculty even went to the extent of recommending YouTube videos to students:

> *Traditional system (face-to-face), with recommendations to students to get some materials on Google Classroom, watch videos on YouTube and share contents by email* [Veterinary Innovator 1, lines 3-4].

On the other hand, the adopters reported how they used didactic strategies such as presentations, seminar format and email. One lecturer from Education said:

> *I used classical methods, I planned the lessons and I waited for the students to be in the room. Mostly direct contact and teaching was face-to-face. I used email as primary communication with students* [Education Early adopter 3, line 5].

One from Veterinary said:

> *Face-to-face classes, using PowerPoint, theoretical and practical classes with reports and seminars discussion* [Veterinary Late majority adopter 1, line 3].

Before workshops, innovators and adopters were using the lecturer-centred-learning approach for face-to-face classes and the most frequently used strategy was PowerPoint presentations followed by the use of email for sending material to students.

4.4.2 Lecturers' pedagogical strategies after workshops (during the Covid-19 pandemic)

When innovators and adopters from both the Education and Veterinary faculties were asked about their teaching in a typical class after the workshop, all 18 participants replied that they were using hybrid models – a combination of face-to-face and remote teaching. This could most likely be because the data were collected during the Covid-19 period. The data reveal that those from Education primarily used Moodle (which, by this time, had been personalised to Vula) and those from Veterinary, Google Classroom. The adopters from both faculties complemented these platforms with Zoom (6), WhatsApp (3) and e-mail (1), and the Veterinary innovator, Zoom, while those innovators from Education never used any complementary tool.

Table 4.5 - Innovators and adopters' pedagogical strategies after workshops (during Covid-19)

Pedagogical strategies before workshops and Covid-19		Education		Veterinary	
Themes	**Codes**	**Innovators**	**Early adopters**	**Innovator**	**Early adopters**
Lecturer-centred-learning (LCL)	Send material to students by email				1
Student-centred-learning (SCL)	Video Conferencing via Zoom		1	1	6
	Interaction in Moodle (chatrooms and forums), Google Meet and Google Classroom	5	5		
	Use WhatsApp for synchronous classes		2		3
	Group and individual exercises (including assignments and quizzes)	3			

In the context of the above question, the participants were asked about the types of technology-augmented pedagogical practices, enhanced activities they assigned their students and the data revealed that the innovators and adopters from both faculties primarily used student-centred strategies. Innovators from Education replied that they assigned their students activities that used discussion forums and chats, as one elaborated:

> *According to my department's program we have some online and face-to-face sessions. In the online sessions we schedule asynchronous classes (chats), discussing the theme of the scheduled class. We also have a forum where we discuss a week-long activity* [Education Innovator 1, line 7].

Furthermore, two innovators said that they used the video conferencing tool on Vula, one innovator replied that they gave individualised assignments, and one mentioned a few activities: "*group and individual exercises, video conferencing, forums and chats*" [Education Innovator 4, line 6].

In turn, the innovator from Veterinary replied that he used a discussion forum, and email for sending materials to students:

I send materials by email and use Zoom and Google Classroom to promote practical lessons and foster discussions [Education Innovator 1, line 17].

For the same question, five EAs from Education replied that they used discussion forums, two said that they used chats, one used videoconferencing for theoretical and practical lessons, and four gave their students assignments, as one went on to say that students *"... and edit a lesson session in a forum or chat or video conference on Vula*" [Education Early adopter 2, line 10]. On the other hand, in the Veterinary faculty, six late majority adopters replied that they assigned their students to discussions in discussion forums, one said they used chats, two used assignments, two sent videos, two gave video conferences, and one used quizzes or exercises, where she was *"… sending the materials for reading with quizzes or exercises to be solved and submitted back on the platform ..."* [Veterinary Late majority adopter 6, line 14].

The above data illustrate that the participants' technology-augmented pedagogical practices moved more towards the SCL approaches after the workshop series.

Although some of this change could be attributed to the changes brought about by the Covid19 pandemic, the participants did articulate what they learnt from the workshops. In response to the question related to what they learnt from the workshops that made them better prepared for remote teaching, participants referred to course design and pedagogical skills developed through the workshop. On one hand, innovators from Education said that they learnt and implemented aspects related to course design: two implemented course design (new course design methods), two designed group work activities, one designed peer-assessed activities, one engaged in content creation and one designed a storyboard to illustrate the learning pathway at large: *"Usage of the storyboard application, [through] activities on how to organise the subject on the platform that I reinforced my knowledge"* [Education Innovator 5, line 14]. On the other hand, the innovator from Veterinary reported that nothing that he implemented was from workshops.

Early adopters from Education replied that the pedagogical skills learnt from workshops were setting up and using discussion forums (4), chats (1), assignments (1) and seminars through video conferences (1). The last went on to elaborate: *"I usually leave a voice recording or recorded homework on Vula for the students to listen [to] and discuss in discussion forums, seminars, or in video conferences"* [Education Early adopter 1, line 15]. At the same time, participants from Veterinary learnt from the workshops to: facilitate the discussion forum with

questions and answer sessions (5); design assignments (1), exercises and quizzes (1) for students to submit; and use chats in synchronous lessons (1). Two elaborated as follows:

> *… Almost all of them, with a focus on performing exercises and submitting them to the Google Classroom platform* [Veterinary Late majority adopter 6, line 17].

> *I was able to stimulate discussions and even give assignments, which are activities that Moodle also provides for* [Veterinary Late majority adopter 2, line 8].

In short, after the workshop, participants started to use hybrid models – a combination of face-to-face and remote teaching, such as discussion forums, chat, video conferences on Vula, assignments and exercises and quizzes and email to facilitate student learning (Table 4.6).

Table 4.6 - Course design and pedagogical skills learnt at the workshops, which were useful for remote teaching during the pandemic

		Education		Veterinary	
Themes	**Codes**	**Innovators**	**Early adopters**	**Innovator**	**Early adopters**
Course design and pedagogical skills	Course design	2			
	Designing group work activities	2			
	Designing peer assessed activities	1			
	Content creation	1			
	Designing of learning activities at large	1			
	Discussion forum		4		5
	Assignments		1		
	Seminars through video conferences		1		
	Chats		1		1

Exercises and quizzes	1

The above can be attributed to the workshops as well as the institutional support provided during the Covid-19 pandemic period. In terms of the support, lecturers reported that they supported colleagues and sought support as well.

4.5. How innovators support technology-augmented pedagogical activities among potential adopters during, between and after the EdTech-UEM workshops

The data reveal that innovators, from both Education and Veterinary provided support to adopters within their faculties. This implies that there were opportunities for social learning during, between and after the workshops.

4.5.1 Innovators supporting adopters during and between workshops (Joint Enterprise and mutual engagement)

Although the main interest was about what happened after the workshops, it was also important to capture the type of support that took place during the workshops, as these interactions could be perceived as springboards for social learning after the workshop series. The Faculty of Education and Veterinary faculty innovators shared that, during Workshops 1 and 2, they provided guidance and support on course design, tool use and pedagogical strategies to the potential early adopters in their faculties. That is, they introduced the adopters to Moodle tools, supported adopters with the execution of workshop activities, and shared pedagogical strategies, such as how to motivate students to participate in class.

This was corroborated by the adopters who reported that during Workshops 1 and 2, they sought support on course design on the Moodle platform, and use of tools, and in execution of activities during the workshops (Table 4.7).

Table 4.7 - Innovators supporting adopters during and between workshops

Themes	Codes	Innovators provide support in …		Early adopters sought support in …	
		Education	Veterinary	Education	Veterinary
Guidance and support on course design	Presented own course design	1			5
	Support on course design	2	1	2	

	Homework				1
Guidance and support on tool use	Introduction to Moodle tools (use tool)	2		2	3
Execution of workshop activities	In the execution of activities during the workshops	1	1	2	
Guidance on pedagogical strategies	How to motivate students to participate in class	1			

Guidance and support on course design

Three innovators from Education guided and supported early adopters on course design. One of them reported that he *"explained the concepts of the different Moodle components, what a forum is, … chat, how the course can be organised on the platform, which could be in topics or weeks"* [Education Innovator 3, line 60]. Another one elaborated that she shared her work:

> *I remember a day the facilitators asked for a small simulation of an analytical plan of a certain module and I volunteered to do the presentation and divided the contents into weeks, ..., and I hope I have contributed in some way* [Education Innovator 1, line 67].

