

**SUPPORTING TEACHERS TO PLAN FOR TEACHING WITH TECHNOLOGY  
THROUGH AN ONLINE COMMUNITY OF INQUIRY**

by

Riaz Ismail

Submitted in partial fulfilment in accordance with the requirements for the

degree of

**MAGISTER EDUCATIONIS**

in the subject

**SCIENCE, MATHEMATICS AND TECHNOLOGY EDUCATION**

at the

**UNIVERSITY OF PRETORIA**

**SUPERVISOR: Dr Ronel Callaghan**

**OCTOBER 2018**

## DECLARATION

I, Riaz Ismail, declare that this dissertation '**Supporting teachers to plan for teaching with technology through an online community of inquiry**', submitted for evaluation towards the requirements for the degree Magister Educations, in the subject Science, Mathematics and Technology Education, is my own original work, and to my knowledge has not previously been submitted in any form for a degree or diploma before in any tertiary institution. All sources used or quoted in this document are indicated and acknowledged to the best of my ability by means of a comprehensive list of references.

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“The author, whose name appears on the title page of this dissertation, has obtained, for the research described in this work, the applicable research ethics approval. The author declares that he has observed the ethical standards required in terms of the University of Pretoria’s Code of ethics for researchers and the Policy guidelines for responsible research.”

## **DEDICATION**

I dedicate this thesis in loving memory of my mother, Shaída Banu Ebrahim Ismail, and my father, Suleman Essop Ismail; their memories continue to support me through challenges along the way.

## **ACKNOWLEDGEMENTS**

This research paper was made possible through the help of many people and I would like to express my deepest gratitude to the following, whose continued support will not be forgotten:

- The Lord Almighty for granting me this wonderful opportunity and blessing me with the most wonderful people.
- My family and friends for their love, inspiration and words of encouragement.
- My sincerest gratitude goes to my supervisor. Completion of this project would not have been possible without her patience, guidance, and mentoring.
- To one and all who directly, or indirectly, have lent their helping hand in me completing this research paper.

## **ABSTRACT**

Recent interest in integrating technology into teaching is growing daily. There remains, however, a demanding need to develop methods that support in-service teachers on the use of these technologies as teachers are facilitators of the learning process. Researchers have found that, through constant training, technology implementation increased when teachers developed the required skills and confidence levels in integrating technology into the classroom. The value of an online Community of Inquiry (Col) is at the core of the transfer of ideas and resources, where educators feel motivated and supported. The goal in forming the online Col was to create an opportunity for teachers to collaborate and share ideas on how to teach with technology in their specific subject fields, and to strengthen teachers' teaching methods. The online Col brought together (in one online community) in-service teachers who were in different schools and locations.

The study was conducted to observe how a community of educators planned to teach using technology by using a lesson study approach. The research was conducted using a qualitative research approach and was a single exploratory case study. The results of the study showed that the three presences found in the Community of Inquiry framework played a vital role in supporting the online Col. The community has shown to be dynamic, flexible and served as a pool of resources. The community grew into a space that guided the participants both emotionally and personally. The transfer of ideas and resources, and providing a space where educators feel motivated and guided are the core value of Col.

**Keywords:** Community of Inquiry, Online Community of Inquiry, Information and Communications Technology, lesson study, professional development, teachers, technology,

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# *Exclamation Translations*

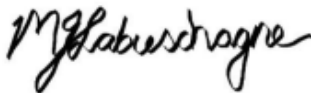
To whom it may concern

The dissertation entitled, "Supporting teachers to plan for teaching with technology through an online Community of Inquiry" has been edited and proofread as of 28 September 2018.

As a language practitioner, I have a Basic degree in Languages, an Honours degree in French and a Master's degree in Assessment and Quality Assurance. I have been translating, editing, proofreading and technically formatting documents for the past seven years. Furthermore, I am a member of the South African Translators' Institute (SATI) and the Professional Editors' Guild (PEG).

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## LIST OF ABBREVIATIONS

CD –	Compact Disc
CEPR –	The Centre for Educational Policy Research
CK –	Content Knowledge
CoI –	Community of Inquiry
CoP –	Community of Practice
CoPs –	Communities of Practice
CPTD –	Continuing Professional Teacher Development
DVD –	Digital Video Disc
ICT –	Information Communication Technology
IT –	Information Technology
LMS –	Learning Management System
MET –	Measure of Effective Teaching
NOS –	Nature of Science
OBE –	Outcomes Based Education
PCK –	Pedagogical Content Knowledge
PD –	Professional Development
PK –	Pedagogical Knowledge
TIMMS -	Third International Mathematics and Science Study
TPCK –	Technological Pedagogical Content Knowledge



# CHAPTER 1 INTRODUCTION AND BACKGROUND

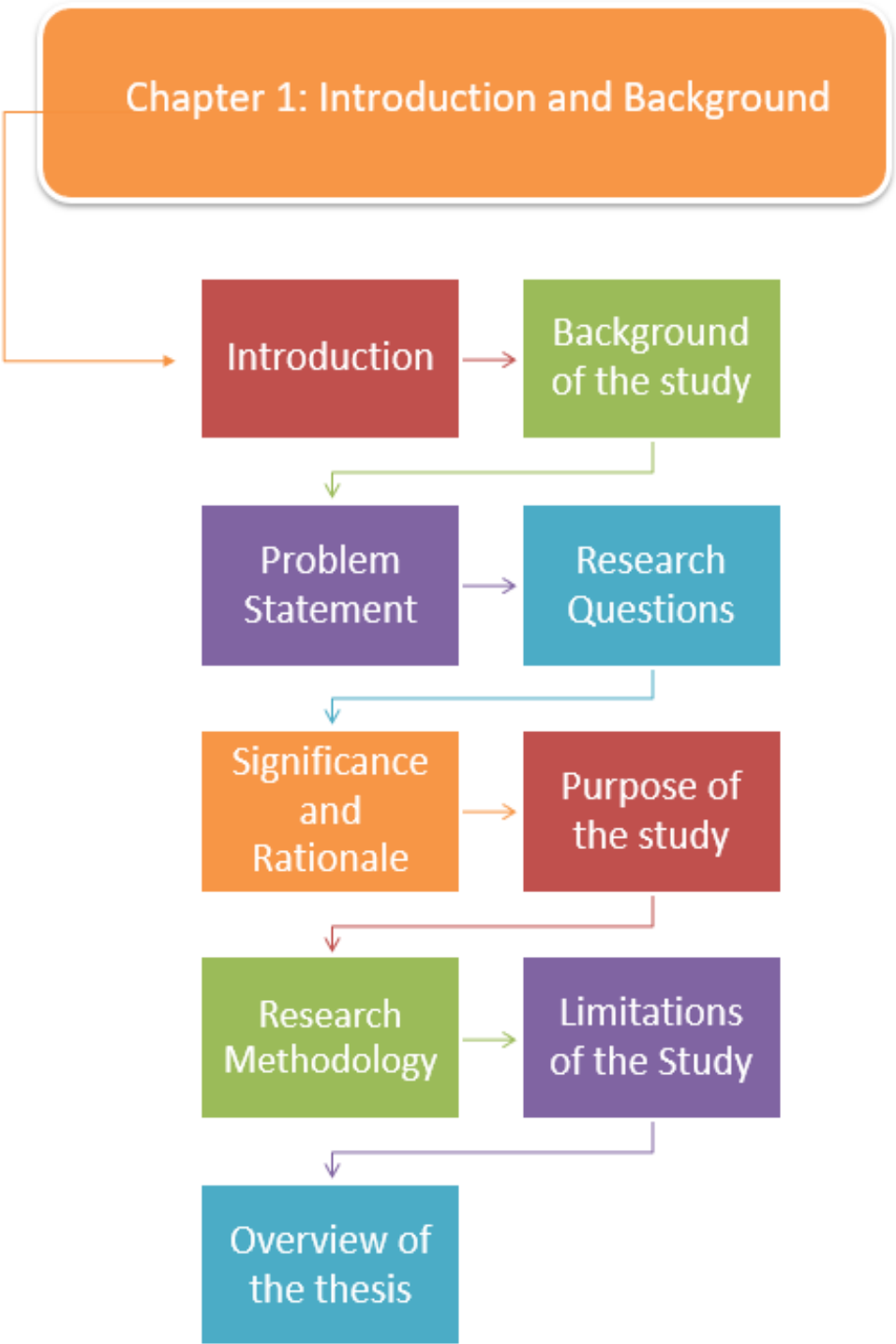


Figure 1.1: Map of Chapter 1

## **1.1 INTRODUCTION**

Interest in integrating technology into teaching is increasing daily. There remains, however, a pressing need to develop methods and resources to support and educate in-service teachers on the use of these technologies, as teachers are facilitators of the learning process. In order to gain the most out of technology integration, teachers must be fully prepared through professional development opportunities that consist of participation and interactive learning within the specific subject area being taught. Researchers found that technology implementation increased when teachers developed the required skills and confidence levels in integrating technology in the classroom by means of constant training (Newbill & Baum, 2013; Ritzhaupt, Dawson & Cavanaugh, 2012).

The transfer of ideas and resources, and providing a place where educators feel motivated and guided are the core values of an online Community of Inquiry (CoI). Research conducted by Duncan-Howell (2007) has revealed that online communities can aid teachers' professional development and enable collaboration amongst teachers. This study aimed to examine how teachers utilise their participation/interaction of an online Community of Inquiry (CoI) and if the online CoI can deliver meaningful professional development to its members. Furthermore, the aim was to develop a better understanding of how the CoI framework can help support teachers plan for teaching with technology.

## **1.2 BACKGROUND TO THE STUDY**

The study investigated a blended mobile learning course that was presented in 2017 to a group of educators from different schools in Southern Africa. The course was presented by an educational team in collaboration with an industry partner. The industry partner provided mobile devices and technical support to the participants. The study was conducted to observe how a community of educators planned to teach using technology by using a lesson study approach. The online CoI brought together (in one online community) in-service teachers who were in

different schools and locations. The research was conducted using a qualitative research approach and was a single exploratory case study. The study was conducted in two phases. (Which is further explained in 3.9).

### **1.3 PROBLEM STATEMENT**

As the demand for technology use increases, many teachers feel overwhelmed by the idea and process of integrating technology into their classrooms (Sprague, Kopfman & Dorsey, 1998). With technology as a key element of everyday life, educators are in charge of teaching students how to use these technological tools. Technology integration into education is no longer for special effect, but rather a key element in the advancement and development of lessons and teachers are feeling the pressure of utilizing it effectively in the class (Morrow, Barnhart & Rooyakkers, 2002).

The current acceptance of online communities makes it essential to study these types of communities and control what features are essential for them to function proficiently. It is similarly vital to study the impact of participation in these communities on teacher practice (Bond, 2004; Chen & Chen, 2002; Cornu, 2004; Matei, 2005).

Professional Development (PD) for teachers has commonly been accessible after school hours or during school holidays as a short course. However, the traditional methods of PD are failing teachers as it has been known for failing to produce positive results. This is due to the fact that it has been unsuccessful in providing teachers with support and satisfactory, timely and reliable content necessary for increasing teachers' knowledge and skills (Garet, Porter, Desimone, Birman & Yoon, 2001). According to Sabra and Trouche (2013), the emergence of new technology creates new needs. Therefore, it is imperative to support teachers to develop the necessary skills to meet the needs concerning the use of ICT in the classroom, a Col could serve as a platform to meet these challenges and needs.

Wenger (1998) states that communities can significantly support the learning of both teachers and learners. To explore this support, a Community of Inquiry was formed to support teachers in their use of ICT in the classroom. The premise underlying this study was the use and impact of participation in an online Col.

## **1.4 RESEARCH QUESTIONS**

The following research questions guided the study and were developed based on the Col Framework, developed by Garrison, Anderson and Archer (2000). See Section 2.9 for more detail on the Col Framework.

### **Main Research Question**

- How can an online Community of Inquiry support teachers to plan for teaching with technology using a lesson study instructional approach?

### **Secondary Research Questions**

The secondary research questions were developed on the separate presences found in Col framework.

- 1) How did the social presence in the Col framework support teachers to plan for teaching with technology?
- 2) How did the cognitive presence in the Col framework support teachers to plan for teaching with technology?
- 3) How did the teaching presence in the Col framework support teachers to plan for teaching with technology?

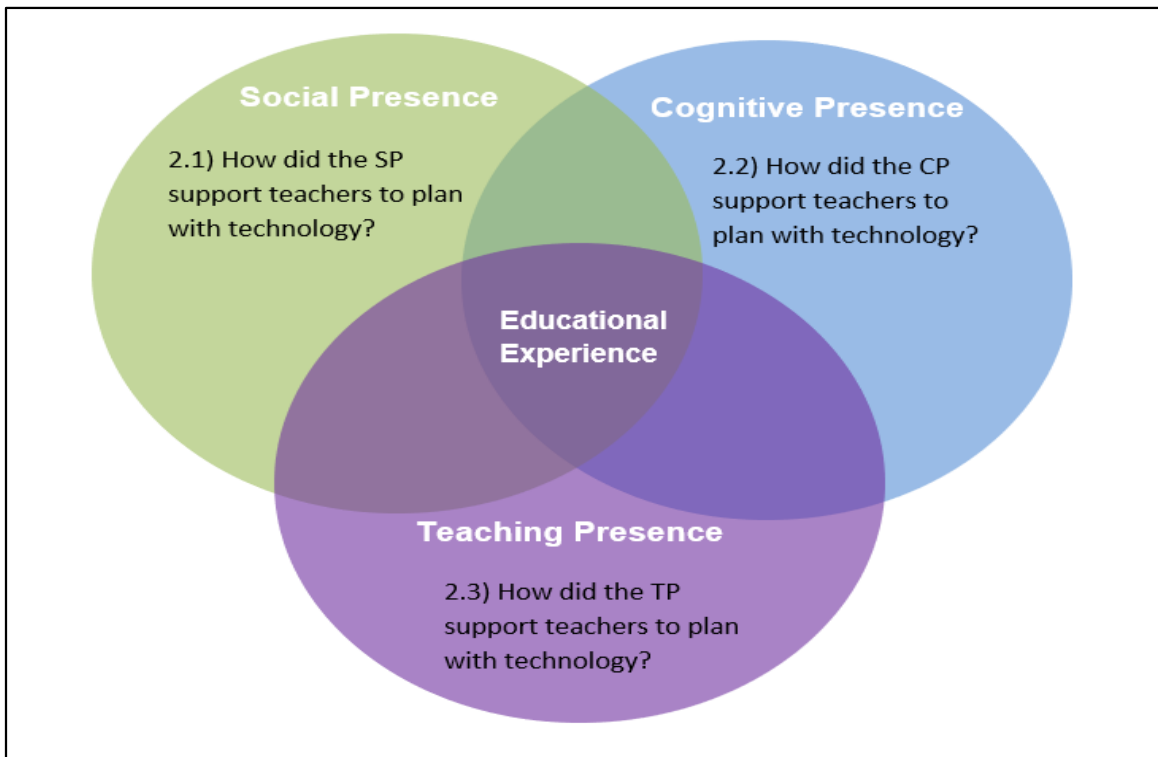


Figure 1.2: Research questions integrated into Community of Inquiry Framework (Garrison et al., 2000)

## 1.5 SIGNIFICANCE AND INNOVATION OF THE STUDY

The significance of this study is based on addressing a vital issue being faced in present-day education, which is the changes in schooling using Information and Communication Technology (ICT) and the necessity to discover meaningful uses of this technology. The innovation of this study is based on the focus of a Col between teachers in different locations working using a Lesson Study approach. The participants of this study (see Section 3.8 for more information) were all voluntary members of the Col and were in various locations across South Africa. Due to the members being in different locations, it was beneficial and suitable to utilise technological tools such as an electronic survey and discussion forums. This study made technology both the context and content of its investigation.

## **1.6 PURPOSE OF THE STUDY**

The purpose of the study was to create an understanding of how a CoI could enhance online learning incorporating the three presences developed by Garrison, Anderson and Archer (2000), namely, social, cognitive and teaching aspects using a lesson study approach. The social aspect focusses on the interaction of the members (in this case it is the online community managed through the learning management system). The cognitive aspect focusses on the content (in this case it is supporting teachers to plan for teaching with technology.) The teaching aspect focusses on how the content will be delivered (in this case it will be taught using a lesson study approach).

## **1.7 RESEARCH METHODOLOGY**

The following summarizes the research methodology for this study and are presented in greater detail in chapter 3.

- Research design – Onion model
- Research philosophy – Interpretivism
- Research approach – Qualitative and Inductive
- Research strategy – Case study
- Data collection – Surveys (Pre and Post course survey) and Community transcripts

## **1.8 LIMITATIONS OF THE STUDY**

This study has the following limitations that can likely be remedied in future research:

1. The results and the implications of this study come from a single case (one community). Thus, the results may not be generalisable.
2. Responses are limited by the participants' willingness to honestly self-report and their ability to reliably recall.

3. Participants – some participants were administrative officials and they could not teach in the classroom; therefore, their participation was minimal.

## **1.9 OVERVIEW OF THE THESIS**

This thesis is comprised of five following chapters. Each chapter begins with an introduction and ends with a conclusion. Chapter 1 includes the background information, problem statement, research questions, purpose, and significance. Chapter 2 presents a literature review. The chapter will first present information on mobile learning that has influenced this research. Next, the theoretical basis for this research, and its relation to mobile learning will be discussed. Chapter 3 will discuss the research methodology used for this study. It will include the research questions, participants, procedures, instrumentation, and statistical analysis along with the conceptual framework. Qualitative findings from the survey are provided in chapter 4. Chapter 5 provides a summary of the study and a discussion of the findings and gives recommendations for future research. These chapters are followed by the reference list and appendices.