At the same time, one of the five early adopters who sought support on course design (on the Moodle platform) asked an innovator, "*how to add an activity on Moodle, how to plan my subjects by weeks or by topics"* [Education Early adopter 2, line 44].

The above excerpts of innovators and early adopters show evidence of social learning and support provided on course design.

Guidance and support on tool use

One innovator from Education said that he supported an EA on tool use, *"inserting files and customising the screen"* [Education Innovator 2, line 68].

One EA from Education, who sought support on the use of tools, shared that it was his first time using the technological tools that were introduced in the workshops: *"I sought support in using all the tools because it was my first contact"* [Education Early adopter 1, line 45].

The excerpt above shows that early adopters had sought support in terms of tool use and innovators provided the support required.

Execution of workshop activities

Some of the workshop activities were undertaken during the workshops, while some were done between the workshops (i.e., Workshops 1 and 2). The latter were referred to as "homework".

With respect to execution of activities during the workshops, an innovator from Education said that he *"provided support in group activities, activities that were given by the facilitators"* [Education Innovator 4, line 31]. The Veterinary innovator supported those who were both present or absent from at least one of the workshops:

> *There were colleagues who could not use the technologies and others were disadvantaged because they could not attend all the sessions; in this case I supported them in formatting the activities which were done in the previous sessions so they could reach the pace where the rest of the colleagues who attended [were]* [Veterinary Innovator 1, line 72].

Two Education early adopters reported that they sought support in execution of activities during the workshop and homework.

The above demonstrates that there was collaboration and support in and outside the workshops.

Guidance on pedagogical strategies

There was one instance where the participants talked about pedagogical strategies. The innovator who shared pedagogical strategies elaborated as follows:

> *It is possible that I shared some experience I have from distance learning, for example, ... in one of the discussions we were having on how to motivate students to participate in class, I shared the experience of how to call the student by their own name to participate in class* [Education Innovator 5, line 70].

Overall, innovators supported early adopters mostly on course design and introduction on Moodle tools to potentially enable all workshop participants to design their courses.

4.5.2 Innovators supporting adopters after the workshops

Innovators from Education continued providing support to the early adopters by guiding and supporting them on course design on the Moodle platform, tool use and through sharing their technology-augmented pedagogy expertise, while the innovator from Veterinary reported that he supported his colleagues on tool use.

Guidance and support on course design

While two Education innovators reported that they guided EAs on course redesign, three early adopters reported that they requested this kind of assistance from the innovators. One of the innovators shared how she supported both individuals and groups:

> "*Recently I had to guide colleagues in designing their courses on the* [Moodle] *platform. I support colleagues in their difficulties when they come to me. I try to do training to respond to colleagues with both planned and unplanned training* [Education Innovator 3, lines 63-64].

At the same time, one of the three early adopters who sought support on course redesign shared the following: "*I have asked for support in setting up the analytical plan of my subject with topics and the relevant dates*" [Education Early adopter 5, line 45]. The other two further expressed the ease with which they consulted innovators to recapitulate on the workshop activities. One of them said:

> *I kept looking for support from an innovative colleague because, before the pandemic outbreak, I was already designing lessons on Moodle to respond to the EdTech training and put into practice the learnings from the workshops* [Education Early adopter 3, line 80].

The other one said: *"I kept looking for support when I wanted to redo an activity that I couldn't remember how to do. I looked for help from colleagues who were in the training to help me do it"* [Education Early adopter 2, line 51].

The above excerpts illustrate how participation at the workshops has fostered innovator-early adopter consultations and social learning within the Faculty of Education.

Guidance and support on tool use

Three innovators (two from Education and the one from Veterinary) reported that they supported their colleagues on tool use. One from Education elaborated:

> *At my department level, I worked with a colleague within the same subject who did not know how to use educational technologies and now works independently* [Education Innovator 5, line 76].

The Veterinary innovator said:

> *I continued to support my colleagues who came to me asking for some help in using Google Classroom and Zoom tools, which are the platforms in use at my faculty*. [Veterinary Innovator 1, line 76].

One Veterinary late majority adopter shared that she consulted a more experienced colleague to help her with the Google Classroom tools.

However, the other six Veterinary late majority adopters had not consulted any innovator by the time of data collection.

Innovators were further asked how they shared their expertise of technology-augmented pedagogical practices with potential early adopters in their departments, to encourage them to adopt similar practices.

Sharing of technology-augmented pedagogy expertise

Three Education innovators said that they offered group consultations and one-on-one consultations as and when asked. In terms of group consultations, one innovator explained as follows:

> *Not in my department, nevertheless, because I was also working in another faculty, some other lecturers in my other faculty enquired how the lecturers in my faculty worked in Moodle, and I gave consultations to this group of lecturers* [Education Innovator 2, line 74].

That is, this innovator ran a group consultation with his secondary faculty colleagues to get them on board.

One out of the five Education early adopters also expressed that they participated in a group consultation:

> *… a colleague who created an interaction exchange not only for me but for many teachers where they exposed their difficulties and were satisfied in this exchange of ideas* [Education Early adopter 1, line 86].

In terms of one-on-one consultations, the Veterinary innovator provided one-on-one technical assistance, such as, "*Editing Zoom classes for my colleagues, especially for the elderly lecturers, and teaching other colleagues how to use Zoom*" [Veterinary Innovator 1, line 79].

Whereas two Education innovators shared that they attended their colleagues' (EAs) classes so they could advise on their pedagogical practices. One of them said:

> *Generally, the consultations are done individually, I explain when I am asked. I attended a class of a colleague and helped him to improve the design of his course on the platform* [Education Innovator 4, line 37].

At the same time, three Education early adopters shared that they engaged in one-on-one consultations with experts. One of them consulted when necessary, sought support and exchanged experiences with innovators and other early adopters, while the other two reported that they were invited to their faculty innovators' classes to learn from them. One elaborated:

> *I was invited to attend a distance learning subject and I could see how they use the tools, how they work, etc. It was a good experience even though it was only once. This invitation came as part of my request for support in using some tools on Vula* [Education Early adopter 5, line 72].

The above excerpts illustrate some form of apprenticeship into the technology-augmented pedagogical practices.

After sharing how they supported their colleagues, innovators from both faculties were asked if they operated in isolation or as part of a supportive community of practice; all participants but one felt they were part of a community. One of these said:

> *I feel included looking at my department's experience because all the lecturers in the department in particular and those from the Education faculty in general are engaged in the adoption of educational technologies* [Education Innovator 5, line 104].

While the one who felt isolated said:

> *I feel I operate in isolation due to organisational issues of weaknesses in coordination among various departments in the use of educational technologies. I insist on having focal points in each department for passing educational technology content. The thing is that many teachers only use it because of the pandemic, otherwise it wouldn't happen* [Education Innovator 2, line 96].

The next section describes how early adopters supported one another.

4.6 How early adopters and late majority adopters supported one another on technology-augmented pedagogical activities after the EdTech-UEM workshops (joint enterprise and mutual engagement)

The interest was about what happened between the adopters in both faculties in terms of support after the workshops. All five early adopters from the Faculty of Education shared that, after the workshops, they supported each other in terms of teaching practices through seeking support for managing the tools and sharing of experiences.

Four of these early adopters reported that the support was mutual, and one of them elaborated as follows: "*The support has been reciprocal. I teach what I still know and try to learn what I don't know*" [Education Early adopter 5, line 48]. This engagement made some early adopters optimistic for the future, as one said:

> *There has clearly been mutual support and it has been great, and I think this will continue whenever the platform presents a new feature* [Education Early adopter 2, line 55].

The other one, who rated himself as innovator, said that he was the one who supported his peers: "*I have been interacting with early adopters like me, to support them because I seem like an innovator for this group even though I am an early adopter*" [Education Early adopter 3, line 80].

There were mixed responses among the seven Veterinary late majority adopters: five said that they never supported one another at all, while two reported some kind of support, although it did not seem to benefit them in any way. For instance, one said that they were "*Just sharing experiences about what we know"* [Veterinary Late majority adopter 2, line 48]. The second one elaborated:

> *There is a group of more experienced lecturers to assist the less experienced, especially the elderly. Support on how to create or edit a lesson, upload a file for students' access, but all this is on Google Classroom* [Veterinary Late majority adopter 3, line 58].