Figure 1.3: General overview map



# CHAPTER 2 LITERATURE STUDY

## 2.1 INTRODUCTION

This chapter comprises the literature study that formed the theoretical basis of this study. This chapter begins with the integration of technology into education and then focuses on Lesson Studies and a Community of Inquiry.

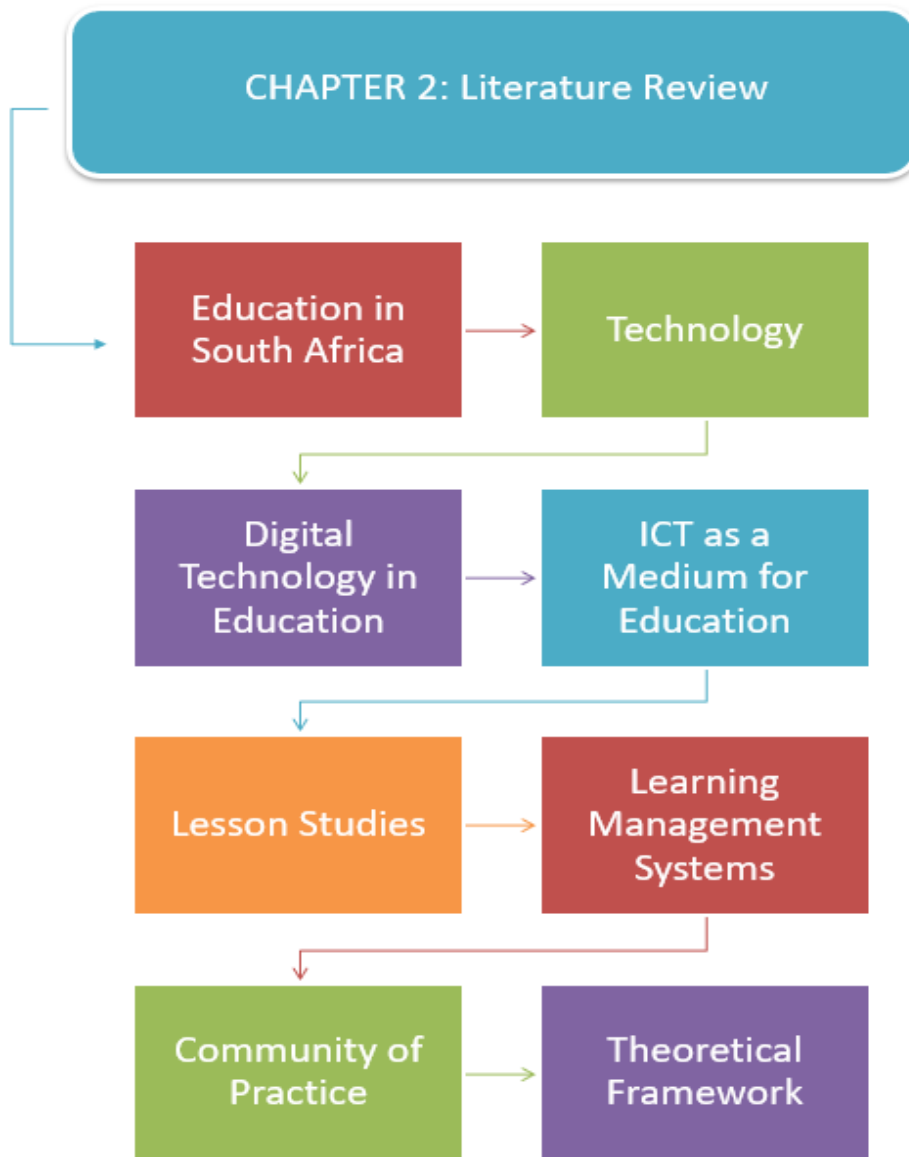


Figure 2.1: Map of Chapter 2

## **2.2 EDUCATION IN SOUTH AFRICA**

The period of 1994 - 2011 welcomed a necessarily stage of development for all South Africans, and most importantly, for the educational system in South Africa. The political rationale in 1994 was to eradicate all the ties with apartheid and to present new and updated policies in all the numerous domains in the country. However, the inexcusable truth is that while South Africa is the richest region on the continent, the education achievement is amongst the poorest (Mouton, Louw & Strydom, 2012).

De Clercq (2002), Kistan (2002) and Scott (2004) agree that secondary and tertiary education in South Africa is heavily burdened with the task of addressing the change and skills needed in the new South Africa, and eradicating any disadvantages that were caused by the apartheid era in the education sector. At the same time, the education system is under enormous strain to better its policy and delivery presentation so that it caters to both privileged and underprivileged learners to ensure efficient teaching and effective learning within the classroom. Improving the effectiveness in the delivery of education to ensure a balanced education system raises numerous challenges for higher education institutions.

Researchers such as Czerniewicz, Ravjee and Mlitwa (2005) and Spreen and Vally (2010) mention that the contemporary emphasis on teaching and learning, tied with the development of educational technological advancements in South African higher education establishments involves investigating how educational technological tools eradicate the educational barriers in the new South Africa. Many schools in South Africa have no libraries, nor do they have books in their classrooms. Those that do have books lack books that are suitable for the bilingual challenge in schools, and have no access to books or educational resources that make reading and writing fun.

Flecknoe (2002), Garrison (2003), McCormick and Scrimshaw (2001), and Wagner (2001) all outline the importance of how mobile tools, such as tablets can be used to reduce such problems. Tablets can be used in education as they provide one

solution to a variety of problems. Technology can play several roles in education. The different roles will be based on the different tools that can be used such as camera, video camera, sound recorder, communication options, storage as well as other tasks that apps can provide. These include providing an opportunity to rethink current and out of date teaching methodologies, improve educational objectives, and refine the value of learning and teaching in the classroom.

## **2.3 TECHNOLOGY**

Newbill and Baum (2013) and Ritzhaupt, Dawson and Cavanaugh (2012) discuss quite extensively how technology forms a complex part of today's society, which is quickly developing and progressing on various levels. Even with global improvements in the duration and convenience of technology, schools seldom uphold the same energy in accessibility to equipment and educators' professional development. Regardless of these downsides, educators as a group carry the duty of enabling the preparation of students for their future, which includes 21<sup>st</sup> century technology skills (Hohlfeld, Ritzhaupt, Barron & Kemker, 2008; Jones, Fox & Douglas, 2011; Larson & Miller, 2012; Voogt & Roblin, 2012).

According to research conducted by Dziuban, Hartman, Juge, Moskal and Sorg (2006) and Lawless (2014), technology is evolving every day and the impact that it has on education increases daily. The strategies and expectations are shifting in the classroom due to the technological enhancements that have taken place. This technological expansion has progressively prepared the way for new instructional opportunities to find better educationally cost-effectiveness like that which has been reached by numerous business organisations.

Researcher Lawless (2014) explains that the internet is a regular element of students' lifestyle and for most of them it is used for watching movies and TV programmes, downloading music, uploading and viewing pictures and videos, reading books, playing games and connecting with friends. It is without surprise that these digital inhabitants do not contemplate online learning as a perilous struggle. Lee and Spires (2009) also agree that the internet has been revolutionised in the

past era and is currently an important vehicle for the advancements of students. It aids most students with research, learning, and socialisation, amongst other endeavours.

Mandell, Sorge and Russell (2002) and Wiburg (1997) emphasise that technology is not a solution; it is a commonly accepted tool utilised by educators to advance and develop the delivery of teaching and learning. An important component of education is the groundwork of ensuring that learners are prepared for the future. Consequently, educators must prepare students to utilise technology successfully. This means that teaching with technology will require a change from the more traditional teaching methods. To ensure the transformation of teaching and learning, the role of the teacher will also require a change, thus leading to a change in existing teaching styles.

According to Inan and Lowther (2010) and ISTE (2002), technology integration refers to technology used for instructional purpose or instructional delivery. Becker (1998) states that technology integration includes technology for both instructional and non-instructional delivery; as long as the teacher uses some form of technology, he or she is engaging with technology for educational purposes. Thompson (2013) agrees that without this frequent emphasis on technology as a means of attaining the required learning objectives, technology purely becomes an unimportant, detached object.

Cauley, Aiken and Whitney (2009), and Guzey and Roehrig (2009) explain that technology integration is not just using a tool to complete an activity; and it is more than perusing a website to use for investigation or presenting a clip in class. This explanation is similar to that of Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur and Sendurur (2012), Hsu (2010), Ottenbreit-Leftwich, Glazewski, Newby and Ertmer (2010), and Ritzhaupt et al. (2012) where it is mentioned that technology integration is the display of a technological tool to enable and aid learning through various mediums, offer opportunities for student-focused learning, participation between peers, and allow for diversity and different learning styles.

Increasingly, researchers such as Baylor and Ritchie (2002), Eteokleous (2008), Hennessy, Ruthven and Brindley (2005), Hew and Brush (2007) and Inan and Lowther (2010) have somewhat agreed that the inability of teachers to effectively integrate technology into their classroom has led to the lack of proof of the role of technology in positive student objectives. Researchers (Chen, 2008; Levin & Wadmany, 2008) also agree that teachers must be at the centre of facilitating and guiding the way for innovation in the classroom.

The combination of online learning and face-to-face methods is called blended learning (Graham, 2006; Reay, 2001; Rooney, 2003). The blended learning approach has been implemented extensively in schools. One of the key reasons that this approach is favoured is since online learning has not completely replaced traditional face-to-face classroom teaching, but it has been used as an integration and a support platform to overcome a few of the limitations of traditional teaching.

## **2.4 DIGITAL TECHNOLOGY IN EDUCATION**

The prominence of digital technology promotes the usage of digital and communication tools for learning in education. To gain from this kind of digital learning, learners will be required to develop critical and analytical thinking skills to choose and process valuable and trustworthy information (Means, Padilla & Gallagher, 2010; Trilling & Fadel, 2009). Learners will also be required to be able to communicate and collaborate with fellow learners to complete activities (Saavedra & Opfer, 2012; Szewkis, Abalos & Tagle, 2011). These four skills are essential components of 21<sup>st</sup> century skills, which equip learners with the right tools to successfully obtain knowledge in the 21<sup>st</sup> century (Hoffman, 2010; Rotherham & Willingham, 2009).

Claro et al. (2012) and Wan and Gut (2011) explain that the content of the subject knowledge and the required 21<sup>st</sup> century skills are elements that should be combined with learning goals to ensure the development of 21<sup>st</sup> century skills in learners. Learners' attainment of 21<sup>st</sup> century skills should be guided, checked on and assessed in the classroom, just like subject knowledge.

Hoppe, Ogata and Soller (2007) emphasise that the evaluation of 21<sup>st</sup> century skills and the evaluation of subject knowledge should be linked to enable teachers to understand their interrelationship amid learners' growth in these two types of learning. The evaluation should test the positive and negative components of this learning cycle by focusing on the validation and openness of the growth.

The digital equipment utilised in digital classrooms provides an opportunity to enhance and develop the current learning process. Teachers can track and store a wide range of information on learners' interaction and development, and provide unlimited resources to better equip themselves with subject-related matter. Such technological advancements can assist a teacher to better organise, record, and comment on learners' developments/assessments (Alvarez, Salavati, Nussbaum & Milrad, 2013).

## **2.5 ICT AS A MEDIUM FOR EDUCATION**

The White Paper on e-Education (Africa, 2004) describes ICT as a representation of information technology and communication technology. Galloway (2007) discusses the fact that ICT is unique to the educational field. Osborne & Hennessey (2003) refer to this as Information Technology (IT), which covers a wide array of tools such as handheld devices, television and radio connections, computers, and the internet, amongst others. The tools for educational purposes cover multimedia, presentations, data capturing tools, recording and projection technology, amongst others.

Osborne and Hennessey (2003) explain that the communication element of IT mainly emphasises the communication of learners and teachers by using e-mails. In addition, the concept of ICT is used as soon as Information Technology apparatus is utilised to achieve a learning activity. Consequently, ICT is not simply valuable for learners in terms of continuous support, but it also increases reasoning capabilities by allowing learners to imagine ideas and concepts in a specific subject.

### **2.5.1 Pedagogical use of ICT**

Ertmer, Addison, Lane, Ross and Woods (1999) find that most people are swayed by the development of new technologies. This is specifically true for ICT in schools, whether it is used for learning, teaching or administrative functions. Several responsibilities in the past have been achieved without the use of ICT, and the question now is: what is the worth of ICT in relation to education? The answer is simple, ICT can enhance and simplify the syllabus.

However, Mishra and Koehler (2006) agree that simply presenting ICT in education is not enough. Teachers must be capable and educated in order to suitably integrate ICT into their education practices. Shulman (2004) explains three elements of knowledge that enable efficient teaching: content knowledge, pedagogical knowledge, and pedagogical content knowledge. Content Knowledge (CK) is the value and formation of knowledge in the thought phase. English teachers, for example, are required to possess the relevant knowledge to teach the subject efficiently and effectively (Ball, Thames & Phelps, 2008; Mishra & Koehler, 2006).

Pedagogical Knowledge (PK) is the skill possessed by teachers in choosing the most effective and efficient teaching styles to teach the content. Ball et al. (2008) explain that when teaching mathematics, a teacher begins by showing, therefore visual aids must be used to enhance the learning process and to allow the learners to move from the abstract phase to a concrete one. Pedagogical Content Knowledge (PCK) occurs with the integration of Subject and Pedagogical Knowledge or specialised Content Knowledge (Shulman, 2004). PCK is apparent when teachers are able to construct new knowledge based on learners' prior knowledge and adapt their teaching styles to allow for the best way to carry the new knowledge through to the learners (Mishra & Koehler, 2006).

With the integration of ICT into education, researchers (Mishra & Koehler, 2006) and (Ball et al., 2008) agree with Shulman's (2004) philosophy by expanding on it to create the framework of the Technological Pedagogical Content Knowledge

(TPCK), which defines the actual integration of ICT into education. In order for technology to bring worth to education, it should not be viewed as context-free and it should be essential for it to be connected to pedagogy and content. Figure 2.2 embodies the TPACK framework and demonstrates the effect of the integration and interrelationship of content, pedagogy and technology.

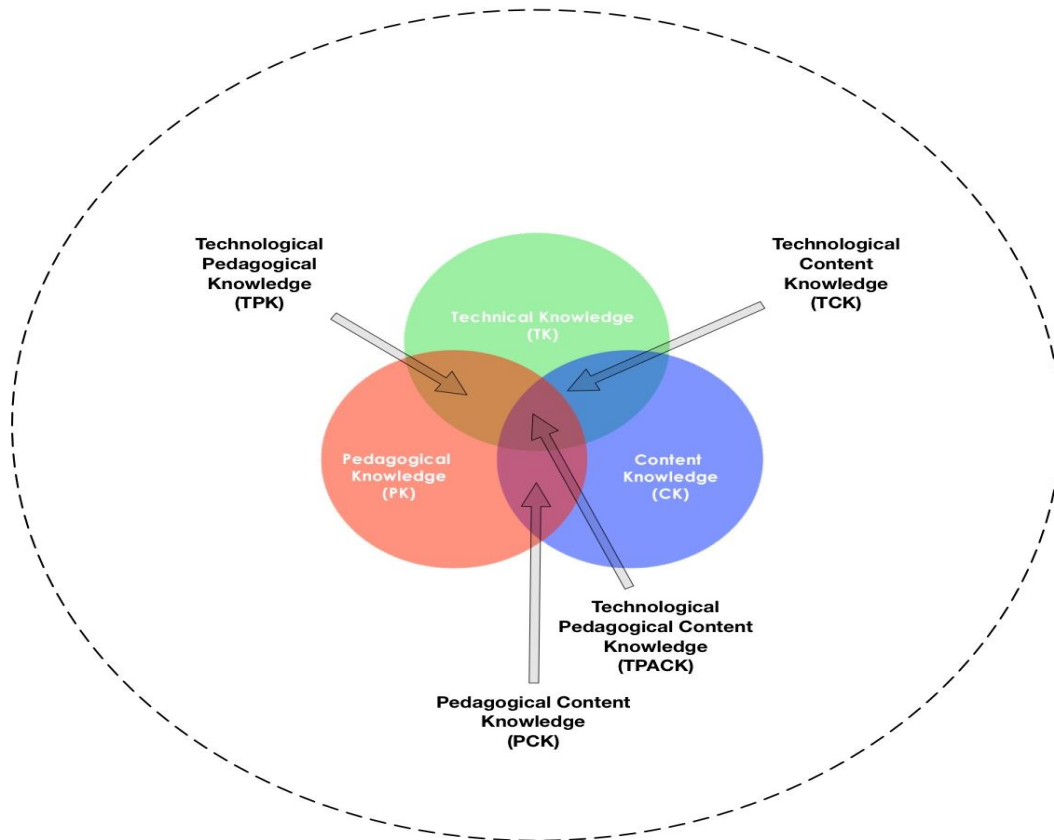


Figure 2.2 TPACK framework (Koehler & Mishra, 2009).

According to Bandyopadhyay (2013), the use of technological tools in education is different from instructional and non-instructional use, whereby the learner is the focal point of the learning cycle as opposed to the teacher. Once learners begin utilising ICTs to expand their comprehension of coursework, cultivating their problem-solving skills, and higher-order thinking, technology becomes beneficial as a learning tool. The table that follows, includes the type of activities used to enhance the learning process with the integration of technology.



Table 2.1: Different uses of technology (Bandyopadhyay, 2013).

Type of Technology Integration	Activities involved
Instructional use of technology	This encompasses activities such as: <ul style="list-style-type: none"> <li>• Lesson Planning;</li> <li>• Lecture presentation;</li> <li>• Research for lesson planning; and</li> <li>• Peer-to-peer collaborations within and outside of the school.</li> </ul>
Non-instructional use of technology	Using technology for: <ul style="list-style-type: none"> <li>• Record-keeping, such as grades and attendance;</li> <li>• Carrying out administrative duties; and</li> <li>• Communicating with parents.</li> </ul>
Technology as a learning tool	When learners start using ICTs to: <ul style="list-style-type: none"> <li>• Collaborate with peers;</li> <li>• Participate in group work for classroom assignments; and</li> <li>• Use technology to improve their critical and higher-order thinking and problem-solving abilities.</li> </ul>

### 2.5.2 The benefits of ICT in teaching and learning

Barnhart and Barnhart (1990) explain that an advantage of ICT in teaching and learning is the notion that it contributes to an individual's welfare and has a positive outcome. They furthermore explain that the integration of technology into education can be seen as an advantage because it contributes to the development of teachers and learners and, if utilised correctly, can yield fruitful results.

In a study conducted by Kolderie and McDoanald (2009) it was found that the education system benefits from developing knowledgeable and capable learners, as well as teachers who can participate and compete in an international culture. The study found that schools that incorporated technology into their classrooms yielded better results as compared to schools that did not integrate technology into their curriculum. Technology allowed the learners to interact with various types of

content and created a more interactive and self-motivated learning environment. In another study conducted by Balanskat, Blamire and Kefalla (2006) it was found that learners' results had improved in several subjects when ICT had been used. The level of enthusiasm and interest in their studies also increased and they were able to work on their own.

The first stage of implementing the required structure for technology integration is expensive, however, it will save the organisation in cost in the long-term. Technology integration allows teachers and learners to have access to a pool of resources. Moreover, time and money are saved on making copies, ordering books and posters. Teachers can create a dynamic, interactive and well-resourced lesson that will allow for an effective learning environment.

The integration of technology into the classroom is not to replace the teacher. However, it is used as a medium to strengthen the relationship between the teacher and learners (Bramald, Miller & Higgins, 2000). Learners' results can be posted online as soon as tasks are completed, and parents can have access to this easily and thus will not have to wait for the school term to end to find out the progress of their child (Underwood, Baguley, Banyard & Wright, 2008). Newsletters and memos can be forwarded to parents timeously and this will cut down on printing and paper costs (Becta, 2006). Becta (2010) explains that the integration of technology not only focuses on the learning process but encompasses a variety of teaching and learning tasks.

According to Ward (2003), teachers share different views on the benefits of incorporating technology into the classroom. However, Kolderie and McDoanald (2009) explain that by incorporating technology in the classroom, teachers are able to enhance the learning process. They further explain that with the integration of technology, the planning of lessons and the actual teaching becomes easier. To understand the importance and value of technology in education, one must be able to effectively and efficiently utilise the tool to its full capacity.

Balanskat et al. (2006) are in agreement with Kolderie and McDoanald (2009) and mention that the successful integration of technology into education has the ability to change the views of educators. If more educators were to experience the value of ICT then more of them would be willing to try and change their outdated teaching styles. The benefits of integrating technology into the classroom not only applies to teachers but to the learners as well. Learners are given the ability to be actively involved in their own learning and this allows for their different needs to be met at once, thus catering to the different learning levels of the learners. The learner becomes the focus of the learning process and the teacher becomes the facilitator who guides and supports the learners. Remedial tasks can also be implemented as soon as learners complete their class tasks. An added advantage is that learners can complete their work at a pace that is comfortable for them.

By using technology in education, learners have a pool of resources at their fingertips and are not restricted to just one textbook in the class. As learners explore and interact with different forms of content, they are dynamically participating in their own learning. This also allows for teachers to be more engaged in the classroom as the poorer performing learners can focus on remedial tasks while the better performing learners can focus on enrichments tasks (Kolderie & McDoanald, 2009). Learners will be able to learn content in a fun and exciting way and can also use games as a method of learning. Experts have agreed that learning does occur through the usage of interactive games (Cooper, Schlachter & Watson, 1996).

Galloway (2007) explains that incorporating technological tools such as smart boards, collaborative programs, and interactive presentations can help support and guide the learning process for subjects like science, technology and mathematics. He explains that by exposing learners to a wide variety of content such as games, tutorials can make learning more interactive and fun, especially for subjects that learners find difficult or show little interest in. Learners become more focused as they move at their own pace and technology allows them to be in control of their own learning.

Ozgun-Koca (2000) explains that the use of spreadsheets can assist learners in mathematics when creating graphs and working out the mean, mode or even percentages. Lower grades can also use spreadsheets to create formulae or even just to check answers to basic addition, subtraction, division or multiplication sums. Using tools such as spreadsheets in the classroom allows the learners to have more concrete examples. Goldsmith and Wharton (1993) agrees with Ozgun-Koca (2000) and explains that when teachers find different ways to teach, they cater to the different needs of the learners.

Lewis (2001) and Ozgun-Koca (2000) note that technology is not biased or able to 'judge' the learners, hence creating a safe, judgement-free environment in which to learn. Learners also have self-esteem issues and may find using technology easier to learn since they can learn at their own pace and not be pressured or embarrassed to face their classmates after getting an answer wrong. Technology incorporation allows learners to learn using different methods and allows for a variety of enrichment opportunities.

Gillespie (2006) highlights that the usage of technology allows teachers and learners to save time in the classroom by using technology to support their learning, which then allows the teacher to focus on more important/problematic activities. The various technological tools allow for an interactive and collaborative learning environment and can be adjusted automatically to the need of the learner. Teachers can extract reports from the online activities and can quickly find out where the learner needs support.

According to Gillespie (2006), the use of technology in the classroom allows for a supported and enhanced learning environment that assists weaker learners and better performing learners at the same time without compromising the pace of any learner (Lim, 2006).

### **2.5.3 Teacher strategies**

Bramald et al. (2000) explains that if teachers are not willing to integrate teaching into their classroom it is because they are not fully aware of the positive effects that it has on teaching and learning. The reason for this stem from the lack of confidence that teachers have in using technology in the classroom. He furthermore states that to overcome this challenge and make teachers more comfortable using technology in the classroom, teachers need effective Continuing Professional Teacher Development (CPTD) opportunities.

Reynolds, Treharne and Tripp (2003) and Ward (2003) found that teachers who possessed good technological skills incorporated technology much more than teachers who were not technologically inclined. They also found that the use of technology in education does have an effect on student learning. Bramald et al. (2000) highlights that teachers' confidence levels do play an important role in achieving the required learning objectives.

Researchers (Jamieson-Proctor, Finger & Grimbeek, 2013) also mention that teachers having little confidence in using technology in the classroom is a worldwide problem and this is the key reason why educators fear using technology. He explains that teachers are not willing to use something that they do not fully understand.

Attitudes, beliefs and communication also play a vital role in the integration of technology into the classroom (Granger, Morbey, Lotherington, Owston & Widerman, 2002). Aspects like teachers' resistance, inflexibility and unwillingness to change their view can thwart the attempts to integrate technology for purposes of teaching and learning, particularly when teachers have not yet understood the full potential and capabilities that technology has for the teaching and learning process.

In comparison to the flexibility and willingness that is needed from teachers when incorporating technology into their teaching, the school/department need to

understand the role that teachers are required to fulfil in order to create the best possible environment for technology integration to occur. Resources need to be available for teachers to create such an environment. Teachers play a vital role in the integration of technology into the classroom as they act as facilitators of the learning process. Teachers need to select the best possible resource that will enable their learners to meet the required learning outcomes (Osborne & Hennessey, 2003).

As evident in various studies, the notion of technology integration is highlighted as a complex process. Bandyopadhyay (2013) mentions that the degree to which technology is integrated successfully is dependent on several factors. Aspects such as curricular, school setting and resources, and the attitude and willingness of the teacher all play a vital role in determining the success of technology integration within the class. Each aspect on its own is vital in changing the outcome of technology integration, however, providing a solution to one aspect might help to remedy more than just that particular aspect.

As shown in Figure 2.3, the several aspects described in the model affect technology integration in general. To ensure the successful integration of technology into the lesson, all components need to be considered when planning to teach with technology.

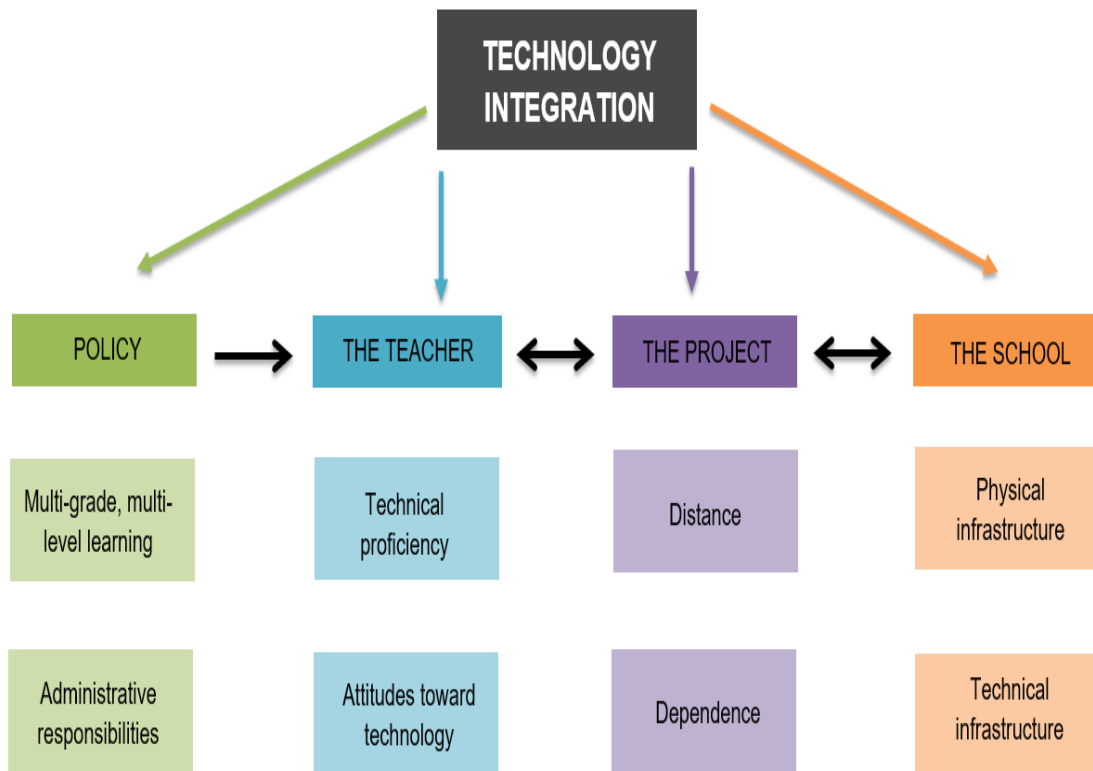


Figure 2.3 Sub-domains of factors affecting technology integration (Bandyopadhyay, 2013)

## 2.6 LESSON STUDIES

Lesson study is an instructional collective approach. One element that makes lessons study unlike other approaches is the reflective process. A cluster of teachers observe a class that is being taught by a teacher, make notes during the lesson, and then analyse the lesson once it is done in terms of what worked and did not work (Lewis, 2002a, 2002b; Lewis & Tsuchida, 1997; Yoshida & Wang-Iverson, 2005).

Several aspects of professional development curricula include a lesson study approach. These aspects include: student-orientated learning, collaboration, and research driven (Murata, 2001). In a lesson study approach, teachers meet with a shared objective/purpose concerning their students' learning, they collectively prepare a lesson to make student learning more efficient and effective, and evaluate

and deliberate on what they witnessed during the lesson (Murata, 2001). Teachers have numerous occasions to converse about student learning and how their application (teaching) affects it.

Lesson study can occur in a single school or can occur in various schools in a specific school area. The lesson study group meetings change based on the needs of the members and the time available. These meetings can occur once a month or several times a year depending on the urgency, resources and time (Lewis, 2002a; Murata, 2001).

### 2.6.1 Lesson study cycle

Lewis and Tsuchida (1997) and Yoshida (1999) are in agreement that the lesson study cycle has five major elements. These elements are clarified below:

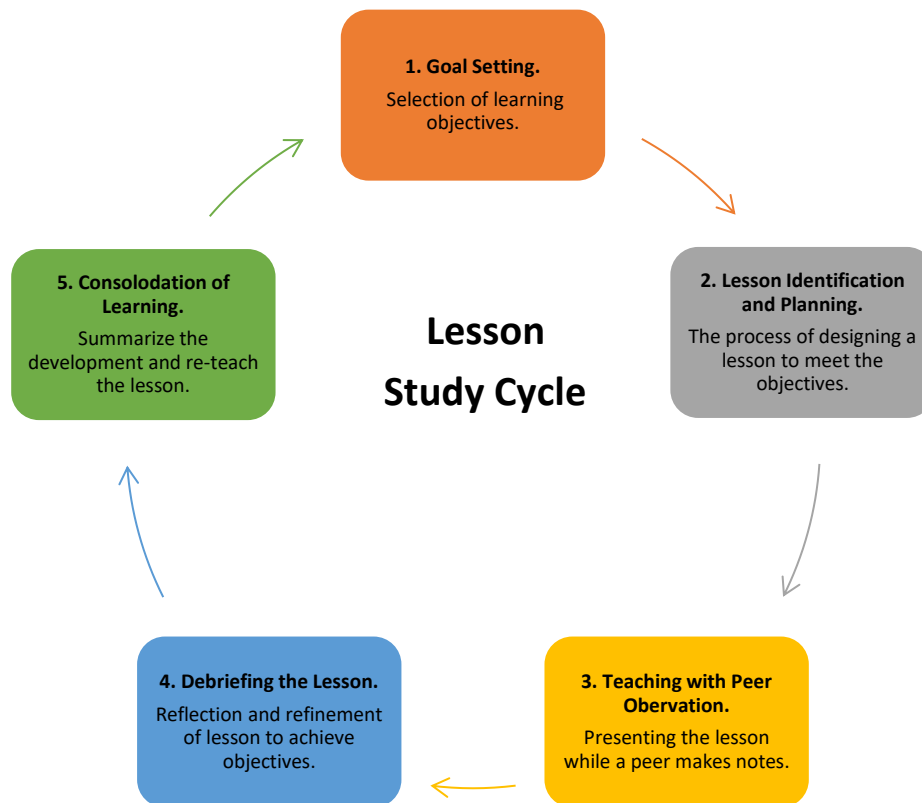


Figure 2.4: Lesson study cycle adapted from Lewis (2002a).



### **2.6.1.1 Goal Setting**

The learning objectives are the backbone of the lesson planning process. These guides and allows the lesson to stay on track and ensures that the focus of the lesson is not lost. A study begins with the identification and selecting of objectives. The objectives will help determine the purpose of the study. Teachers that work together in a group recognise the goals together based on what they have identified as the biggest obstacle/gap in the learning process. The lesson study approach takes these objectives and applies them to the content of the specific grade/subject (Lewis, 2002a).

### **2.6.1.2 Lesson identification and planning**

Members of the lesson study then identify the topic that needs to be taught and to which grade it needs to be taught. The topic that is selected serves as an opportunity to meet the required goals as set out in the first step of the lesson study process (Lewis, 2002b; Research-for-Better-Schools, 2002).

The members of the group then schedule a time that is convenient for each member to frequently meet and discuss ways to plan and teach the topic chosen. During the lesson planning process, teachers suggest resources that will enhance the lesson, this can be various textbooks, charts, online resources, PowerPoint presentations and so forth. The members of the group can seek advice from peers outside of the lesson study group to gather more information about the learning and teaching process (Research-for-Better-Schools, 2002).

### **2.6.1.3 Teaching the lesson with peer observation**

Once all of teachers have agreed on the best method to teach the lesson, one of the teachers involved in the planning of the lesson then teaches it to a class. The lesson can be taught by any teacher who was involved in the planning process of that lesson. Lesson study is beneficial as other teachers sit in on the class and record the lesson or make notes on what did or did not work and the teacher is observed by other teachers. This may make the teacher a little nervous as fellow

teachers are watching them, but because the lesson was created collectively it lessens the anxiety. The focal point, however, is not the teacher, but the learning process (Lewis, 2002a). In Japan, it is a common practice for educators from other schools to observe the lesson.

#### **2.6.1.4 Debriefing the lesson**

After the delivery of the lesson, all members of the lesson study group sit-down to analyse the lesson. The teacher who presented the lesson talks about what did or did not work well in the lesson. The teacher provides some insight for the other members of the group. The learning outcomes of the lesson are clarified by the other members of the group. The discussion is based on the evidence assembled during the lesson by watching the videotape together. This helps to identify the level of students' participation, whether the learners were engaged during the lesson and what they did and whether the learning goals were met or not. The deliberations are often not formal since the lessons induce different views on the best learning styles and lesson development process to meet the learning goals that were set at the start of the cycle (Lewis, 2002a).