Two of those who did not support one another highlighted issues such as internet connectivity and lecturer resistance. One late majority adopter said:

> *There hasn't been any support. After the workshops, for example, I haven't heard of anyone who continued practicing what we learned on Moodle. We also have been facing internet signal problems* [Veterinary Late majority adopter 7, line 49].

Another late majority adopter mentioned the elderly lecturers' resistance as an inhibiting factor to colleagues supporting each other. He said:

> *There has not been this support due to factors such as resistance from lecturers, especially the elderly* [Veterinary Late majority adopter 5, line 37].

The excerpts above show that there are indications of mutual support among the early adopters in their technology integration practices, while the late majority adopters highlighted constraints such as lecturer resistance and age.

4.7 Barriers inhibiting lecturer adoption of technology-augmented pedagogical practices after the EdTech-UEM workshops

Innovators and adopters from both faculties faced some challenges that influenced their adoption of technology-augmented practices. Participants were asked what barriers inhibited their adoption of technology-augmented pedagogical practices after the EdTech-UEM workshops, and their responses were in terms of systems-level factors, institutional factors, lecturers' factors and student constraints. The main system-level factor, as raised by participants from the Veterinary faculty, was that there was no policy on teaching and learning with technology at UEM. Institutional factors include lack of technological infrastructure, limited professional development opportunities, while lecturer and student factors include time and interest constraints; lecturer reluctance, scepticism and technophobia; and reliance on affinity; and lack of student motivation due to lack of digital literacy skills among students (Table 4.8).

Table 2 - Barriers to lecturer adoption of technology-augmented pedagogical practices

Themes	Codes	Education		Veterinary	
		Innovators	Early adopters	Innovator	Early adopters
Systems-level factors	Training is not compulsory			1	1
No policy on Teaching and Learning with Technology (Institutional culture)	No monitoring of platform use			1	
Institutional factors	Lack of technological infrastructure	5	4		7
	Limited professional development opportunities (compulsory training)	1	3		1
Lecturer factors	Time and interest constraints		3		6
	Lecturers' reluctance, scepticism and technophobia	3	1		2
	Reliance on affinity		1		
Student constraints	Lack of digital literacy skills			1	

Systems- level factor: Absence of a policy on teaching and learning with technology

The participants' responses revealed that the integration of educational technology into pedagogical practices was voluntary at UEM and, in turn, there was no policy guiding these practices. The innovator and one late majority adopter from Veterinary highlighted the need for instigating institutional teaching and learning with technology policy that would make it compulsory for lecturers to undergo training. This late majority adopter recommended that

> *[t]here should be a document regulated by UEM that obliges lecturers to participate in training regarding educational technologies… currently teachers use them in a*

mandatory way, just because of the pandemic. [Veterinary Late majority adopter 2, line 31].

The innovator from Veterinary further suggested that there should be monitoring of the Learning Manager System (LMS) use:

Greater monitoring of the academic units (my faculty) by the IT Center (CIUEM); the academic units should have focal points [local faculty-based champions] to monitor the use of digital platforms for education [Veterinary Innovator 1, line 49].

The above implies that lecturers might feel obliged to adopt technology-augmented practices should there be an institutional policy guiding adoption.

Institutional factors

In the Education faculty, all five innovators highlighted the lack of technological infrastructure and one also pointed out the limited provision of professional development, as barriers. This innovator highlighted the lack of compulsory training which adds more complexity to the situation:

There is no barrier, but what happens is that the lack of compulsory training can be a barrier, because, in this collaboration, some lecturers share and there are some who like using educational technologies and others who don't like using them in their practices [Veterinary Late majority 2, line 98].

Seven participants from the Veterinary faculty shared the same sentiment and referred to lack of internet stability and computers for lecturers as barriers to adopting technology. Four early adopters reported the lack of technological infrastructure, and three highlighted the limited professional development opportunities as institutional barriers in adoption.

Lecturer factors

Six participants highlighted barriers with respect to time constraints, while one mentioned lecturer reluctance to educational technology adoption. Three Education innovators replied that lecturers' factors related to lecturer reluctance, scepticism and technophobia compete with adoption of technology integration. One of them elaborated:

> *Scepticism is somehow a barrier but I and other colleagues have approached this group of colleagues who are sceptical about technologies to support them* [Education Innovator 1, line 89].

Another innovator also expressed that some lecturers had technophobia:

> *No, what happens is that there are lecturers who are afraid; afraid to research, afraid to click on an application or key without knowledge of what they are doing. In these cases, I advise the colleague to research or watch videos on YouTube on how to deal with a particular tool or application* [Education Innovator 5, line 101].

In turn, five participants pointed out lecturers' factors such as time and interest constraints (3), lecturers' reluctance, scepticism and technophobia (1) and reliance on affinity (1) as barriers to adoption of technology-augmented practices. One of three EAs who highlighted time constraints, elaborated:

> *I think that, due to the lecturers' lack of time, it makes it impossible for them to have meetings to exchange experiences, making collaboration more difficult to happen. It is an issue of scarcity or lack of time from the lecturers* [Education Early adopter 5, line 83].

> *I wouldn't say that it is a barrier, but sometimes a colleague who has made himself available to explain a feature ends up not being available because he has other commitments, thus making this collaboration difficult* [Education Early adopter 1, 107].

Student constraints

The innovator from Veterinary replied that there were no barriers to adopt technology-augmented pedagogical practices despite having mentioned that the students are not registered on Vula. This can demotivate students so in order to prevent this, he said:

> *I send materials by email and use Zoom and Google Classroom to promote practical lessons and foster discussion* [Veterinary Late majority adopter 1, line 18].

This innovator further elaborated how this negatively influenced his adoption:

> *I have not explored much practice from the workshops since the students have not learned how to use the Moodle platform. Also because the students are not yet registered to use this platform which is currently Vula* [Veterinary Innovator 1, line 18].

4.8 Summary

This chapter presented findings of the study, in response to the four sub-questions but the main findings were observed in the lecturer's motivational factors and in terms of support among them. In terms of motivational factors after the workshops, lecturers from both faculties started using a hybrid model as an obligation due Covid-19, exploring different platforms with the goal of completing the academic year plan. In this endeavour, the lecturers also moved from LCL approaches towards a SCL approach. In terms of support, findings showed peer-support between innovators and early adopters through some form of apprenticeship into the technology-augmented pedagogical practices as well as support amongst early adopters. The late majority adopters reported little engagement in activities using technology, arguing barriers such as the absence of policy in teaching and learning with technology, institutional factors, lecturer factors and student constraints.

CHAPTER 5 – DISCUSSION

This chapter relates the findings presented in Chapter 4 to Lave and Wenger's (1991) and Wenger's (1998) Communities of Practice (CoP) framework discussed in Chapter 2. The findings are used to show which of the essential components described in the framework are executed by innovators and adopters in their adoption of technology-augmented pedagogical practices, and which are supported by their motivation to adopt it. The findings reveal that implementation of the EdTech-UEM professional development model has resulted in emerging communities of practice.

5.1 Factors motivating lecturers to adopt technology-augmented pedagogical practices

The factors motivating the 18 lecturers interviewed in this study were both intrinsic and extrinsic.

5.1.1 Intrinsic motivations

The findings showed that intrinsic motivation for lecturers to adopt technology-augmented practices include personal motivation towards technology, such as their passion for technologies, enjoyment in using technology and interest in technologies. Enjoyment in using technology as expressed by the lecturers in the current study is reported elsewhere (Mylonopoulos & Theoharakis, 2020) as a positive feeling that fosters 'passion' and 'interest' in teaching with technology. These findings concur with research conducted elsewhere (Ellis, 1984; Davis, Bagozzi & Warshaw, 1992; Davis & Wilson, 2000; Gears, 2012; Chigona, et al., 2014; Curran et al., 2015; Orosz et al., 2016; Verner-Filion et al., 2017; Mylonopoulos & Theoharakis, 2020), which suggests that personal motivation towards technology plays a role in the integration of technology into teaching.