#### **2.6.1.5 Consolidation of learning**

The lesson study members consolidate the data gathered throughout the lesson study process. The members acknowledge the findings acquired during the learning process and then analyse the challenges faced by learners during the learning process; the teachers then reevaluate the learning goals. The teachers then refine the lesson to cater to the challenges that learners encountered during the lesson and continue to refine the lesson until the lesson outcomes have been met. The refined lesson is then retaught by a new educator after the lesson has been refined (Lewis, 2002b). This study focusses on a version of the lesson study that stops just before the reteaching part.

### **2.6.2 Lesson study in teacher training**

McDowell (2010) conducted a study with 16 pre-service teachers related to the lesson study approach. The aim of his study was to identify the use of the pre-service teachers' incorporation of lesson study into their teaching. He explained in his study that students studying to become a teacher took courses that concentrated on theory and teaching styles focusing on science education. The course included a three-month teaching experience that allowed the students to practice some of the pedagogical aspects they had learnt during the course time. After collecting and analysing the data, he found that the lesson study approach helped to transfer their ideas into practice.

Japanese teachers who used the lesson study approach explained that it enables a teacher to integrate worldwide educational goals into the classroom. They also explain that one of the most vital elements of the lesson study approach is based on observation (either peer-led observation or video recording), as it allows teachers to analyse a lesson and quickly identify what did or did not work (Lewis, 2002a). The main objective of the lesson study approach is for teachers to collaborate and find common goals and strategies to solve the common challenges in the classroom. It also allows teachers to share teaching methods, which serves as a platform for teacher development (Takahashi, 2005).

### **2.6.3 Videotaping in a lesson study approach**

The concept of meaningful learning and teaching is at the heart of educational research. At Harvard, the Centre for Educational Policy Research (CEPR) drove the Measures of Effective Teaching (MET) project. The participants consisted of 3000 educators from various districts. The main objective of the project was to identify ways to inform educators on best practice methods that develop teachers professionally and to create more ways to ensure more efficient and effective teaching and learning processes. The participants recorded themselves and had peer-review reflections to aid their growth (Foundation, 2010).

Reflection has been used to help teachers develop a more productive framework for best practice. In a study conducted by Tarmizi and Bayat (2011), participants observed videos of their teaching and wrote about their performance in a journal. Reflection by teachers is supported by video recording (Rich & Hannafin, 2009). Lamkin (2015) looked at the process of teachers videotaping their lessons to improve their instruction in the classroom. Orlova (2009) and Hennessy and Deaney (2008) find that the permanency and objectivity gained from video recording enables teachers to identify elements of their teaching methods that do or do not work in achieving the required lesson outcomes. The reflection process can aid in the development of teaching skills.

#### **2.6.4 Professional development in a lesson study approach**

Diez (2007) and Flake (2001) explain that teacher education has developed as the years have gone on. However, researchers (Roschelle et al., 2010; Stigler, Gonzales, Kawanaka, Knoll & Serrano, 1999) highlight that teachers have not updated their teaching styles and are still practicing using the same styles from previous generations, irrespective of new methodologies and continuous refining and revision of policies. A study conducted for the Third International Mathematics and Science Study (TIMSS), whereby teachers were recorded while teaching in the classroom, showed that they used outdated teaching methods irrespective of the school's policy.

A proposition was made by Alexander, Heaviside and Farris (1999) and Smith (2008) that school management should enable teachers by providing a chance to develop professionally. By allowing teachers a chance to learn new teaching strategies, teachers will be able to meet the challenges faced by 21<sup>st</sup> century learners. Joyce and Showers (2002) explain that meaningful teacher development is achieved in many ways. The lesson study approach allows for teachers to learn new teaching methods from their peers through peer evaluations and peer feedback.

When teachers have the time to collaborate with peers, the planning process of that lesson becomes more enriched as more than one educator is providing input. Listening to the advice and criticism of other teachers allows the teacher to grow and become open-minded in trying out different ways to achieve a more effective teaching style. Researchers (Bandura, 1995; A Bandura & Schunk, 1981; Wan & Gut, 2011; Zimmerman & Ringle, 1981) are in agreement that social encouragement is an influential instrument in this process.

By collaborating with peers, teachers support and motivate each other by providing feedback on lessons. This feedback allows teachers to change their ideas/beliefs, which allows them to develop a sense of professional development as they learn new ideas or teaching methods (DuFour, 2010; Eaker, DuFour & Burnette, 2002a; Ellwood, 2013). Professional development should be based on teaching strategies that yield the best possible outcome for effective student learning (Joyce & Showers, 2002). Professional development must develop teacher's information and understanding in the specific subject. It must improve the teaching methods used in the classroom and must allow teachers to meet the continuous change and developments in education. It must further allow for positive reflection and feedback on student outcomes (Wan & Gut, 2011).

Bangel, Enersen, Capobianco and Moon (2006) explain that in-service teachers are repeatedly being told to meet the continuous challenges stemming from learners' diversity in the classroom. The study furthermore explains that this challenge is poorly investigated at the pre-service level, where teachers require support and guidance to develop skills to meet these demands.

In order for teachers to find the solutions they need to understand exactly what is happening in the classroom, teachers also need to understand the process to gather the data required to assist them in achieving the lesson outcomes when current teaching methods are not working (Bransford, Darling-Hammond & LePage, 2005; Bangel et al., 2006). The focus of the learning process is always on what is beneficial for the learner, thus each solution should be learner-centred. Zeichner

(1991) highlights that the implementation of a lesson study approach is just one method to create a platform for teachers to develop (Bond, 2004; Bray, 2002; Day, 1999; England, 1992; Haythornthwaite, 2002; Kaufman, 1959; Lave & Wegner, 1991; Lechner, 1998; Nolan & Weiss, 2002; Riel, 1996).

### **2.6.5 Teacher collaboration in a lesson study approach**

Researchers (Eaker, DuFour & Burnette, 2002b; Stigler & Hiebert, 1999) agree that teachers who meet frequently find that they develop professionally and develop a sense of working together and become more productive in class. This occurs by collectively planning a lesson, setting common lesson objectives, exchanging meaningful reflection on lessons and finding solutions to classroom-based problems. As a result, this attitude leads to a more effective and enhanced learning process for both learners and educators.

Williams (2010) explains that normally, most of the time at school is spent with learners in the class. Teachers collaborating with each other enables the teaching/learning process to be more open to diversity, flexibility and various teaching styles. It further allows for other educators to provide their insights and solutions to common problems faced in the classroom. This method serves as a platform for teachers to develop professionally and personally. Williams (2010) further explains that by collaborating, teachers become more productive, which then plays a positive role in student learning.

Teacher productiveness rises when they collaborate with each other (Garmston & Wellman, 1999; Graziano & Navarrete, 2012; Hawley & Valli, 1999; Hiebert & Stigler, 2000; Sparks, 2013). Bandura (2006) agrees with the above statement to an extent, and adds that collaborations are established when people come together and interact with each other. The skills and capabilities of all the individuals create a pool of skills and capabilities.

Moreover, there are aspects of a group of teachers working together that promote support for teaching efficacy, which includes the preparations of a lesson together,

the refinement and reflection of lessons, and peer-led guidance, support and motivation (Garmston & Wellman, 1999; Hawley & Valli, 1999; Hiebert & Stigler, 2000).

Garmston and Wellman (1999) highlight that teachers who collaborate share the responsibility of enhancing and enriching the learning and teaching process, and teachers feel less burdened as they no feel alone. Such collaboration is advantageous to both educators and learners. Educators find more ways to be resourceful and teach a lesson, while the learners achieve the best possible understanding of the lesson as the educators are better prepared.

## **2.7 LEARNING MANAGEMENT SYSTEMS**

Learning Management Systems (LMS) are web-based applications which allows the users to access the content anywhere and at any time. LMS focus on the educational process management and learning management tools. It serves as a platform of support for learning activities and administrative functions (Recesso, 2001). LMSs allow students to register for the course and allows the facilitator of the course to deliver the content and monitor the progress of the learners. It can be used as a submission tool for assignments. Functions of the LMS ranges from content and assessment management, discussion and resource forums, messaging systems etc. (Searchcio, 2015).

Applications such as LMSs aid educational organizations to provide courses remotely and discussion forums assist with creating a platform that caters for learner to learner interactions as well learner to teacher interactions and feedback (Hammond, 2005).

## **2.8 COMMUNITY OF PRACTICE**

According to Van Wyk (2005), a Community of Practice (CoP) is a group of people evolving logically and is glued together by casual relationships and mutual drive. This means that the group members share a mutual understanding, skill, and

apparatus, and absorb information from each another. Wegner, McDernott and Snyder (2002) explain that essentially, CoPs are natural, living and casual, and are not part of the official administrative structure. A review of the literature has shown that CoPs are habitually initiated in learning establishments.

Van Wyk (2005) finds that learning establishments are categorised as information organisations; while CoPs can also aid in the development of learning establishments. Wegner et al. (2002) state that CoPs are a combination of people within a group. Roberts (2006b) highlights that CoPs can be characteristically defined as 'ordinary' places where human collaboration blossoms, but these must essentially be maintained.

CoPs rise, develop, and excel in unseen systems without any specific mindfulness about their reality amongst the members of society, apart from the members themselves (Lave & Wenger, 1991; Wegner et al., 2002). It is reasoned that CoPs can check and quicken the distribution of knowledge. Learning establishments are categorised by the attainment, construction, practice, storing, and handover of knowledge; in other words, knowledge management (Marquardt, 2002).

As shown in Figure 2.5, the existing idea of a community can be classified into four elements allowing for a rich explanation of a community to arise. These elements are: collective, operational, personal and manifest.



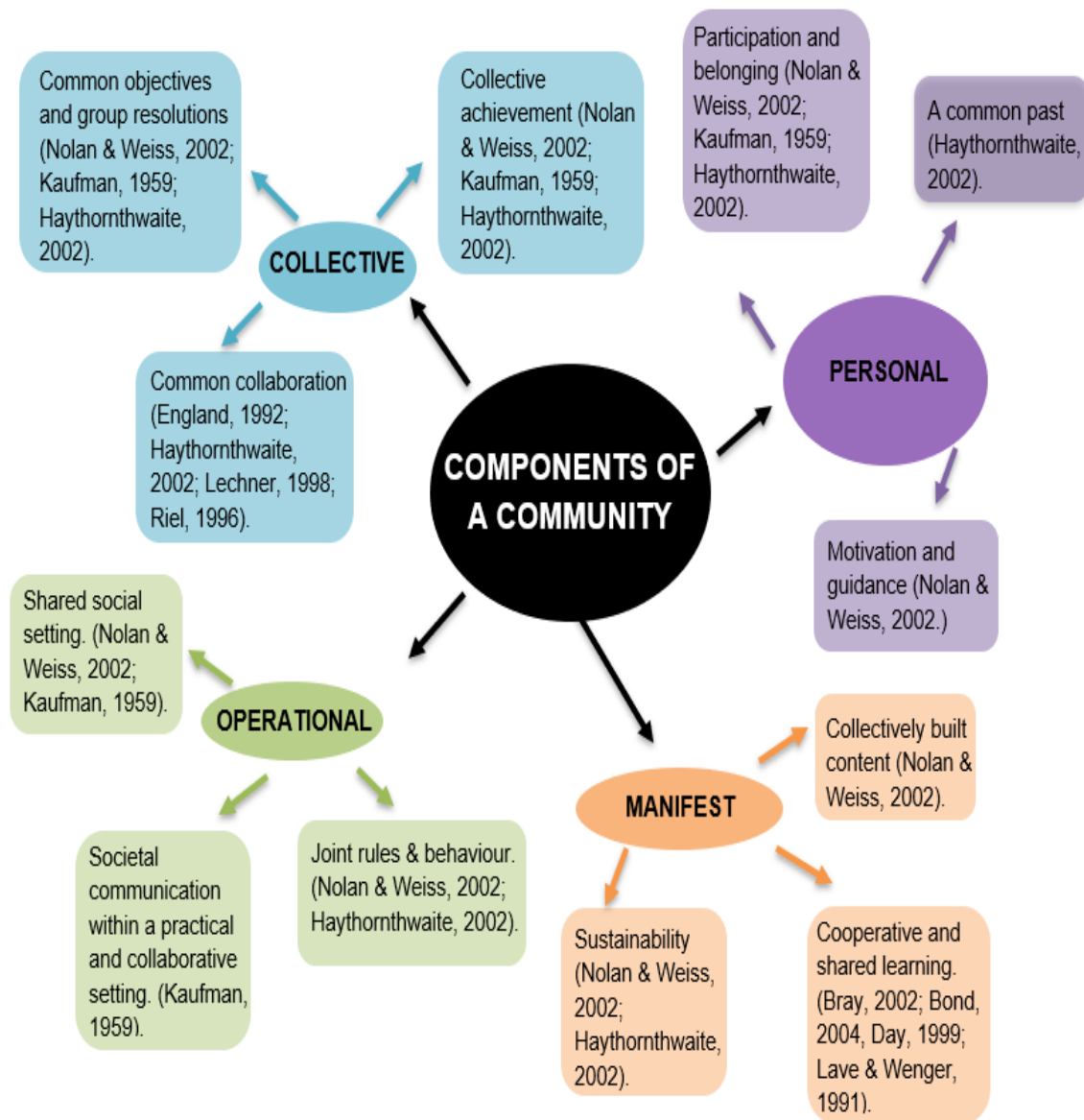


Figure 2.5: Components of a Community identified in review of literature (Duncan-Howell, 2007).

### 2.8.1 Dimensions of CoPs

Wegner (2011) explains CoPs as groups of people who share a common interest in a specific field, and interact with each other regularly to learn how to improve within their field. This explanation embraces the core of CoPs, but does not provide the basis for the analytical work necessary. Building on this explanation, Wenger

associates three vital dimensions with CoPs, namely, their community, domain and practice (Wegner, 2004, 2011; Wegner et al., 2002). It is not an easy task to clearly separate the content of each dimension because of their interconnected and mutually dependent nature. Each of the respective dimensions will be described in the following sections, outlining the fundamental aspects thereof.

### **2.8.1.1 Community**

The first part of the definition presented by Wegner (2011) refers to clusters of people that interact frequently, which may be related to the dimension of community. This leads to the fundamental understanding that a CoP is fundamentally and evidently a social endeavour (Duguid, 2005) that is deeply rooted in social learning theories, as opposed to the traditional theories outlined above. However, the dimension of community is most likely the part that has been subjected to the most substantial amount of discussion in CoP Theory. The term 'community' may imply a moderately large, cooperative and approachable, constrained group. In this vein, Cox (2005) argues that this carries quite a distinct optimistic association (Lindkvist, 2005). Furthermore, communities are conversationally associated with harmony, whilst CoPs can be branded by aspects such as dissimilarity, challenges, and opposition (Wegner, 1998).

For a group to be classified as a CoP, it is essential that members must interact and learn together and engage in shared activities and share information with each other (Wegner, 1998; Wegner et al., 2002). Akkerman and Bakker (2011) mention that the involvement of members in a community suggests the presence of boundaries, but without boundaries, there cannot be a community. Borders suggest permanency and belonging, referring to an extent of involvement. This suggests that members of a CoP's collective learning becomes a bond among them over time. Cox (2005) and Roberts (2006a) find that there does not seem to be a generally agreed on definition of what a community is, because of the various understandings of the concept. Some researchers have argued for different

categorisations thereof, like collectives of practice (Lindkvist, 2005), or epistemic communities (Hakanson, 2010).

#### **2.8.1.2 Domain**

The second part of the definition presented by Wegner (2011) and Wegner et al. (2002) relates to a shared concern or passion for something, which comprises a collective intention. A crucial aspect of CoPs consists, thus, in the fact that they are not restricted to the task that they perform (Wegner, 2004) but to a domain, the purpose that collects around the common identity, purpose and values of the community. These hold together the members and encourage participation and contribution. Beyond the abilities that the members of the CoP value and the purpose for which they come together, identity creates a central feature in this context. Identity relates to participation in the social meaning-making process within the communities of which people are members, as argued by Wegner (1998).

Identity is a crucial aspect of being in the world, defining what individuals feel they belong to and what they do not, as well as defining what they are and what they are not. Wenger (1998) further argues, in line with the adopted research paradigm, that it is wrong to associate identity with the members or the community. Wegner (1998, 2004, 2011; Wegner et al., 2002) mention that everyone is rooted in a social context and identity exists in these mutually intertwined relations. However, this does not remove the unique character that identity has for each member, because their meaning-making process is unique. However, the production of meaning emerges from the social communities in which people take part.

#### **2.8.1.3 Practice**

The third part of the definition by Wegner (2011) embraces doing and learning, which appears in practice. While there has been an emphasis on the feature of communities within research, Duguid (2005) argues that the feature of practice needs more attention. Indeed, a fundamental feature of CoPs is the fact that members are practitioners who share a common practice and develop a collection

of shared resources (Brown & Duguid, 2001; Wegner, 2011). A practice is not restricted to an activity, but above all, comprises the social negotiation of meaning associated with the activity. This, again, alters the activity as a mutually tangled and inter-reliant process.

The negotiation of meaning happens through participation and reification (Wegner, 1998). Participation highlights the participatory character of CoPs. Members get involved in the community and activities, this is manifested through their membership of the community, and form part of the creation of its identity. Reification refers to the processes and products that give a platform to the meaning-making process. Whilst these products may be rather abstract, Tusting (2005) illustrates the concept by referring to a book (reification), which does not make meaning until someone engages in reading it (participation). A conversation (participation) builds upon a language (reification).