Self-empowerment was a second theme that emerged with respect to intrinsic motivation in this study. Participants reported that they empowered themselves to enrich their professional life in terms of technology-augmented pedagogical practices when provided with an opportunity to do so within an educational technology environment. Related studies revealed that such environments enable educators to make decisions and increase their internal motivation and ambition to achieve success in technology adoption (Deci & Flaste,1995; Davis & Wilson, 2000; Ungar, 2017). Three of the 10 lecturers raised the importance of conducting research on educational technologies, and the will to acquire skills to use educational technology. Barni, et al. (2019), Ellis (1984), Ford et al., (2017 and Peralta and Costa (2007)

had stated that elements including perceived self-efficacy, teacher efficacy, dedication, autonomy, competence, and interpersonal connectivity can all have an impact on motivation.

5.1.2 Extrinsic motivations

The findings of this study revealed that the primary extrinsic motivator for both the innovators and adopters to adopt technology-augmented pedagogical practices was the goal to improve teaching and learning experiences, followed by the need to complete the academic year, the implementation of the UEM vision and reduced teaching load. With respect to improving teaching and learning experiences, such as improving the teacher and student interaction, independence and autonomy of students, availability of information/material, ability to connect any time and optimise time, are linked to lecturers' behaviour and sense of job satisfaction and their personal decision to adopt a technology innovation (Frase & Sorenson, 1992; Deci & Flaste, 1995; Schifter, 2000; Gautreau, 2011). That is, extrinsic motivating factors were undergirded by lecturers' intention to improve their performance (Davis, et al., 1992).

Some extrinsic motivators were shown to have a positive impact on intrinsic motivation in the current study. Deci and Ryan (1985, 1987) have indicated that extrinsic motivators can positively influence intrinsic motivation. Responses from lecturers illuminated this relationship, where lecturers were motivated to adopt educational technologies to: 'enhance teaching and learning experiences', meet deadlines – 'completing the academic year', 'help the UEM in technologies adoption', 'keep up with the current trends' and 'reduce their teaching load', which would help them perform their jobs better (Gautreau, 2011) in terms of research output. Hennessey et al. (2015, p.2) argue that extrinsic motivators are most likely to influence intrinsic motivators "when two conditions are simultaneously met: (i) initial intrinsic task motivation is strong and salient, and (ii) the [extrinsic motivators] enable the person to become more deeply engaged in work that was already intrinsically interesting". This relationship may need further investigation at the current institution.

Further, although only two lecturers raised the issue of adopting technology-augmented practices with the intention of reducing their teaching load, to use some of their time for research, it is important to note that there has been ongoing tension between lecturer teaching load, and research and publishing effort. This was noted by Parish and Wimer (2019) and McAlpine and Amundsen (2018). UEM and other HEIs may have to consider working out a balance between these two areas of responsibility for 'research-teaching academics' (McAlpine & Amundsen, 2018).

In addition, the findings reveal that other extrinsic factors that motivated lecturers to adopt technology-augmented practices were the availability of technological infrastructure, and technical training and support for lecturers and students. These findings support previous research (Gautreau, 2011; Gillard, Gillard & Pratt, 2015) that indicates that availability of resources and adequate training and support have a strong relation to faculty members' motivation and personal decision to adopt a technology innovation. These (as highlighted in Chapter 2) are actually enabling factors for an institutional initiative of this nature, meaning that the integration of educational technology is more likely to be taken up by lecturers when these aspects are addressed.

The next section discusses findings in relation to the nascent communities of practices formed as a result of the pilot workshops and highlights some challenges illuminated by the findings.

5.2. Emerging communities of practice

5.2.1 Practice – learning by doing: Pedagogical practices before and after the EdTech-UEM workshops

Before the workshops, all the innovators (five from Education and one from Veterinary) were involved in both LCL and SCL and the adopters were mainly involved in LCL. Twelve adopters and all the innovators from both faculties used the LCL approach for contact teaching and knowledge transmission. The innovators tended to differentiate the strategies that they used; combining LCL for contact teaching and SCL strategies for engaging students in activities taking place online. That is, they used hybrid approaches to teaching. The period after workshops coincided with the pandemic, which had an influence on lecturers' adoption of hybrid models, although they enormously attributed the pedagogical knowledge and skills they applied to the workshops. Lecturers combined face-to-face LCL strategies and email, with online interactive strategies, such as use of discussion forums, chats, video conferences, assignments, quizzes, videos, peer-assessed activities and some group work. The increased opportunities for engaging in different learning activities, brought about by the Covid-19 pandemic, was also observed elsewhere (Baticulon et al., 2020; Krönke, 2020; Martins, Tinga & Manjate, 2021). In addition, lecturers' confidence in course design increased as their use of digital technology for teaching increased (including activities that enhanced interaction and collaboration), class teaching, assessing and communicating with students.

5.2.2 Joint Enterprise

The findings revealed that the joint enterprise in this study was course redesign to integrate technologies into the curriculum in a student-centred manner. This was aimed at improving the adoption of technology-augmented pedagogical practices. The joint enterprise was evident in the kind of interactions that occurred during and after the workshops, where innovators supported adopters, provided guidance and support on course design, tool use and pedagogical strategies. According to Lomos, Hofman and Bosker (2011), this makes adopters develop professional collaboration with innovators, which could lead to group activities aimed at specific improvements in teaching and learning processes. All five early adopters from Education guided and supported one another on the management of tools and through sharing their teaching-with-technology experiences.

As was noted by Beardsley et al. (2021); Albó, et al. (2020); Littlejohn (2020) and Gewerc, et al. (2020), that lecturers became more driven to develop their digital skills and employ technology-augmented their pedagogical practices as a result of creating their own digital course content, as well as a greater focus on the need for professional growth. Furthermore, Stone (2005) found that intrinsic and extrinsic motivating factors of members of CoPs influence how they participate in CoPs. Likewise, the findings of this study revealed that the participants' intrinsic and extrinsic motivating factors influenced how they worked on the joint enterprise of the emergent CoP in the two faculties. It may be worth investigating further why the six Veterinary late majority adopters had not consulted any innovator by the time of data collection. Two of these late majority adopters highlighted some demotivating factors, such as internet instability and colleagues' (more so older ones) reluctance to engage technology-augmented pedagogical practices. It might be that the older ones are by virtue more experienced in teaching, hence, their reluctance to acquire new skills in educational technologies. Raman and Yamat (2014) concluded that this set of lecturers seldom acquire new technological skills due to their impatience with technologies and tenacity towards traditional teaching methods. Wenger (1998) warned that, without a clear sense of a joint enterprise, it may be challenging to sustain the current enterprise (Wenger, 1998). Hence, faculty coordinators may have to intervene in their faculties, more particularly, in the Veterinary faculty.

5.2.3 Mutual engagement and social learning

In relation to innovators' support for early adopters, the innovators from Education provided guidance and support on course design, and shared technology-augmented pedagogy expertise through one-on-one and group consultations. Also, three innovators (two from Education and

one from Veterinary) provided guidance and support on tool use on a one-on-one basis. Three early adopters from Education expressed that they approached innovators as and when they saw fit as they worked on the joint enterprise. That is, they learnt from innovators through some form of apprenticeship. Similarly, the Education early adopters emphasised that they engaged in reciprocal and mutual forms of support as they guided and shared among themselves what they knew, drawing on their own experiences. As it is one of the outcomes of social learning in CoPs, the above demonstrates that there was situated learning that helped participants to improve their practices.

Related to social learning in CoPs, Wenger (2000), raises the concern about mutuality: How strong is the sense of community that emerges through mutual engagement? He argues that:

> *People must know each other well enough to know how to interact productively and who to call for help or advice. They must trust each other, not just personally, but also in their ability to contribute to the enterprise of the community, so they feel comfortable addressing real problems together and speaking truthfully* (p. 230).

On one hand, the one Education early adopter's reference to affinity (which has been identified as a barrier to achieving the so-called 'joint enterprise' in this study) may be linked to this. On the other hand, this might be the reason that there is more social learning among Education early adopters rather than between innovators, and among the late majority adopters in the Veterinary faculty. This may require further investigation. Perhaps, if the data were collected a few months (or a year) later than they were, there would have been more evidence of mutuality.

5.2.4 Shared Repertoire

Most of the innovators and early adopters from Education have reached new understandings of professional collaboration in technology-augmented pedagogical skills and practices, developed through community engagement, allowing learning to take place, as mentioned by DeMatteo and Reeves (2013). Situated learning through individual or group consultations after the workshops led to some changes in technology-augmented pedagogical practices, including a redesign of courses. Pink (2009) noted that lecturers may be less interested in what they consider to be routine tasks that do not demand creative thinking. For this, Pink (2009) says that extrinsic rewards can provide a small motivating boost without harmful side effects. Maybe UEM could consider rewarding lecturers who integrate technology into their teaching,

evidenced through hybrid and SCL pedagogical strategies. This, in addition to addressing the barriers identified by the Veterinary late majority adopters, might motivate them.

5.3 Barriers and Enablers to the Adoption of Technology-Augmented Pedagogical Practices

Systems-level: Although only two participants expressed this, it was interesting that these lecturers required a policy that enforced training, to motivate them to adopt technology-augmented pedagogical practices. The notion of a policy in ICT development, lecturers' knowledge, skills and competences was also advocated for by Divaharan and Koh (2010), Muianga et al., (2013) and Alemu (2015) to enable the adoption of such practices. Stone (2005) had also recommended that universities should develop policies to address constraints in integration of technology, such as lecturer workload and recompense. Instigating a policy and addressing institutional barriers through providing technological infrastructure and skills to both lecturers and students, as well as increasing professional development opportunities for lecturers would enhance adoption of technology-enhanced pedagogy. In addition to the centralised EdTech-UEM workshops, UEM could also consider 'local departmental champions' to work with the lecturers after the workshops. This might mean formalising the role of innovators and supporting the growth of faculty/course-based CoPs. This would be more helpful for faculties, such as the Veterinary one, that are located outside Main Campus and may at most times not have remote access to the central EdTech-UEM.

With respect to lecturer and student constraints, participants reported lecturer barriers, such as lack of time, reliance on affinity, scepticism, technophobia, lecturers' reluctance (mostly associated with lecturers' age and limited technology skill) as hindering the lecturers' integration of ICT into their pedagogical practices. Raman and Yamat (2014) also found lack of time and ICT skills, and lecturers' experience and age to be barriers to technology integration. The lack of time is often associated with lecturer workload (an extrinsic motivator discussed earlier on). The authors recommend sufficient training, and flexible time and task arrangements for lecturers. The lecturers who are strongly committed to the conventional pedagogical practices must embrace technological changes and improve their teaching competence. Lecturers also reported students' lack of digital literacy skills, which demotivated lecturers in implementing educational technologies in their courses. Brown et al. (2016) split the term of 'digital literacy' into four categories: access, operational, situated and critical. The operational category refers to a person's ability to "understand the affordances of a range of modes, operate technologies and know where and how to access information" (p. 13), which is

essential for the navigation of the students' participation in their courses. With student access and skills having been identified as barriers and demotivating factors to lecturers' technology-augmented pedagogical practices, UEM may have to ensure that students are trained in digital literacy skills.

5.4 Summary

Flowing from the discussion, personal motivational findings include personal motivation towards technology such as passion and interest for technology. Self-empowerment was also identified as a factor which increased internal motivation for lecturers to adopt technologies. Among the extrinsic motivation to adopt technology, such as 'improve teaching and learning experiences', 'reduce teaching load', 'implement this new vision at UEM', and 'meet deadlines', such as completing the academic year during the pandemic times, lecturers highlighted the last. Other extrinsic factors to adopt technology-augmented pedagogical practices were the availability of technological infrastructure, technical training and support for lecturers and students that, simultaneously, are related with the enabling factors for UEM.

The key findings of discussion arise with the emergence of some dimensions of communities of practice (joint enterprise, mutual engagement and shared repertoire) through activities that enhanced lecturers' interaction and collaboration (peer-support and apprenticeship) during and after workshops. During this process, barriers related to policy in ICT at UEM – lack of time and ICT skills, lecturers' experience and age, students' lack of digital literacy skills – came up as factors that demotivate lecturers to adopt of technology-augmented pedagogical practices in the Education and Veterinary faculties.

CHAPTER 6 – CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This research study sheds light into the phenomena of technology-augmented pedagogical practices of lecturers from Veterinary and Education faculties at Eduardo Mondlane University. The study also provides insight into potential ways of achieving successful implementation of faculty-based professional development through fostering, and providing conditions that could help communities of practice (integration of educational technologies into learning and teaching) at UEM succeed. In this chapter, a summary of the findings in relation to the research questions underpinning this study is presented.

How could communities of practice for technology-augmented pedagogical practices be fostered among innovators and potential adopters through the faculty-based EdTech-UEM professional development model?

The question was selected in order to gain a better understanding of:

i. What are the motivating factors for innovators and potential adopters in the Education and Veterinary Faculties to adopt technology-augmented pedagogical practices?

ii. What are the technology-augmented pedagogical practices of the innovators and potential adopters before and after the EdTech-UEM workshops?

iii. How do innovators support technology-augmented pedagogical activities among potential adopters during and after the EdTech-UEM workshops?

iv. How do potential adopters support each other on technology-augmented pedagogical activities after the EdTech-UEM workshops?

v. What are the barriers to lecturer adoption of technology-augmented pedagogical practices after the EdTech-UEM workshops?

6.1.1 Motivating factors for innovators and adopters in the Education and Veterinary faculties to adopt technology-augmented pedagogical practices

The study found that for both innovators and early adopters, the primary intrinsic motivator that inspired these educators to adopt technology-augmented pedagogical practices was personal motivation (passion for technologies, enjoyment using technologies and interest in technology) towards technologies followed by self-empowerment on using educational

technologies. In descending order of frequency, the lecturers expressed that they were externally motivated to adopt technology-augmented pedagogical practices by: the desire to improve teaching and learning experiences; provision of technological infrastructure by the institution; provision of technical training and support by the institution; aiming to meet deadlines (completing the academic year); the requirement to implement the UEM vision to keep up with global trends; and reduced teaching load. This implies that UEM needs to pay attention to the external factors, such as the increased provision of technological infrastructure and technical training and support, and reduction of lecturers' teaching load. Schifter (2000) noted that these are enabling factors, while at the same time, the inverse could be inhibiting lecturers' adoption of educational technologies. Furthermore, Hennessey et al. (2015) argue that extrinsic motivators are most likely to influence intrinsic motivators, which was evident in this study.

6.1.2 Technology-augmented pedagogical practices of the innovators and adopters before and after the EdTech-UEM workshops

Before the workshops, all the innovators were involved in both lecturer-centred-learning (LCL) and student-centred-learning (SCL), while the EAs were mainly involved in LCL approaches. LCL includes face-to-face didactic approaches (using PowerPoint for theoretical classes), sending material by email, doing theoretical and practical classes and face-to-face seminars and discussion as well as using Moodle and Google Classroom for placement of materials. Innovators from Education also used SCL approaches, such as interactions (through discussion forums and chats) on Moodle and YouTube videos.

After the workshops, a period that coincided with the pandemic imposed an increased demand for hybrid learning in order to complete the academic year. It is important to note that the innovators from Education were already implementing hybrid learning in their distance learning programmes prior to the workshops. They drew on this experience together with that of the workshops, while the adopters drew on the workshop experiences to design for SCL strategies. There was significant use of Vula (Moodle) followed by Google Classroom, Zoom and WhatsApp during the pandemic. Lecturers combined face-to-face LCL strategies and email, with online interactive strategies, such as use of discussion forums, chats, video conferencing, assignments, quizzes, videos, peer assessed activities and some group work.

6.1.3 How innovators support technology-augmented pedagogical activities among adopters during, between and after the EdTech-UEM workshops

Although the question was open to all periods during and after workshops, the researcher had a particular interest in how innovators supported adopters after workshops. A range of social learning approaches emerged, which related to the joint enterprise, where innovators provided guidance and support on course design, and shared technology-augmented pedagogy expertise through one-on-one and group consultations, and also provided guidance and support on tool use on a one-on-one basis. These interactions were substantially different between the two faculties. The Education faculty demonstrated emergence of a CoP with a joint enterprise and reasonably strong social learning that resulted in redesign of courses and change in pedagogical practices (shared repertoire). On the other hand, in the Veterinary faculty, there was emergence of some kind of social learning between the innovator (based on the reported practices) and the late majority adopters (six of the research participants had never consulted with innovators) – social learning was stronger among the early adopters.