Wegner (1998) mentions that whilst two aspects contribute to this process, it is not to be understood as a contradiction, but rather as a duality where both are mutually influencing. In the interaction between reification and participation, the meaning is continuously negotiated and influenced by the world that the CoP is rooted in, and the experiences that it enables for its members. It enables people to complete their tasks without being required to know all the specific details because of a communal memory. This provides the entry point for newcomers to the community and creates an atmosphere where the activity itself is intertwined with customs and rhythms of community life.

### **2.8.2 Designing effective communities**

Wegner et al. (2002) have mentioned seven key elements when creating a community that is effective and self-sustaining and that is linked to the management of the community. However, the true success of the community will be based on the activities of the members within the community. When creating a community, members will need to:

1. **Establish a need for evolution:** enable the community to grow to ensure that the interests of the participants are met without losing focus on the specific topic/area.
2. **Create a link or dialogue between inside and outside views:** promote a healthy platform that supports and encourages the discussion of new viewpoints that are brought in from outside of the community.
3. **Create and accept different levels of participation:** the level of participation in the community will differ from member to member. Members who contribute regularly by either commenting on other members' posts, posting their own views, or uploading links/files will be the members who are most active. Another type of participation is that of members who do not make contributions to discussions but still follow these. A third type of participation is that of members who are in the shadows of a community but only become active once the discussions peak their interest.
4. **Create public and private spaces:** Promote individual contributions or group activities that are on a private level over and above the more public discussions. This allows for more participation or interaction.
5. **Create a focus on value.** Efforts should be made clearly to recognise the contributions that are made in the interests of the community, via feedback and discussion, then focus the dialog and actions on these topics.
6. **Create a mixture of familiarity and excitement** by concentrating on common viewpoints (to create familiarity), but also by presenting challenging outlooks for discussion.
7. **Create a schedule:** creating a fixed timetable of events or deadlines of submissions that enables the members to meet on a frequent basis, within the boundaries of the members' interest and time.

According to Tolu (2012), important aspects to consider include developing learner individuality, and using a wide variety of resources such as books, websites and media. In conclusion, due to the uniqueness of each learner, each online learning

environment will be different, but will nevertheless be guided by the learning outcomes. These suggested guidelines help to encourage the creation of a Community of Inquiry (Col).

## 2.9 THE THEORETICAL FRAMEWORK

### 2.9.1 The Community of Inquiry Framework

The Col framework developed by Garrison et al. (2000) describes learning online based on the amount of interaction. At the centre of this is an understanding of learning involving three key fundamentals: (a) Social presence; (b) Cognitive presence; and (c) Teaching presence. To ensure meaningful online learning, this framework integrates three overlying elements. As can be seen in Figure 2.6, learning takes place through the collaborative use of these fundamentals.

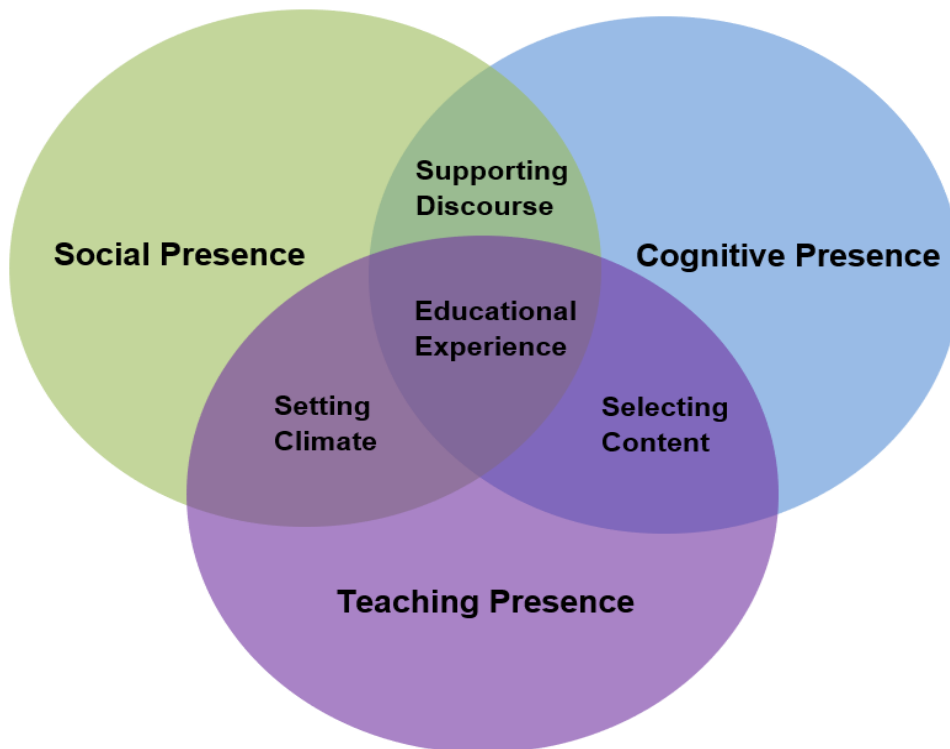


Figure 2.6: Community of Inquiry Framework (Garrison et al., 2000)

It is mentioned by Garrison and Vaughan (2008) that the Col framework is based on knowledge constructed through interaction with others, insightful thinking and applied investigation. It merges the community, the societal element, with an investigation to generate online learning settings. The societal element can be witnessed in any community, however, in an academic situation, the Col needs insightful thinking and a shared building of meaning.

Garrison et al. (2000) explain that the Col model adopts the idea that learning happens inside the community via the communication of the three presences. A presence is the level on which learners can construct and understand through reflection. Firstly, social presence is explained as the skill of members within the community that portrays the participants' true selves using the tool of communication. Secondly, cognitive presence is the level at which the members within the community can construct and comprehend knowledge through reflection. Lastly, teaching presence includes the teacher's collaborative role as a guide. All three presences are inter-reliant on each other and intersect with the others to create an experience (Dewey, 1938, 1959).

According to Garrison et al. (2000) a rudimentary belief of the Col is the inclusion of a learner's individual world as a collective world, coupled with a focused structure to create a meaningful learning experience. The obstacle encountered by many educators is finding an inexpensive manner to transfer knowledge to an online medium. The difficulty can be overcome if educators take in the three main fundamentals: social presence, cognitive presence, and teaching presence. The model undertakes that learning transpires in the community via the collaboration of the three presences. Each presence is separate yet overlaps each other. A brief overview of each presence is explained below.

### **2.9.2 Social presence**

The social component is a collaborative one where reflection is stimulated and allowed in order to create a meaningful learning environment (Garrison et al., 2000). The social component in the Col has three sections:

- Emotional expression (humour and self-disclosure),
- Open communication
- Group cohesion.

### **2.9.3 Cognitive presence**

The cognitive component is based on to what degree learners in the classroom are able to theorise and validate meaning via continuous reflection (Garrison et al., 2000). Dewey (1959) argues that it is the reflection process that enables the education process. Dewey (1938) further explains that a complete cycle of reflection is defined by the problem and trailed by five stages of insightful thinking:

- Suggestion,
- Intellectualism
- A Guiding idea
- Reasoning
- Testing

This notion was the source for the cognitive presence in the Col framework.

### **2.9.4 Teaching presence**

Anderson, Rourke, Garrison and Archer (2001) explain that the teaching presence is the enabling of cognitive and social methods with the aim of understanding valued learning objectives. Dewey (1938) found that one of the roles of an educator is to create objectives and activities that meet the objectives, but are not completely limited by them. Garrison et al. (2000) argues that the learning objectives, cognitive and social issues are brought together by the teaching presence. In the Col framework, the teaching presence is not limited to one teacher, but includes all of the members within the community. Dewey (1938) further states that to create a sense of inquiry, educators must be flexible with the idea of the unknown, yet concentrated and well-informed in their subject field. Teaching presence allows the teacher to be a supporter and allows the content to take a back seat to the facilitation of learning development.



## **2.10 CONCLUSION**

This chapter discussed literature on educational technology in South Africa, digital technology, lesson studies and CoPs. The chapter concluded with the Community of Inquiry Framework as the conceptual framework for this study.

# CHAPTER 3 METHODOLOGY

## 3.1 INTRODUCTION

Chapter 3 presents the research design, methodology and approach of this study. The participants, data collection and method of analysis are also discussed, as well as the credibility and trustworthiness of the data. Lastly, research ethics are also discussed.

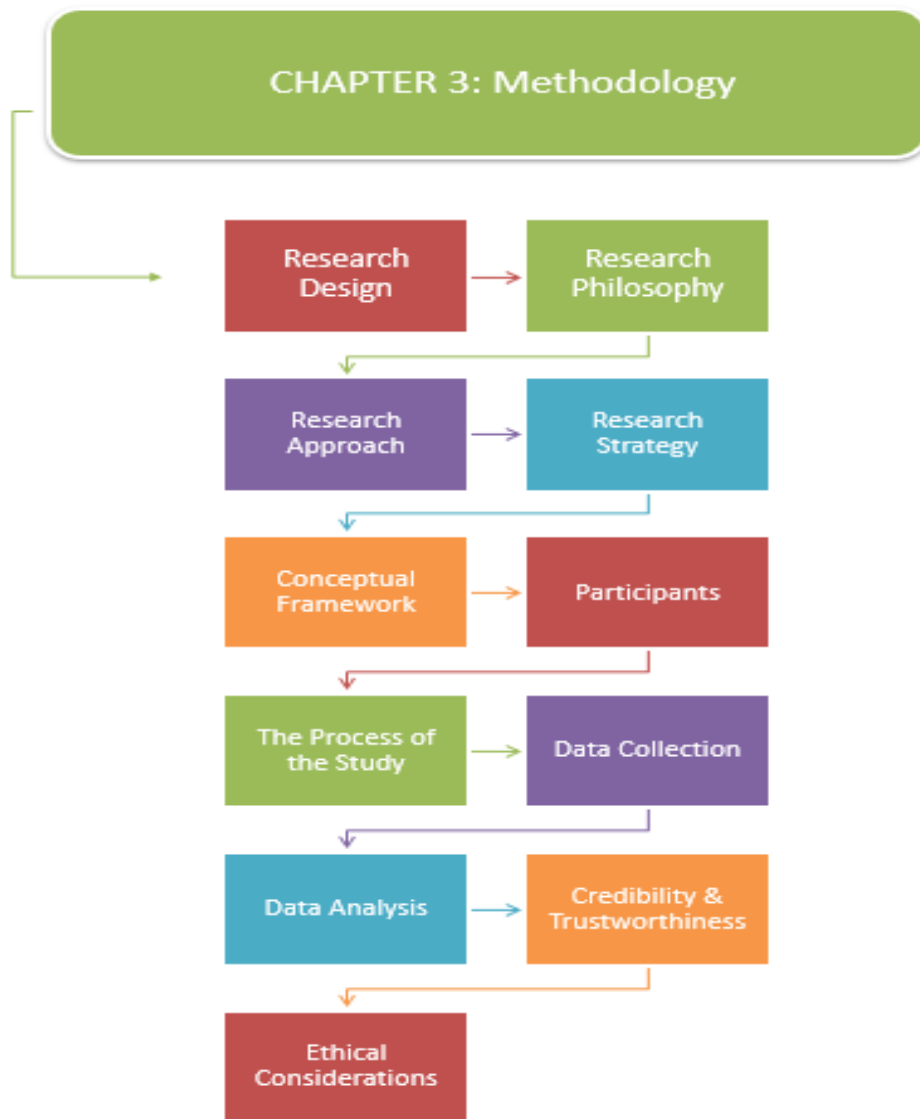


Figure 3.1: Map of Chapter 3

### **3.2 RESEARCH DESIGN – ONION MODEL**

Creswell (2013) and Polit and Beck (2004) both explain that a research design is a process used to answer the questions that are being investigated or studied. A research design also assists to manage several of the obstacles faced during the research process. Research designs are formed to meet the required standards of a selected study. Research method designs, and approaches are vital aspects that signify an outlook on research in a continuous way. Both researchers have detailed that the combination of research methods is also dependent on the research problem, the researcher's personal experiences, and the participants of the study being conducted.

A research design is the outline of how the study is steered (De Vos, 1998; Blanche, Durrheim & Painter, 2006). It is created as a strategic framework that functions as a bridge between the research questions and the implementation of the study. These authors further describe that research designs are tactics that help the researcher to take charge of preparing the requirements for the collection and study of data. However, selecting a research method must result in yielding the most dependable responses to the research question posed (Polit & Beck, 2004; Wood & Haber, 1998).

The research design for this study was based on the research onion model developed by Saunders, Lewis and Thornhill (2007). This represents each layer/step of the study, and is applied to structure the process better. It allowed for this study to move from the abstract idea phase to the concrete data collection phase. Saunders et al. (2007) highlights that the research onion model is a good structure to define and explain the research philosophy, approach, strategy, time horizons, and data techniques and analysis method of a study. Figure 3.2 presents the research onion used in this study. Layer one focuses on the research philosophy, layer two focuses on the research approaches, layer three focuses on the research strategies and layer four focuses on the data collection methods.

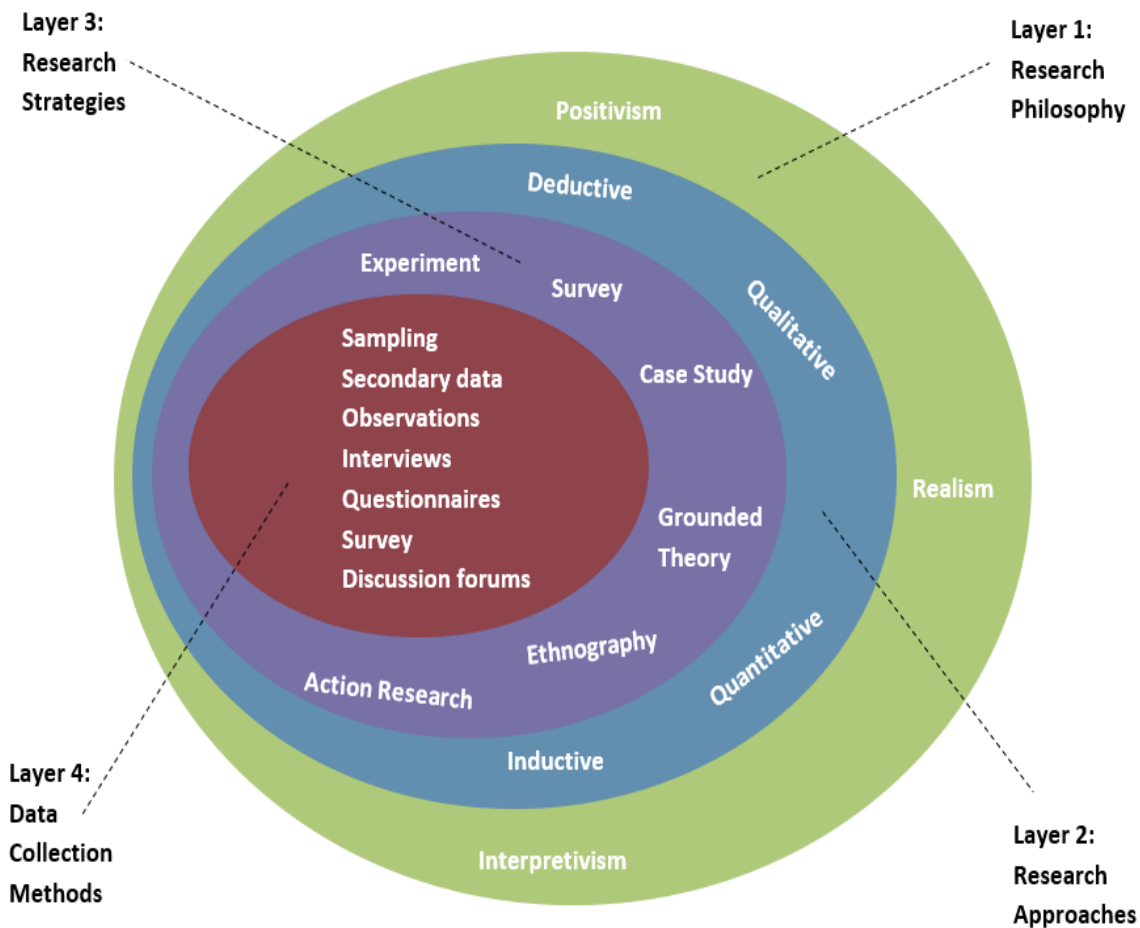


Figure 3.2 Research Onion adapted from Saunders et al. (2007)

### 3.3 RESEARCH PHILOSOPHY - INTERPRETIVISM

Researchers differentiate on the vast types of philosophies that a research can be based on in conducting a study. According to Saunders et al. (2007) the notion 'research philosophy' debates the development of information and the nature of that information. Interpretivism was the philosophy used in this study. Three main philosophies are compared below:

Table 3.1: Comparison between research philosophies (adapted from Bachman & Schutte, 2003; Jackson & Sorensen, 2007; Maree, 2007; Sprague, 2005; Terreblance, Durrheim & Painter, 2008)

Interpretivism	Positivism	Constructivism
<ul style="list-style-type: none"> <li>• Centres the meaning communities allocate to their experiences.</li> <li>• Intersubjective meanings are critical to attain understanding.</li> <li>• Behaviour is established by social agreements. Interpretation is essential.</li> <li>• Social situation, agreements, standards and values of the person are vital fundamentals in assessing and understanding human behaviour.</li> </ul>	<ul style="list-style-type: none"> <li>• Only objective, noticeable facts can be the foundation of systematic research.</li> <li>• Doctrinal or philosophical dues must yield to the positive.</li> <li>• Clarify and foresee what happens in the societal world by scientifically checking data for patterns and associations among people.</li> <li>• Try to test the projected understanding of wonders by assuming that certainty is unbiased.</li> </ul>	<ul style="list-style-type: none"> <li>• States the nature of human knowledge and comprehension.</li> <li>• Insight is reality, which is partial through societal, three-dimensional and momentous contexts.</li> <li>• A collaborative connection highlighting the importance of discovering what individuals do and how they build their views in a societal civilization.</li> <li>• The result of perception theory generation in a communal process.</li> </ul>

### 3.3.1 Interpretivist philosophy

Reeves and Hedberg (2003) explain that the interpretivist philosophy highlights the need to place the analysis within the setting of the study. The interpretivist philosophy is fixated on comprehending the world as it is from the perspective of

the personal experiences of individuals. Interpretivists admit that knowledge and meaning are open to interpretation (Gephart, 1999).