Wenger (1998b) talks of five stages of CoP development (over time): potential, coalescing, active, dispersed, and memorable stages. At the 'potential' stage, "people face similar situations without the benefit of a shared practice" and the typical activities are "finding each other, discovering commonalities" (p. 2), which seems to be the stage at which the Veterinary faculty is. The Education faculty seems to be transitioning from the 'coalescing' stage, where "members come together and recognize their potential" and "explor[e] connectedness, defin[e] joint enterprise, negotiat[e] community", to the 'active' stage, where "members engage in developing a practice" but have not fully got to the point of "engaging in joint activities, creating artefacts, adapting to changing circumstances, renewing interest, commitment, and relationships" (p. 2). There is room for improvement; maybe with the formalised faculty-based champions (innovators), who are given time by relieving them of some of their teaching load to work with colleagues and provide institutional support, CoP could be fully 'developed'.

6.1.4 How adopters support one another on technology-augmented pedagogical activities after the EdTech-UEM workshops

The Education early adopters supported others after the workshops, and this demonstrated evidence of situated learning. They engaged in reciprocal and mutual engagement that helped them improve their technology-augmented pedagogy practices and redesign their courses. These forms of support for one another are one of the outcomes of social learning in CoP evidence from the Faculty of Education. This engagement implies that it can create pathways

to open, creative and collaborative networked professional development (Gachago, Pallitt & Bali, 2020).

The late majority adopters from Veterinary reported constraints, such as lecturer reluctance and technology infrastructure and unavailability of local faculty-based champions, who could work with them at their campus. The institution has to pay attention to the challenges raised by this faculty. This will hopefully encourage late majority adopters to become experts as well.

6.1.5 Barriers and enablers to lecturer adoption of technology-augmented pedagogical practices after the EdTech-UEM workshops

From a systems perspective, this research study suggests that instigating a Teaching and Learning with Technology policy is critical for UEM. This policy could focus on allocation of technological infrastructure, provision of technical and professional development for lecturers (which could be made compulsory depending on the institutional culture), lecturer workload and compensation, incentivising lecturers for technology integration, and provision of student digital literacy skills. The above would address aspects of digital literacy for both lecturers and students. Also, a balanced workload would allow lecturers time to focus on the technology integration and redesign of their courses for student-centred pedagogical practices.

Technological infrastructure enablers would improve internet quality, provision of internet connectivity for lecturers, free access (zero-rating) to the platforms for students, provision of computers for lecturers and for students, as well as to provide technical training for lecturers.

6.2 Summary of the Conclusion

This study gathered data concerning the 'what and how' of motivations and pedagogical practices before and after workshops, and support and barriers in adoption of technology-augmented practices. The 'what' aspect of the study seemed to reveal what are motivating factors for technology-augmented pedagogical practices, and barriers to adoption of technology-augmented pedagogical practices by innovators and early adopters from Education and the innovator and late majority adopters from Veterinary. The 'how' hones in on innovators supporting adopters (early adopters and late majority adopters); early adopters supporting one another; and late majority adopters supporting one another in technology-augmented pedagogical practices before and after workshops. The study determines a direct connection between the perceived motivation from lecturers and the emerging of the CoP. The importance of peer interactions among innovators and early adopters during and after workshops (Covid-

19) in the Faculty of Education, as evidenced by the emergence of 'joint repertoire' and 'mutual engagement,' as well as the perceived importance of a clear relationship between appropriate use of technology, effective teaching, and the perceived benefit to student learning are also the study's most important conclusions, which are related to the enabling characteristics for UEM.

6.3 Theoretical Implications

Using the communities of practice framework of Lave and Wenger (1991) to interpret the findings helped illuminate the instance of social learning in the two faculties. The findings revealed the emergence of the 'joint enterprise' – what the innovators and adopters were focused on; 'mutual engagement' and social learning – how social learning happened in the two faculties; and how these engagements and situated learning have led to some form of 'shared repertoire' – the practices and courses. Drawing on the findings, the interactions between innovators and adopters, as well as the interactions amongst adopters, were substantially different between the two faculties. In the Faculty of Education, the 'joint enterprise' resulted from some kind of social learning that emphasised the emergence of a CoP; whereas in the Veterinary faculty, there was the emergence of some kind of social learning between the innovator and adopters which needs to be strengthened.

6.4 Practical Implications

Lecturers would benefit from training and professional development programs that would allow them to learn more from time to time. Furthermore, these programs would ensure that lecturers keep up on education knowledge in specific subjects and the most recent curriculum implemented, as well as that lecturers engage with new technologies and a variety of resources that can help them enhance their pedagogical practices. The workshops provided by EdTech were designed to provide a platform for lecturers to upgrade their skills and knowledge, share knowledge with peers, and connect to the latest changes in the education field. In terms of practical implications of the model in both faculties, the Faculty of Education is in the forefront to easily adopt augmented-technologies in their practices once this faculty has been engaged in the application of the technologies for a long time. In addition, there are many cases of lecturers from this faculty linked to distance learning, therefore with wide experience. The UEM, providing enabling conditions for technology integration and CoP can inspire lecturers to adopt technology-augmented pedagogical practices.

6.5 Study Limitations

There are three limitations to this study that should be considered:

Firstly, the differences in the levels of engagement with technology in teaching and learning before the pilot workshops between lecturers from Education and Veterinary. Lecturers from Education have, over several years, played a leading role in distance learning courses and they are more likely to have had exposure to some previous workshops or courses in teaching with technology. Comparison of this faculty with others and difference of innovators and adopters in these faculties may not be fair, but highlighting Education faculty practices may provide inspiration for other faculties.

After the workshops, many different factors, such as the COVID-19 pandemic, could have influenced the lecturers' pedagogical practices in this study. As a result, it's possible that the same study, conducted under different conditions, would yield different results.

Lastly, the findings of this study are not generalizable because they are bound by contextual aspects. However, it provides insights into the nurturing of faculty-based communities of practice.

6.6 Recommendations

6.6.1 University lecturers

It is suggested that university lecturers should consider:

- ➔ Developing their own CoPs, either online or on-site with some colleagues to acquire and share knowledge obtained via the use of technology.
- ➔ Experienced lecturers in using technology-augmented (innovators), or other volunteers, assisting the EdTech in training on Moodle/Vula platform use for specific subjects in different faculties and schools of UEM.

6.6.2 Faculties and/or departments support

It is suggested that faculties and departments support lecturers by doing the following:

- ➔ Providing lecturers with the opportunity to receive different forms of training, including advanced training and/or individual consultations.

- ➔ Supporting lecturers in their use of ICTs, as not all lecturers are completely familiar with technology and need time to explore and collaborate to identify the best ways to work using technology.
- ➔ Recognizing lecturers that are eager to share knowledge about teaching using technology by giving them incentives such as computers and internet access.

6.6.3 EdTech Department

It is suggested that EdTech Department should:

- ➔ Provide institutional support via help desks and available technicians.
- ➔ Encourage faculty development initiatives to meet their requirements.
- ➔ Promote and invite lecturers to apply to hybrid design courses and to share their technological knowledge via the CoPs.

6.6.4 Institutional support

It is suggested that the institution should support lecturers and professional development programs in the following ways:

- ➔ Increase the awareness of faculty motivation factors among all actors involved in the process of teaching and learning.
- ➔ Expand the awareness of lecturers in respect of the inhibiting factors that exclude the use of technology in the pedagogical practices.
- ➔ UEM has to consider working out a balance between these two areas of responsibility (lecturer teaching load and to use lecturers' time for research) for 'research-teaching academics'.
- ➔ Ensure compulsory training in technology programs for lectures.

6.7 Further Research

An additional issue for future research possibilities is to examine the balance of support given to lecturers and supporting the growth and health of CoPs, once the current study shares evidence of the emergence of some ways of CoP, even among a few lecturers from the Faculty of Veterinary. There is also a need for research on how the work to support CoPs should be

allocated throughout UEM's faculties, as well as the desired ratio of innovators and adopters for a CoP to be successful?

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APPENDICES

Appendix A – Information letter for participant

Dear Lecturer/Participant

Thank you for your interest in taking part in this study, which will investigate the introduction of a faculty-based professional development model to foster communities of practice for technology-augmented pedagogical practices. To achieve the research's objectives, I plan to conduct this research at UEM, especially in this faculty, once this faculty had attended a series of EdTech seminars with the aim to investigate How could communities of practice (CoP) for technology-augmented pedagogical practices be fostered through the faculty-based EdTech-UEM professional development model?

An interview will be conducted by Zoom, Skype, and/or phone as part of this study's data collection methods. It will be beneficial for me to audio-tape the interview. The recording will be available only to you and me as well as the information received from the audiotapes will be treated with strict confidentiality, and the identity of the information giver will be kept anonymous. After the research has been completed, the recordings will be deleted.

Participation in this study is completely voluntary, and you can stop at any time. You will stay anonymous during the collection and I will not use any of the participants' names when reporting on the research results (thesis, academic publications, etc.). I will make every effort to secure your identity and protect your anonymity through pseudonyms. If I believe that someone may be able to identified and such identification could have negative implications for the individual, I will communicate the relevant sections of the report to the individual and promise to make revisions to the participant's satisfaction. I will protect data confidentiality of information, and the data will not be available to anyone.

The interview will take not more than 30 minutes.

If you require any additional detail on this research, please do not hesitate to ask it at any time. My personal contact is provided below:

Elódia Miguel

Cell no. (+258) 84 6871734/879871734

E-mail: elodiamiguel@gmail.com

I thank you for your time.

Appendix B – Consent form for participation and audio-taping the interviews

By taking part in the research, you affirm that you participated in at least one of the EdTech workshops.

Please tick the most appropriate answer for you:

I agree to participate in the interview.	**YES ☐NO ☐**
I understand why I am being interviewed/participating in this research.	**YES ☐NO ☐**
My concerns and questions about this research have been addressed.	**YES ☐NO ☐**
I acknowledge that the researcher will de-identify me and my department/ course and redact ("delete") details to obscure my identity.	**YES ☐NO ☐**
Identification **I wish to be identified in the following way within research outputs:** **Pseudonym ☐No attribution ☐** **If pseudonym, please indicate your preferred pseudonym:** **……**	
I agree to be directly quoted in the research in line with my preference above.	**YES ☐NO ☐**

Research publication **I am aware that the research will be published in the form of a thesis and if possible, in academic publications.** **I give permission for my information to be used in all these forms of dissemination. If No, please specify.** **……**	**YES ☐ NO ☐** **YES ☐NO ☐**
Possible Harm **I have been informed that there is little or no risk related to this study.** **You will be asked to check the interview transcripts to ensure that detail is captured correctly.**	**Initial:**
I understand that I am participating voluntarily and I may withdraw at any time without prejudice. (I understand that I am free to refuse to answer any questions or to stop participating in a conversation whenever I am not comfortable with the subject).	**Initial:**
I have not been offered any reimbursement for participating in this study.	**Initial:**
Audio-taping the interviews **I have been informed of the purpose of the audio-tape and how the data will be protected.**	**Initial:**
I have given my informed consent to being audio-taped during the discussion provided that confidentiality of my contribution is observed.	**Initial:**

Researcher: **Name: ……** **Signature:……** **Date:……**	**Participant:** **Name: ……..** **Signature:……** **Date:……**

Appendix C – Permission Letter for Interview Lecturers from Faculty of Education

Director of Faculty of Education

My name is Elódia Júlia da Graça Miguel and I am lecturer of the Faculty of Education from UEM. I am student of Master of Educational Technologies at University of Cape Town - South Africa. I intend to do this investigation at UEM particularly in this faculty once lecturers from this faculty attended the series of EdTech workshops. The aim of this research is to investigate 'How could communities of practice (CoP) for technology-augmented pedagogical practices be fostered through the faculty-based EdTech professional development model implemented from the workshop'.

The sample of the study are lecturers from this faculty who participated in workshops. I request your permission to interview lectures from your faculty who are willing to participate in this research.

If you require any additional detail on this research, please do not hesitate to ask it at any time. My personal contact is provided below:

Elódia Miguel

Cell no. (+258) 84 6871734/879871734

E-mail: elodiamiguel@gmail.com

I thank you for your time.

Appendix D – Permission Letter to Interview Lecturers from Faculty of Veterinary

Director of Faculty of Veterinary

My name is Elódia Júlia da Graça Miguel and I am lecturer of the Faculty of Education from UEM. I am student of Master of Educational Technologies at University of Cape Town - South Africa. I intend to do this investigation at UEM particularly in this faculty once lecturers from this faculty attended the series of EdTech workshops. The aim of this research is to investigate 'How could communities of practice (CoP) for technology-augmented pedagogical practices be fostered through the faculty-based EdTech professional development model implemented from the workshop'.

The sample of the study are lecturers from this faculty who participated in workshops. I request your permission to interview lectures from your faculty who are willing to participate in this research.

If you require any additional detail on this research, please do not hesitate to ask it at any time. My personal contact is provided below:

Elódia Miguel

Cell no. (+258) 84 6871734/879871734

E-mail: elodiamiguel@gmail.com

I thank you for your time.

Appendix E – Innovator Interview Protocol

Research Questions	Key concept	Interview schedule 1: Innovators
RQ 1: **What are the motivating factors for innovators Faculties of Education and Veterinary to adopt technology-augmented pedagogical practices?**	Innovators Intrinsic and extrinsic motivating factors	1.1 What motivates you to implement technology-augmented practices? - Extrinsic (external) - Intrinsic (personal) 1.2 What motivates you to share/collaborate with adopters? 1.3 How could you be motivated to use technology more for teaching and learning? *Prompt:* What would you like your department/EdTech Unit/EUM to do to keep you motivated?
RQ 2: **What are the pedagogical practices of the innovators and early adopters after the workshops?**	Innovators pedagogical practices	2.1 How did you use technology in teaching and learning before the Workshops and Covid-19?? 2.2 How do you teach in a typical class nowadays? 2.3 What types of activities/strategies do you have your students participate in using educational technology? 2.4 Which of these activities/strategies from the workshop/how did you implements what you learnt from the workshops
RQ 3: How do innovators support technology-augmented pedagogical activities among early adopters during and after the EdTech-UEM workshops?after the workshops?	Innovators support	3.1 What kind of support did you provide to adopters, in terms of their technology-augmented pedagogical practices: - during workshop 1 and 2? - after workshop 1 and 2? - after workshop 3 and 4? 3.2 How do you share your experiences of technology-augmented pedagogical practices with adopters in your department? e.g. do you undertake one-on-one consultations, course/departmental 'show and tell' sessions, etc.? Do you invite them to watch you teach? 3.3 How do you encourage adopters to adopt technological innovations? 3.4 How do you think collaboration between you and adopters in your department has contributed to the department's adoption of technology-augmented pedagogical practices? 3.5 How do you think UEM could provide more technology support or faculty development with respect to educational technology use?

		3.6 What kind of support did the institution provide during the Covid-19 pandemic period, in terms of teaching and learning with technology? 3.7 Would you recommend that the institution sustains such support? Please elaborate. 3.8 Have you operated in isolation without a supportive community of practice?
RQ 4: **What barriers or challenges do you face when adopting technology-augmented pedagogical practices after the EdTech-UEM workshops?**	Innovators barriers	4.1 What challenges do you face in teaching with technology? 4.2 Please help me understand the kind of barriers to collaboration (if any) between you and adopters in your department. 4.2 Why do you keep going?