This study was conducted based on the interpretivist philosophy. The interpretivist component of the philosophy is constructed on understanding and interpreting instead of simply providing a description of the motion of education learning. All teachers have their own original experience when it come to their teaching practice. The interpretivist philosophy was the best approach for this study as the study focused on the understandings of teachers. Williamson (2006) explains that interpretive research is based on 'why' and 'how' questions that entail a comprehensive study. This was thus well aligned with this study. Wu and Chen (2005) mention that new information can be produced in this way, which can be used for future research. Although, the nature of this study was relevant to only one case, which means that the data found cannot be generalised. However, the findings of the study can be utilised as the foundation for future research in the same or similar contexts (Bryman, 2012).

### **3.4 RESEARCH APPROACH - QUALITATIVE**

#### **3.4.1 Qualitative approach**

Qualitative and quantitative methods are the key forms of research design. The method is selected based on the topic being investigated and how it is to be measured. The qualitative approach serves as the best tool in an interpretivist research philosophy (Maree, 2007). The main differences between a quantitative and qualitative approach can be seen in Table 3.2 below.

Table 3.2: Comparison between the quantitative and qualitative research methods (adapted from Becker, 1998; Burns & Bush, 2010; Gelo, Braakmann & Benetka, 2008)

<b>Criteria</b>	<b>Quantitative</b>	<b>Qualitative</b>
<b>Focus of the Research</b>	Quantity – studying how many participants/items offer the same data.	Quality – studying the nature and core of the concept.
<b>Sampling Methods</b>	<ul style="list-style-type: none"> <li>• Convenience sample;</li> <li>• Grouped sample;</li> <li>• Systematic random sample;</li> <li>• Random samples;</li> <li>• Purposeful sample;</li> <li>• Stratified random sample;</li> <li>• Single random sample.</li> </ul>	<ul style="list-style-type: none"> <li>• Homogeneous case sample;</li> <li>• Convenience sample;</li> <li>• Purposeful sample;</li> <li>• Extreme and typical case sample.</li> </ul>
<b>Data Collection Methods</b>	<ul style="list-style-type: none"> <li>• Official documents;</li> <li>• Structured interviews;</li> <li>• Census secondary data;</li> <li>• Closed observation protocol;</li> <li>• Tests or standardised questionnaire</li> </ul>	<ul style="list-style-type: none"> <li>• Secondary data;</li> <li>• Focus groups;</li> <li>• Interviews;</li> <li>• Official documents; personal documents;</li> <li>• Natural observation protocol.</li> </ul>
<b>Data Analysis</b>	<ul style="list-style-type: none"> <li>• Inferential statistics;</li> <li>• Descriptive statistics.</li> </ul>	<ul style="list-style-type: none"> <li>• Narrative/descriptive;</li> <li>• Identification of themes/categories;</li> <li>• Relationship between themes/categories.</li> </ul>
<b>Data Interpretation</b>	<ul style="list-style-type: none"> <li>• Generalising and forecasting - theory driven.</li> </ul>	<ul style="list-style-type: none"> <li>• Contextualisation – data driven.</li> </ul>

A comprehensive understanding of the research setting is allowed by means of a qualitative approach (Houser, 2009). In this study, the qualitative method allowed for a comprehensive understanding of the knowledge of the participants on the integration and implementation of ICT in the classroom, which would not have been as comprehensive had a quantitative method been used (Houser, 2009).

Qualitative research is defined by its objectives, which imply accepting some facet of a social lifestyle; and its tools, which produce words rather than statistics as data for investigation (Patton & Cochran, 2002). According to Myers (2009), qualitative research is used to aid researchers in comprehending individuals and the societal and ethnic contexts in which they live. Qualitative researchers observe aspects in their normal settings, trying to understand the associations that people bring to them (Denzin & Lincoln, 2000). Quantitative research utilises tools such as surveys, questionnaires and experiments to gather data that is organised in numbers. These are then constructed into a table, which allows the data to be categorised by the use of statistical analysis (Hittleman & Simon, 2006).

In this study, the researcher used a qualitative approach to obtain a more comprehensive understanding of the planning process of teachers who incorporate technology into their teaching. The qualitative approach was also selected as it aided in the development of a depth of meaning where the participants and their understandings formed the focus of the research. Henning, Van Rensburg and Smit (2004) explain qualitative research as an approach that aims for depth rather than understanding.

### **3.5 CHALLENGES OF THE QUALITATIVE APPROACH**

There is a growing understanding that conducting qualitative research can yield many challenges for researchers. A few of the challenges identified by researchers comprise aspects connected to keeping boundaries, increasing understanding of relationships, forming friendships, handling emotions and exiting the field (Dickson-Swift, James, Kippen & Liamputtong, 2007). This is further presented in Table 3.3 below.



Table 3.3: Advantages and disadvantages of a qualitative research approach (adapted from Creswell, 2014; Hair, Bush & Ortinau, 2006; Kumar, 2005).

Advantages	Disadvantages
<p><b>Natural setting:</b> Participants are watched in their usual environments without the existence of non-natural behaviour that many times is evident in quantitative research.</p>	<p><b>Sample size:</b> The research attracts a sample that is too small to permit the researcher to make a sweeping statement about the findings outside of the sample chosen for the study.</p>
<p><b>Depth of research:</b> It allows the researcher to deepen the complexity of thought on the subject studied.</p>	<p><b>Reliability of data:</b> Loss of impartiality might pose a problem because researchers are explaining a single event and researchers are in close proximity to the respondents.</p>
<p><b>Flexibility:</b> It is flexible and allows the researcher to exercise innovative ideas of comprehension.</p>	

### 3.5.1 Deductive approach

There are two types of approaches, namely, inductive and deductive. The deductive approach was deemed the best approach for this study.

Snieder and Larner (2009) explain that the deductive research approach explores a known theory or phenomenon and tests if that theory is valid in given circumstances. It has been noted that the deductive approach follows the path of logic most closely. The reasoning starts with a theory and leads to a new hypothesis. This hypothesis is put to the test by confronting it with observations that either lead to a confirmation or a rejection of the hypothesis.

On the one hand, Pelissier (2008) explains deductive reasoning can be explained as reasoning from the general to the particular, whereas inductive reasoning is the opposite. In other words, deductive approach involves formulation of hypotheses and their subjection to testing during the research process, while inductive studies

do not deal with hypotheses in any ways. Deductive approach can be explained by the means of hypotheses, which can be derived from the propositions of the theory. In other words, deductive approach is concerned with deducing conclusions from premises or propositions. Deduction begins with an expected pattern that is tested against observations, whereas induction begins with observations and seeks to find a pattern within them (Babbie, 2010).

### **3.5.2 The stages of using a deductive approach**

Generally, studies using deductive approach follow the following stages:

1. Deducing hypothesis from theory.
2. Formulating hypothesis in operational terms and proposing relationships between two specific variables
3. Testing hypothesis with the application of relevant method(s). These are quantitative methods such as regression and correlation analysis, mean, mode and median and others.
4. Examining the outcome of the test, and thus confirming or rejecting the theory. When analyzing the outcome of tests, it is important to compare research findings with the literature review findings.
5. Modifying theory in instances when hypothesis is not confirmed (Wilson, 2010 & Gulati, 2009).

## **3.6 RESEARCH STRATEGY**

### **3.6.1 Case study**

Creswell (2005) highlights that case studies are a kind of ethnography, although they are different from this approach in a few ways. Tesch (1990) states that ethnography can allow for a more detailed representation of a culture-sharing group. Creswell (2005) further states that an online CoI can be classified as a culture-sharing group. An in-depth investigation of the participants can assist in comprehending their features and boundaries. However, a case study account is

more focused on the description of the activities within the group as opposed to describing the common patterns of behaviour, which is more likely to be found in ethnographic research.

Creswell (2005) argues that case studies are less likely to focus on cultural themes, but are rather an in-depth examination of the case itself. This study was most interested in the discussions of teachers' experiences in an online Col. Therefore, the case study approach appeared to be the most suitable approach.

Yin (2003) highlights that a case study can be categorised as exploratory, descriptive or explanatory and can be steered as single or multiple case studies. According to Candy (1989), a case study is an interpretive method used to conduct research. The interpretive outlook observes agreement, purpose and motive to be fundamental notions. Furthermore, an interpretive approach personalises the research by giving a voice to the participants. By including the three notions mentioned above, interpretive research presents a clear reason for this study. While there are numerous case study methods currently, this study has chosen to use the method proposed by Yin (1994), which is explained further in Section 3.4.1.1.

Creswell (2013) explains that case studies are guided by the following principles:

1. Size of the group – does the case require an individual, group or community?
2. Purpose of the case:
  - Instrumental case study: a single issue being studied.
  - Collective case study: one issue is chosen to be studied but many cases are investigated to display the issue.
  - Intrinsic case study: unique situations are studied.

During this study, a single exploratory (Instrumental) case study was used to observe how a community of educators planned to teach using technology by using a lesson study approach.

### **3.6.2 The context of the case**

The initial goal in forming the online Col was to create an opportunity for teachers to collaborate, share ideas and experience on ways to teach with technology in their specific fields, and to strengthen teachers' teaching methods. The online Col brought together (in one online community) in-service teachers who were in different schools and locations. The participants were all from schools that dealt with the industry partner and were invited by them (industry partner) to participate. However, the members' settings were not all the same, as they were based in schools in various locations and their resources were different in terms of technological tools and access to those tools. The members were also teaching different subjects, resulting in their experience and opinions being different.

An online survey was administered to the participants before the course. The technology used by the participants before the course comprised e-mail, PowerPoint, and online research for the planning and delivery of lessons. The mobile applications identified by the participants before the course were browser-apps, WhatsApp, and YouTube.

#### **3.6.2.1 Case study components**

According to Yin (1994), a case study design has five key elements: (1) The research problem/question, (2) Its aims/objectives, (3) Its units of analysis, (4) An explanation of how the data is connected to the aims/objectives, and (5) The conditions required to understand the results. Figure 3.3 below shows the key elements and is further discussed below.

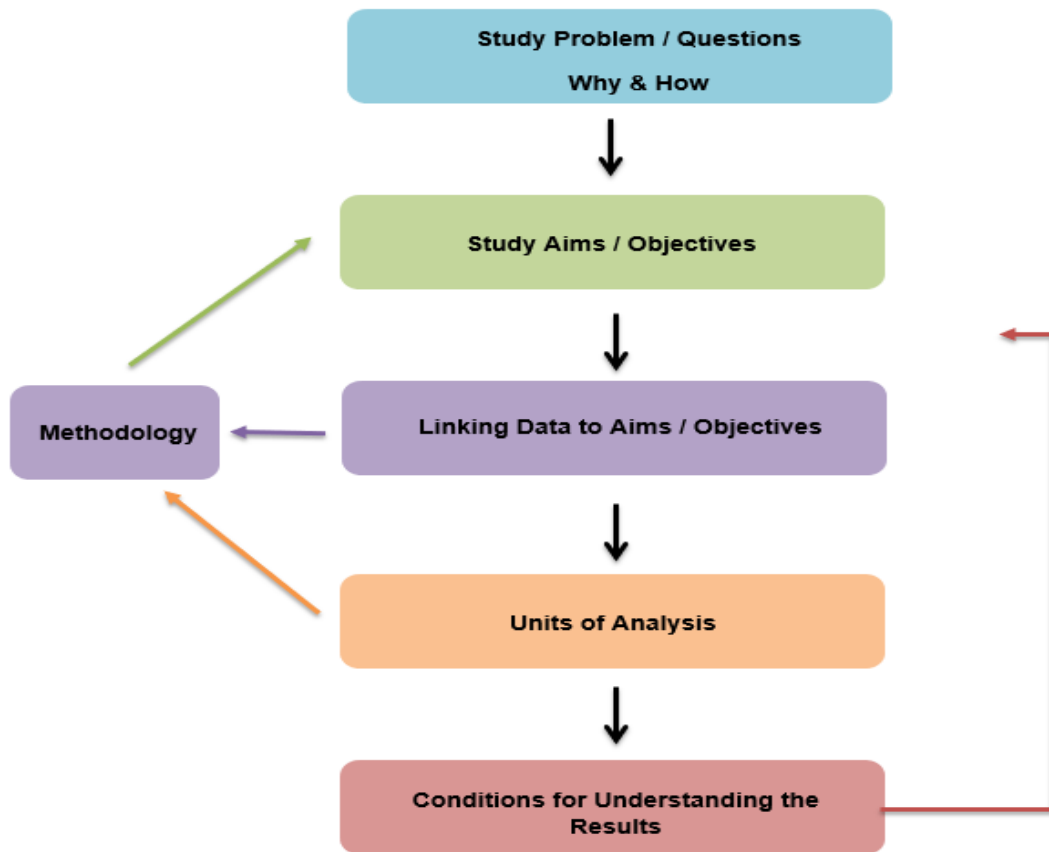


Figure 3.3: Case study components (adapted from Yin, 2003)

### 3.6.2.2 Research questions

As previously noted, the main aim of the study described in this dissertation is to understand how teachers utilise their membership of an online Col and if the online Col can deliver meaningful professional development to the members. Furthermore, the aim was to develop a better understanding of the effect of members' participation on their teaching practice and their classroom.

### 3.6.2.3 Aims of the research questions

The outcome aims guiding this study was to create an understanding of how a Col could enhance online learning incorporating the three presences developed by Garrison, Anderson and Archer (2000), namely, social, cognitive and teaching aspects using a lesson study approach.

### 3.6.2.4 Units of analysis

According to Johansson (2003), the notion of what creates a unit of analysis (a case) in a case study is challenging, but at the very least is accepted to be an experience that is precise to a time and place. The case examined in this study was an online community in an online Col. Hence, what was being investigated was the participation and development of each member within the online Col. The unit of analysis in this study were the individual teachers as well as the groups within the community, which consisted of several individuals. The researcher analysed the data per group and as single individual responses from the participants.

### 3.6.2.5 How the data will be linked to the aims of the study

Data was collected through electronic surveys, and community transcripts (see Section 3.8. for further details). Table 3.4. below shows the links amongst the research questions, presences and data collection tools

Table 3.4: Research questions and data collection method.

Question Type	Research Question	Presence	Data collection tools
Main question	How can an online Col support teachers to plan for technology using a lesson study approach?	Cognitive, Social & Teaching	Surveys and community transcripts (Discussion Forums).
Sub Question	How did the cognitive presence support teachers to plan for technology?	Cognitive	Surveys and community transcripts (Discussion Forums).
Sub Question	How did the social presence support teachers to plan for technology?	Social	Surveys and community transcripts (Discussion Forums).
Sub Question	How did the teaching presence support teachers to plan for technology?	Teaching	Surveys and community transcripts (Discussion Forums).

### 3.6.2.6 The conditions required to understand the results

The criteria needed to analyse, interpret and understand the findings are related to the three elements of the conceptual framework, that is, cognitive presence, social presence and teaching presence (as noted in Chapter 2). These also form the cornerstone of the methodological approach used in this study (see Section 3.7 for further details).

## 3.7 THE CONCEPTUAL FRAMEWORK

The Col model was used as a conceptual framework to guide the development of the research. For this study, only the three core presences will be used. The overlapping of presences will not form part of the research findings and interpretations. However, the overlapping of presences is explained below.

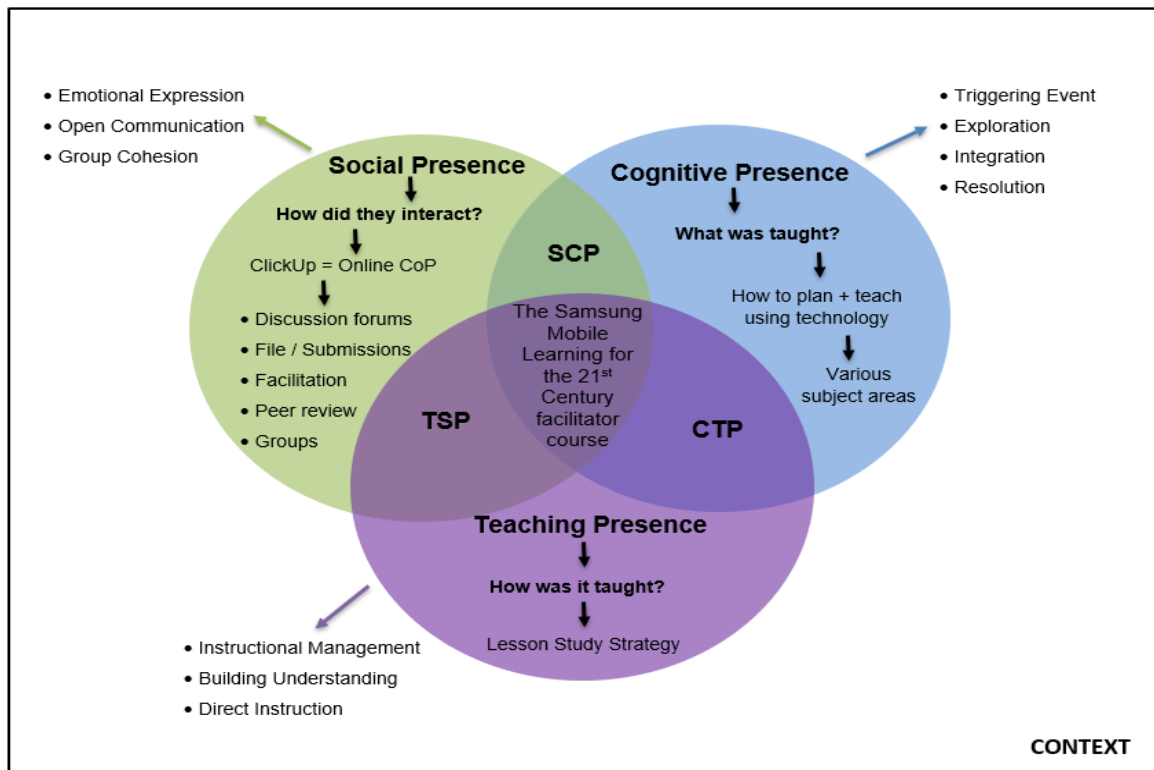


Figure 3.4: Community of Inquiry Framework (adapted from Garrison et al., 2000)

### **3.7.1 Social Presence (SP)**

The social presence focused on the social aspect independent of the cognitive or teaching presence, specifically on how the participants interacted with each other in the community. The participants interacted through a Learning Management System. The participants communicated and interacted under the following tabs in the Learning Management System: Discussion forums, File/Submissions section (links were posted), Peer reviews, Group discussions, and Facilitation. The community had a general discussion forum through which the participants posted messages. Members in the community were divided into groups and there were also separate group discussion forums where only members from the specific group could post, read and reply to messages. The social presence aspect allowed the researcher to look at the emotional expression, open communication and group cohesion of the community.

### **3.7.2 Cognitive Presence (CP)**

The cognitive presence focused on the cognitive aspect independent of the social or teaching presence, specifically on what was taught to the participants. The participants were taught how to plan and teach using technology for the various subjects in which they specialised. The cognitive presence allowed the researcher to look at the triggering event, exploration, integration and resolution events of the community.

### **3.7.3 Teaching Presence (TP)**

The teaching presence focused on the teaching aspect independent of the social or cognitive presence, specifically on what method/teaching style was used to ensure that the content was taught. A lesson study approach (as explained in Section 2.6) was used to teach the participants. This presence allowed the researcher to look at the facilitation process of the community, as well as how instructional management, building understanding and direct instruction was



maintained throughout the community.

The following sections 3.7.4 – 3.7.6 have been explained below, because during the analysis of the survey, the researcher identified that some of the questions fitted into the overlapping of the presences. However, these aspects do not form part of the study and this is the reason why it has not been carried through in chapter four and five.

### **3.7.4 Social Cognitive Presence (SCP)**

The social cognitive presence focused on the social and cognitive aspect independent of the teaching presence, specifically on the integration of the two overlapping presences, social presence and cognitive presence. This category allowed the researcher to look at how the participants interacted with each other regarding the content (how to plan to teach with technology) without the teaching aspect (lesson study). For example, the participants created WhatsApp groups to discuss the challenges that they experienced at school with their learners.

### **3.7.5 Cognitive Teaching Presence (CTP)**

The cognitive teaching presence focused on the cognitive and teaching aspect independent of the social presence with specific reference to the integration of the two overlapping presences, cognitive presence and teaching presence. This category allowed the researcher to look at how the participants were taught/guided (lesson study cycle) regarding the content (how to plan to teach with technology).

### **3.7.6 Teaching Social Presence (TSP)**

The teaching social presence focused on the teaching and social presence independent of the cognitive presence with reference to the integration of the two overlapping presences, teaching presence and social presence. This category allowed the researcher to look at how the participants interacted with each other regarding the teaching aspect (lesson study) without the content. For example, the participants introduced themselves to each other on Day 1, which was managed by

the facilitators, but the subject of these discussions was not related to the content of the course.

### **3.7.7 Social Cognitive Teaching Presence (SCTP)**

At the core of this model is taking into consideration the involvement of all three presences - Social, Cognitive, and Teaching, which is where the Mobile Learning for the 21<sup>st</sup> Century Facilitator Course fits in.

## **3.8 PARTICIPANTS**

The participants in this research were the members of the online community. The members were in-service teachers that attended the Samsung Mobile Learning for the 21<sup>st</sup> Century Facilitator course. A total of 53 participants and three facilitators participated in the course.

The main subject areas represented were mathematics, science, language, and Economic and Management Sciences. A few participants were office-based officials. The researcher investigated the participants regarding the effectiveness of a Col using a lesson study based online Col approach.

## **3.9 THE PROCESS OF THE STUDY**

The study was conducted in two phases. The first phase comprised of a face-to-face session and the second phase was an online session with two lesson study cycles. Lesson study is an instructional collective approach. One element that makes lesson studies unlike other approaches is the reflective process. A cluster of teachers observe a class that is being taught by a teacher, makes notes during the lesson, and then analyses the lesson once it is done in terms of what worked and did not work (Lewis, 2002a, 2002b; Lewis & Tsuchida, 1997; Yoshida & Wang-Iverson, 2005). The course itself and the communication were managed through the University's Learning Management System (LMS), which is the blackboard system. The schools in question, where all Samsung schools. Samsung schools refer to schools that utilize a classroom system for the use of Samsung tablets with

a smart board and/or computer. It allows for the distribution of files, the ability to do assessments, manage the tablets etc. These two applications were utilized in this study.

## **FACE-TO-FACE PHASE**

The face-to-face session was offered over two and a half days. The technical support team of the industry partner was available throughout the three days to support the participants technically. The day commenced with introductions and a reprisal of the expectations from the industry partner's team and it focused on the technical aspects of the devices made available to the participants for the duration of the face-to-face phase.

The second day was presented by the educational team. The content focused on creating and finding e-resources; teaching and assessment with mobile devices; and an introduction to the learning management system (LMS). The LMS was instrumental in the management of the online section of the course.

The third day focused on application and commenced with teaching and assessment in the mobile environment, as well as introducing the Lesson Study approach and the online learning process. The participants were divided into groups of three or four members (thirteen groups in total) in which they worked for the online section of the course. The rest of the day, the participants designed lessons in their groups and presented and evaluated these lesson plans for each other. They registered on the LMS in their online groups and the online process was introduced to them.

## **ONLINE PHASE**

During the online phase, the participants were divided into groups of three to five members. Groups were facilitated throughout the process by three facilitators. The participants worked in their groups for the duration of the online phase. The activities were divided into three lesson study group work activities; and other sharing and reflection activities.

Each group had access to their own discussion, file sharing and assignment submission area. All group members had to present the lesson planned during the face-to-face sessions to their own classes in their own schools, after which they shared experiences through the group discussion forum, videos and photos, as well as other files shared. They had to refine the first lesson plan and submit the refined lesson plan as a group assignment.

The second online assignment was the planning of another lesson, based on lessons learnt, discussing and sharing ideas and files on the group area throughout the process. This lesson plan was submitted by each group as the second assignment. After planning the lesson, they taught the lesson each to their own classes, again sharing experiences through discussions, photos, videos and files. The lesson was refined, and the final lesson plan was submitted as the third and final group assignment.

A variety of sharing discussion forums were available throughout the online phase. This included topics such as interesting apps found and used, sharing lessons learnt, challenges experienced, reflection on each day and phase of the course, and individual photo/experience journals.

### **3.10 DATA COLLECTION**

According to Richardson (1994), another direction currently being pursued in research into education is research that provides a voice to the participants as this enables researchers to convey their knowledge to other researchers and aids them in improving on their study. By studying the participants of the online Col and analysing their discussions via the use of surveys and transcripts from the online community discussions, it was aimed that the case study approach would provide the participants with a 'voice'.

The qualitative data for this study was collected through the Qualtrics system (surveys) and the learning management system (community transcripts). Two types of instruments were used, namely, surveys and community transcripts.

### 3.10.1.1 Surveys

According to Bell (1996), Creswell (2009) and Galliers (1992), a survey method is a commonly utilised tool to enable researchers to deliver a descriptive sample of a specific study. Surveys are best used when gathering data from a large test group of the population. Surveys are inclusive of the kinds of variables that can be investigated, it is a low-cost technique to produce and manage, and can be used easily to make general statements. The final aim is to investigate a large population of individuals through surveying a sample of said population. However, surveys only deliver estimates and are not an exact depiction of the population.

Fowler (1995), Leedy and Ormrod (2005), McIntire (1999) and Salant and Dillman (1994) are in agreement that survey questions must:

- Be practical to answer.
- Engage the respondents' willingness to answer.
- Comprise questions that are considerate and ethical.
- Evade questions that require information that the respondents do not have.

Members of this CoI completed an electronic online survey. The survey was administered before and after the course. The purpose of the survey was for the participants to provide a self-report to determine their technology knowledge and experience before the course, challenges during the implementation of the course, and measure experiences after the course. The questionnaire consisted of 17 open-ended questions (refer to Appendix A).

The survey was created and completed (by the participants) on the Qualtrics system. The questions from the survey have been integrated into the CoI model, which is shown in Figure 3.5 below.

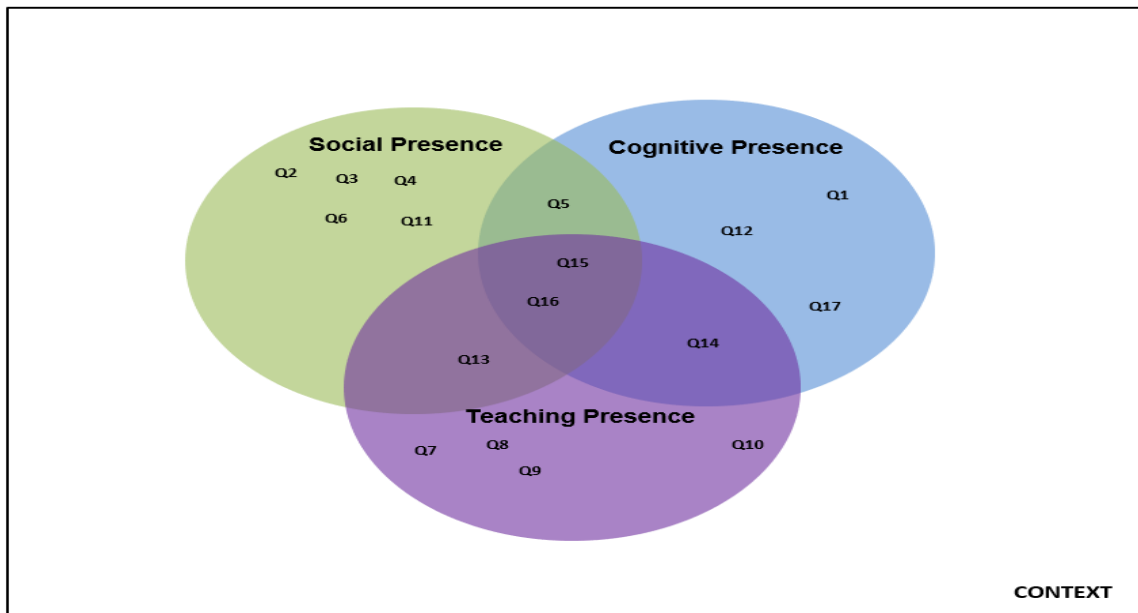


Figure 3.5: Survey questions integrated into the CoI framework

### 3.10.1.2 Community transcripts

The online activities were divided into three lesson study group work activities, and other sharing and reflection activities. Each group had access to their own discussion, file sharing and assignment submission area. All group members had to present the lesson planned during the face-to-face sessions to their own classes in their own schools, after which they shared experiences through the group discussion forum, videos and photos, as well as other files. The participants had to refine the first lesson plan and submit the refined lesson plan as a group assignment. The second online assignment was the planning of another lesson, this lesson plan was submitted by each group as the second assignment. After planning the lesson, they taught the lesson each to their own classes – again sharing experiences through discussions, photos, videos and files. The lesson was refined, and the final lesson plan submitted as the third and final group assignment.

The online discussions recorded within the CoI were analysed to examine the content of the messages and the impact of participation within the CoI, as well as the effect it had on their professional development. During the participants' development of their lessons, they used the space to communicate, and afterwards

they had to reflect based on the following aspects: what worked well; even better if; and target.

### 3.10.2 Data analysis

Thomas (2006) mentions that the method of a logical data analysis is intended to develop a small number of categories, which can be used to recognise the most significant features of the themes chosen in the raw data. The Col framework was selected in which the data analysis was conducted so that the responses of the participants could be identified, analysed and reported. The data was further categorised into the different areas of the Col framework (as shown in Table 3.5).

The different areas of the Col framework have been used in this study, not only as guidance for the way in which the data gathered was analysed but also as a method of structuring the findings that arose from the data analysis process.

Garrison, Anderson and Archer (2001) include a table that illustrates the relationship among the three essential elements in a Col. The indicators of those elements, and the categories into which they have grouped the indicators are also presented.

Table 3.5: Community of Inquiry coding template (Garrison et al., 2001)

<b>Elements</b>	<b>Category</b>	<b>Indicators</b>
<b>Cognitive Presence</b>	Triggering event	Sense of puzzlement
	Exploration	Information exchange
	Integration	Connecting ideas
	Resolution	Apply new ideas
<b>Social Presence</b>	Emotional expression	Emotions
	Open communication	Risk-free expression
	Group cohesion	Encouraging collaboration
<b>Teaching Presence</b>	Instructional management	Discussion topics
	Building understanding	Sharing personal meaning
	Direct instruction	Focusing the discussion

The following items were used by Akyol, Vaughan and Garrison (2011) to code transcripts regarding student's online forum activities. The same items were used to code the transcripts of this study, as indicated below:

**1. Social presence:**

- Emotional expression;
- Open communication;
- Group cohesion.

**2. Cognitive presence:**

- Triggering event;
- Exploration;
- Integration;
- Resolution.

**3. Teaching presence:**

- Design and organisation;
- Facilitating discourse;
- Direct instruction.

The content analysis framework used in this study was the Community of Inquiry framework developed by Garrison et al. (2001). The model is divided into three presences: cognitive, social and teaching. These three presences each contain categories that in effect act as the broadest grouping of codes. This is demonstrated in Tables 3.6, 3.7 and 3.8. The category codes are suggestive of the type of activities in which the participants engaged within each presence. Each category contains one possible code for messages, which Garrison et al. (2001) describe as indicators.



### 3.10.3 Cognitive presence

Messages within the cognitive presence were concerned with reasoning. The type of messages that could be coded within the descriptor can be seen in Table 3.6. below.

Table 3.6: Cognitive presence

Category/Descriptor	Indicators	Socio-cognitive Process	Code
Triggering event	Sense of puzzlement	Problems posed increased my interest in the course issues / Course activities piqued my curiosity.	CP1
Exploration	Information exchange	I utilised a variety of information sources to explore the problems posed in this course. Brainstorming and finding relevant information helped me to resolve content-related questions.	CP2
Integration	Connecting ideas	I can describe ways to test and apply the knowledge created in this course.	CP3
Resolution	Apply new ideas	Combined new information helped me to answer the questions raised in the course activities	CP4

Category 1 in the cognitive presence is the triggering event, which would indicate a sense of puzzlement from the participants. To identify the messages for this category, these would need to contain words or phrases that indicate that the problems posted in the community increased the participants' interest in course issues or piqued their curiosity.

Category 2 in the cognitive presence is exploration, which would indicate an information exchange for the participants. To identify the messages for this category, these would need to contain words or phrases that indicate that the

participants used a variety of information sources to explore the problems posed in this course. Brainstorming and finding relevant information helped the participants to resolve content-related questions.

Category 3 in the cognitive presence is integration, which would indicate the connecting of ideas for the participants. To identify messages for this category, these would need to contain words or phrases that indicate that the participants can describe ways to test and apply the knowledge created in this course.

Category 4 in the cognitive presence is resolution, which would indicate the application of new ideas by the participants. To identify the messages for this category, these would need to contain words or phrases that indicate that the participants combined new information that helped them to answer the questions raised in the course activities.

### 3.10.4 Social presence

Messages within the social presence were concerned with the social interactions within the community. The type of messages that could be coded within this descriptor can be seen in Table 3.7 below.

Table 3.7: Social presence

Category/Descriptor	Indicators	Socio-cognitive Process	Code
Emotional expression	Emotions	I felt comfortable/uncomfortable conversing through the online medium, participating in the course discussion, interacting with other participants.	SP1
Open communication	Risk-free expression	I felt that my point of view was acknowledged by other participants.	SP2
Group cohesion	Encouraging collaboration	Online discussions helped me to develop a sense of collaboration.	SP3

Category 1 in the social presence is the emotional expression, which would indicate messages of emotion created by the participants. To identify messages for this category, these would need to contain words or phrases that would relate to the participants being comfortable/uncomfortable conversing through the online medium, participating in the course discussion, and interacting with other participants.