Appendix F – Adopters Interview Protocol

Research Questions	Key concept	Interview schedule 2: Adopters
RQ 1: **What are the motivating factors for innovators and early adopters in the Faculties of Education and Veterinary to adopt technology-augmented pedagogical practices?**	Adopters intrinsic and extrinsic motivating factors	1.1 What motivates you to implement technology-augmented practices? - Extrinsic (external) - Intrinsic (personal) 1.2 What motivates you to share/collaborate with early adopters? 1.3 How could you be motivated to use technology more for teaching and learning? *Prompt:* What would you like your department/EdTech Unit/EUM to do to keep you motivated?
RQ 2: **What are the pedagogical practices of the innovators and early adopters after the workshops?**	Adopters pedagogical practices	2.1 How did you use technology in teaching and learning before the Workshops and Covid-19?? 2.2 How do you teach in a typical class nowadays? 2.3 What types of activities/strategies do you have your students participate in using educational technology? 2.4 Which of these activities/strategies from the workshop/how did you implements what you learnt from the workshops
RQ 3: **How do early adopters support each other on technology-augmented pedagogical activities after the EdTech-UEM workshops?**	Adopters support each other	3.1 How are the Innovators supporting your adoption of technology-augmented pedagogical practices? 3.2 What kind of support did you seek from the Innovators - during workshop 1 and 2? - after workshop 1 and 2? - after workshop 3 and 4? 3.3 How are you supporting each other (as adopters)? 3.4 How do you think UEM could provide more technology support or faculty development with respect to educational technology use? 3.5 What kind of support did the institution provide during the Covid-19 pandemic period, in terms of teaching and learning with technology? 3.6 Would you recommend that the institution sustains such support? Please elaborate. 3.7 How would you say Innovators influenced your approach to teaching with technology? 3.8 Have you received any kind of invitation from Innovators/other adopters to exchange experiences in terms of educational technologies? If yes, please elaborate.

		3.9 Have you received any invitation from a colleague who uses blended learning to watch his/her lesson? If yes, please elaborate. 3.10 How do you think collaboration between you and Innovators in your department has contributed to the department's adoption of technology-augmented pedagogical practices? 3.11 Please help me understand the kind of barriers to collaboration (if any) between you and early adopters in your department.
RQ 4: **What barriers or challenges do you face when adopting technology-augmented pedagogical practices after the EdTech-UEM workshops?**	Adopters barriers	4.1 What kind of challenges do you experience when supporting each other (as adopters)?

Appendix G – Summary of early adopters' responses

	EA 1	EA 2	EA 3	EA 4	EA 5
Before the workshops	Face-to-face classes, using PowerPoint and email to deposit materials for students	Face-to-face (classroom classes) classes with PowerPoint and email for sharing materials and clarifying doubts	I used classical methods, I plan the lessons and I waited for the students to be in the room. Mostly direct contact and teaching was face-to-face. I used email as primary communication with students	Face-to-face (classroom) classes using class email to share materials	Face to face classes
After the workshops	Hybrid (face-to-face and online classes) the latter using Vula platform	Hybrid (face-to-face and online classes), the latter using moodle platform that has currently changed to Vula platform and using google classroom	Hybrid (face-to-face and online classes) the latter, using mostly the Vula platform and googlemeet. At first, due to the pandemic I used Zoom and it is very expensive for students and in the search for more affordable platforms in terms of costs I adopted moodle and it had the disadvantage of not having videoconferencing	Hybrid (face-to-face and online using Moodle and vula platforms, google meet and WhatsApp)	Hybrid (face-to-face and online) the latter, using the moodle platform (but with the students' difficulties in accessing it, we (me and my colleague teaching the same subject) started using WhatsApp and finished the year 2020 using this platform)
What motivates you to continue implementing educational technology practices?	The more I use it, the more I learn. I was afraid to access it before on moodle but not anymore	The will to learn was the greatest reason	I have found out that face-to-face teaching, although student-centered, is not as comprehensive as the current approach with technology and I am the protagonist of allowing the process to occur with the use of technology, this is an opportunity for lecturers to	Self-interest, learning and learning to instruct others	

			position themselves in this new way of doing things.		
Support from Innovators during the workshops	I sought support in using all the tools because it was my first contact	How to add an activity on moodle, how to plan my subjects by weeks or by topics? How to do the storyboard of my subject in lino	How to access the moodle platform, execution of activities during the workshop and homework	Subject setup, editing discussion forums and chats	Accessing moodle with the credentials, editing forums and chats
Support from Innovators after the workshops	I keep searching … and I already had a minimal notion of using digital platforms for teaching and learning with frequent use of the tools during this period of Covid-19 pandemic	I kept looking for support when I wanted to redo an activity that I couldn't remember how to do, I looked for help from colleagues who were in the training to help me do it	I kept looking for support from an innovative colleague because before the pandemic outbreak I was already designing lessons on moodle to respond to the EdTech training and put into practice the learnings from the workshops	I continued sharing experiences in using technologies with two colleagues who did not participate in the EdTech Workshops	I have not yet sought any kind of support, because I still have the knowledge I sought in the workshops. I have asked for support in setting up the analytical plan of my subject with topics and the relevant dates
Support among early adopters	We have supported each other, I try to find in them what I don't know, and I am satisfied with my difficulties in handling some tools	There has clearly been mutual support and it has been great, and I think this will continue whenever the platform presents a new feature	I have been interacting with early adopters like me, to support them because I seem like an innovator for this group even though I am an early adopter.	There has clearly been mutual support and it has been healthy	The support has been reciprocal. I teach what I still know and try to learn what I don't know

Appendix H – Summary of late majority responses

	Late majority 1	Late majority 2	Late majority 3	Late majority 4	Late majority 5	Late majority 6	Late majority 7
Before the workshops	Face to face classes, using PowerPoint, theoretical and practical classes with reports and seminars discussion	Face to face classes and from time to time I use email to share materials with students	Traditional model (face to face classes) exhibition and practical classes where we interacted more	Face to face classes using PowerPoint, internet research by the students	Classic model, totally face to face and student-centred without the use of educational technologies	Face to face classes	Face to face classes
After the workshops	Combined teaching with face-to-face and online weeks (Zoom and google classroom)	Combined teaching using google classroom and Zoom and Moodle	Hybrid model forced by the Covid-19 pandemic. I use Google Classroom to deposit materials and Zoom for classes but the latter is not very much accepted by the students because it is an expensive platform. I also use WhatsApp to clarify doubts for those who couldn't have classes on google classroom	Combined teaching due to the pandemic situation, using the google classroom, Zoom, WhatsApp and email	Hybrid model. Using educational technologies, video classes and support links for the students. Uploading materials for the students, adding the topics on moodle.	Hybrid model. Not with the use of moodle because I had problems with credentials and the students say that it is a heavy platform and because they do not master it. Using WhatsApp and Zoom	Combined/ hybrid teaching (theoretical classes with google classroom and practical classes done in face-to-face
What motivates you to continue implementing educational technology practices?				I enjoy learning new technologies and do new things that can help me in my daily life.			

				I enjoy technologies			
Support from Innovators during the workshops	I only attended one session and I learned all the tools and the language used was simple for all the lecturers to understand. I had support in setting up the subject, how to login.	Support in setting up subjects. I design my subject, test editing, forums and chats	Creating my subject on moodle, access to moodle in terms of credentials	Subject setup, how to login. Subject design, editing forums and chats	I had support from a colleague in creating my subject. Setting up the version I was using on my computer.	Homework support. Creation of the subject storyboard	No response
Support from Innovators after the workshops	It did not continue	It have not continued but during this pandemic period we have had some capacity building sessions on the use of Vula and the lecturers have been collaboratin g with each other to assimilate the handling of this tool	There was no further contact. There was an intention to exchange contacts to organize some testing in terms of using moodle, for a recycling of what we learned but it didn't happen	No continuatio n, since at the department level no one talked about exchanging experiences of what was learned. Also because they don't use moodle for online classes, but google classroom.	There was no continuity. No implementa tion, maybe due to different occupations of lecturers	There was no more continuity	After the workshops the teachers didn't continue with the use of technologie s because they didn't have any type of refresher training.
Support among early adopters	There is hardly any support among us because right after the workshops the lecturers no longer worked together as they did during the workshops.	Just sharing experiences about what we know	There is a group of more experienced lecturers to assist the less experienced , especially the elderly. Support on how to create or edit a lesson, upload a file	I go to a more experienced colleague to help me with the google classroom tools	There has been no support due to factors such as resistance from lecturers, especially the elderly.	There has been no support among us.	There hasn't been any support. After the workshops for example, I haven't heard of anyone who continued practicing what we learned on moodle, we also have been facing

			for students access, but all this on google classroom				internet signal problems.