Category 2 in the social presence is open communication, which would indicate risk-free expression from the participants. To identify the messages for this category, these would need to contain words or phrases that showed the participants that their point of view was acknowledged by other participants.

Category 3 in the social presence is group cohesion, which would indicate an encouragement of collaboration amongst the participants. To identify the messages for this category, these would need to contain words or phrases that show that the online discussions helped the participants to develop a sense of collaboration.

### **3.10.5 Teaching presence**

Messages in the teaching presence were concerned with the instruction process. The type of messages that could be coded within the descriptor can be seen in Table 3.8 below.

Table 3.8: Teaching presence

Category/Descriptor	Indicators	Socio-cognitive Process	Code
Instructional management	Discussion topics	The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.	TP1
Building understanding	Sharing personal meaning	The instructor was helpful in identifying areas of agreement and disagreements on course topics that helped me to learn.	TP2
Direct instruction	Focusing the discussion	The instructor helped to focus the discussion on relevant issues in a way that helped me to learn.	TP3

Category 1 in the teaching presence is instructional management, which would indicate the topics up for discussion. To identify the messages for this category, these would need to contain words or phrases that showed that the instructor was helpful in guiding the community towards understanding course topics in a way that helped the participants to clarify their thinking.

Category 2 in the teaching presence is the building of understanding, which would indicate a sharing of personal meaning. To identify the messages for this category, these would need to contain words or phrases that show that the instructor was helpful in identifying areas of agreement and disagreements on course topics that helped the participants to learn.

Category 3 in the teaching presence is direct instruction, which would indicate the focusing of the discussions for the participants. To identify the messages for this category, these would need to contain words or phrases that show that the instructor helped to focus the discussion on relevant issues in a way that helped

the participants to learn. Table 3.9 below is a summary of the codes for all three presences.

Table 3.9: Summary of codes

<b>Elements</b>	<b>Category</b>	<b>Indicators</b>	<b>Codes</b>
<b>Cognitive Presence</b>	Triggering event	Sense of puzzlement	CP1
	Exploration	Information exchange	CP2
	Integration	Connecting ideas	CP3
	Resolution	Apply new ideas	CP4
<b>Social Presence</b>	Emotional expression	Emotions	SP1
	Open communication	Risk-free expression	SP2
	Group cohesion	Encouraging Collaboration	SP3
<b>Teaching Presence</b>	Instructional management	Discussion topics	TP1
	Building understanding	Sharing personal meaning	TP2
	Direct instruction	Focusing the discussion	TP3

### 3.10.6 Data analysis process

#### 3.10.6.1 Survey results

The closed-ended questions from the survey were organised into a spreadsheet (Microsoft Excel) and then organised into pie charts/bar graphs.

#### 3.10.6.2 Community transcript analysis

The community transcripts were the main source of data for this study. The transcripts were downloaded from the learning management system). The community transcripts comprised of the dialogue with other members and facilitators during the online phase. The data gathered from the community transcripts were analysed in the following process:

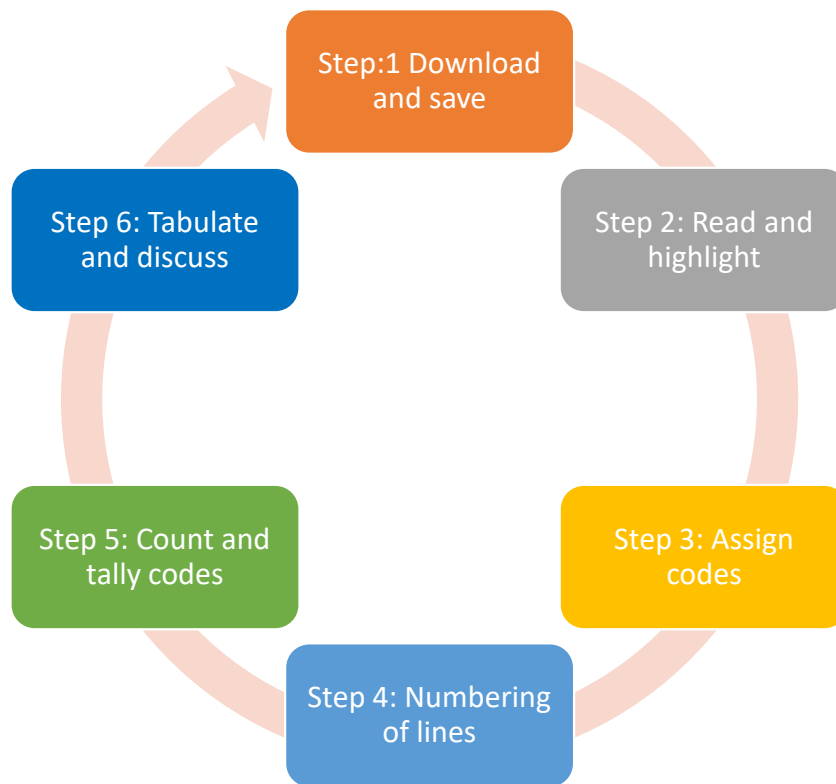


Figure 3.6: Overview of the data analysis process

**Step 1:** The community transcripts were downloaded and saved in PDF format. The researcher printed out the document and wrote the section number on the first page of each section using a red pen. There were 29 sections in total, which comprised the different tabs in ClickUP.

Example:

<input type="checkbox"/> Name	Date modified	Type	Size
Day 1 and 2 reflections1.pdf	07-Aug-18 8:22 PM	Adobe Acrobat D...	7,822 KB
Day 1 and 2 reflections2.pdf	07-Aug-18 8:24 PM	Adobe Acrobat D...	10,491 KB
Day 1 and 2 reflections3.pdf	07-Aug-18 8:24 PM	Adobe Acrobat D...	5,604 KB
Day 3 reflections.pdf	07-Aug-18 8:28 PM	Adobe Acrobat D...	10,593 KB
First Online Assignment Discussion_Th...	07-Aug-18 6:19 PM	Adobe Acrobat D...	4,347 KB
General discussions advice questions_...	07-Aug-18 8:03 PM	Adobe Acrobat D...	13,487 KB
Online phase reflection_Thread Order.	07-Aug-18 8:05 PM	Adobe Acrobat D...	7,564 KB
Samsung mobile learning introduction...	07-Aug-18 8:17 PM	Adobe Acrobat D...	6,308 KB
Samsung mobile learning introduction...	07-Aug-18 8:18 PM	Adobe Acrobat D...	6,162 KB
Sharing apps resources and ideas.pdf	07-Aug-18 8:11 PM	Adobe Acrobat D...	7,969 KB
Sharing apps resources and ideas2.pdf	07-Aug-18 8:13 PM	Adobe Acrobat D...	12,252 KB

Figure 3.7 Screenshot of the partial files downloaded and saved

**Step 2:** The researcher read through all the messages (1276 in total) and highlighted the words in those messages that related to the socio-cognitive process (as discussed in Tables 3.6 – 3.8) that matched the relevant presences. Social presence messages were highlighted in green. Cognitive messages were highlighted in blue, and teaching presence messages were highlighted in yellow.

Example:

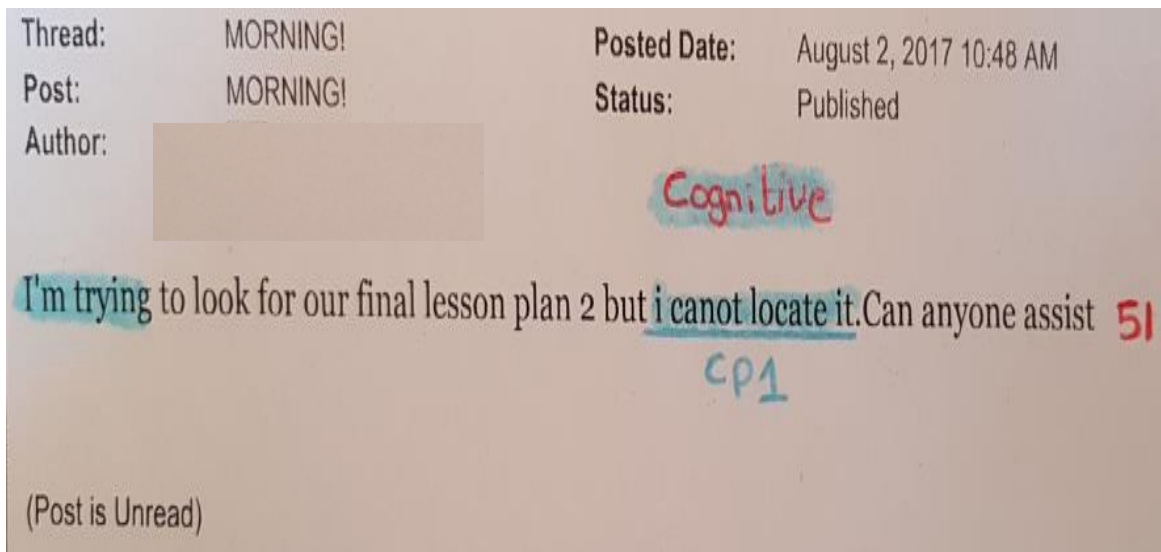


Figure 3.8 Example of the identification and naming of presences

**Step 3:** Codes, as mentioned in Table 3.9, were then written based on those messages in the community transcripts that matched the specific presence. The following colours were used to write the different codes:

Example:

Elements	Category	Codes	Colours
Cognitive Presence	Triggering Event	CP1	
	Exploration	CP2	
	Integration	CP3	
	Resolution	CP4	
Social Presence	Emotional Expression	SP1	
	Open Communication	SP2	
	Group Cohesion	SP3	
Teaching Presence	Instructional Management	TP1	
	Building Understanding	TP2	
	Direct Instruction	TP3	

Figure 3.9 Colours used for the codes

**Step 4:** The lines for each section were numbered and used as a reference when quoting examples in Section 4.2.1

Example:

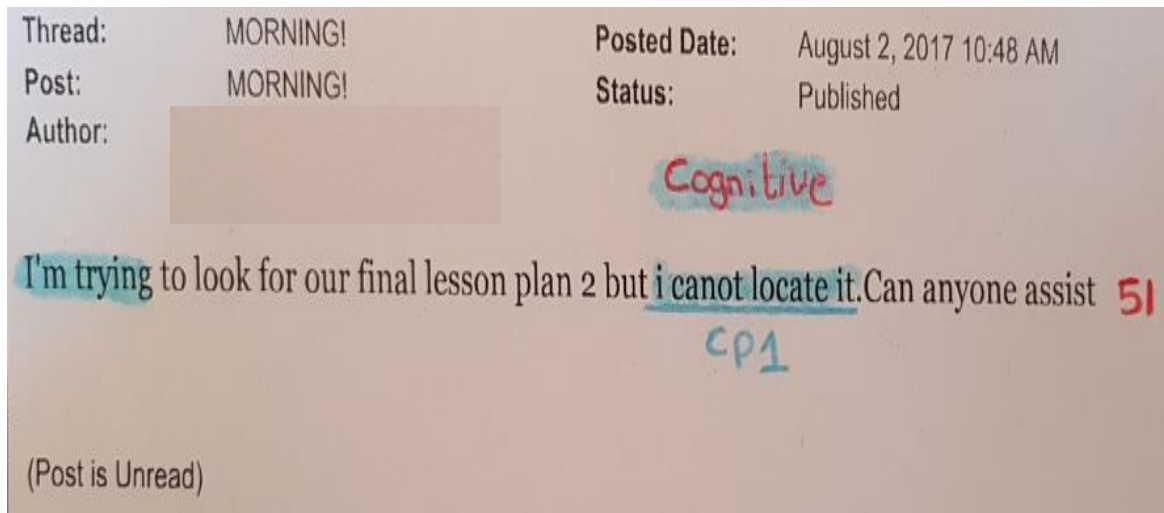


Figure 3.10 Example of the lines numbered in the community transcripts

**Step 5:** The researcher then counted each code and recorded it in an Excel Spreadsheet. The number of codes counted matched the total number of messages sent.



Example:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	SET	CP1	CP2	CP3	CP4		SP1	SP2	SP3		TP1	TP2	TP3		Total	
2	1	2	7	5	6		2	3	4		0	4	2		35	
3	2	5	4	5	5		1	4	6		4	5	8		47	
4	3	11	0	1	0		0	1	1		2	7	1		24	
5	4	12	6	5	1		2	3	6		8	9	13		65	
6	5	6	3	0	0		8	4	0		1	0	2		24	
7	6	26	3	1	2		6	6	3		2	9	11		69	
8	7	6	4	5	0		8	2	3		1	7	1		37	
9	8	4	2	2	0		19	3	0		0	2	0		32	
10	9	0	0	0	0		14	6	0		0	4	1		25	
11	10	3	11	2	0		14	7	2		0	0	3		42	
12	11	8	21	3	8		13	9	8		1	12	7		90	
13	12	1	6	1	3		11	7	5		0	3	4		41	
14	13	3	19	4	6		8	3	5		3	9	3		63	
15	14	2	14	5	5		9	9	5		0	3	0		52	
16	15	0	5	3	3		20	17	2		1	3	3		57	
17	16	2	2	0	0		2	2	1		0	0	0		9	
18	17	2	10	8	4		13	7	4		0	2	3		53	
19	18	0	1	1	0		5	8	8		0	7	3		33	
20	19	2	1	1	0		5	3	1		3	0	6		22	
21	20	0	3	0	2		5	6	0		0	4	1		21	
22	21	2	6	2	2		11	6	3		0	3	4		39	
23	22	0	5	4	1		6	3	1		0	2	1		23	
24	23	10	15	11	14		42	22	11		0	3	1		129	
25	24	5	12	9	6		32	22	15		1	0	1		103	
26	25	2	9	1	3		8	4	1		3	3	2		36	
27	26	0	1	1	0		2	1	1		0	0	0		6	
28	27	1	5	12	6		13	6	5		0	3	0		51	
29	28	0	7	4	11		10	5	2		1	0	0		40	
30	29	1	0	1	0		2	0	1		1	1	1		8	
31														Total	1276	
32																
33	Total	116	182	97	88		291	179	104		32	105	82		1276	
34	Percent	9.09091	14.26332	7.60188	6.89655		22.80564	14.02821	8.15047		2.50784	8.22884	6.42633			
35																

Figure 3.11 Screenshot of the Excel spreadsheet

Step 6: The results were then tabulated and discussed in chapter 4 and 5.

### 3.11 CREDIBILITY AND TRUSTWORTHINESS

To ensure the credibility and trustworthiness of this study, the researcher has explained the research process for this study in this section (Chapter 3). Creswell (2012) explains that the participants' version of the events must link with the researcher's representation of events for the research report to be dependable.

Creswell (2005) proposes three core approaches for ensuring the reliability and integrity of a study, namely, auditing, member checking and triangulation. This study used auditability, peer reviewing and triangulation to ensure the reliability and integrity of the findings.

According to McMilan and Schumacher (2010), auditability can be explained as a method of collecting all raw data, data techniques and decisions that comprise the

trail of evidence. Regarding this study, the researcher kept a complete record of all the raw data and codes assigned to the data.

Researchers Denzin and Lincoln (2000), explain that triangulation is the use of two or more data collection methods or two or more perspectives that contribute to the topic of study. In this study, the researcher used surveys and the community transcripts to collect the data. The researcher also used 53 different participants in the study to create different viewpoints.

Peer reviewing: the researcher's supervisor is accustomed with the research and concept being investigated. Consequently, the supervisor provided guidance with the organization, structure and procedure of the research as well as challenged the researcher's expectations and understandings (Lincoln and Guba 2005).

### **3.12 ETHICAL CONSIDERATION**

To guarantee that the rights of the participants would not be affected by this study, the following ethical issues were addressed:

- Ethical clearance was sought and gained from the University's Research Ethics Committee.
- Informed consent and voluntary participation were sought from the participants.
- Anonymity and privacy of the participants involved were guaranteed.
- Confidentiality of the data obtained from the participants was also guaranteed.

#### **3.12.1 Ethical clearance from the University's Research Ethics Committee**

This study involved educational research among in-service teachers attending a course at the University. Therefore, the researcher only needed ethical clearance from the Research Ethics Committee at the University.

### **3.12.2 Informed consent and voluntary participation from the participants**

The survey was completed through a learning management system. The participants were clearly informed that by completing the course they would be consenting to take part in this study on a voluntary basis. No incentives were provided to encourage them to complete the course. By completing the consent form the participants gave permission for the discussions in the forum to be used as data for research purposes.

### **3.12.3 Anonymity and privacy of the participants involved**

The participants were informed that the answers provided would be treated as anonymous and confidential. Their personal information was not available to the researcher. Where anonymity could not be ensured, the researcher allocated numbers to the participants, which replaced their names in the discussion forums and the researcher did not report it in a way that the participants could be identified.

### **3.12.4 Confidentiality of the data obtained from the participants**

Before the participants completed the survey, they were verbally informed that the results obtained from their responses would be used in conjunction with all the responses obtained, but that the responses would not be linked to them individually.

## **3.13 CONCLUSION**

This chapter explained the research method and sampling plan followed. The chapter further discussed the overall research design, the participants, the data collection methods, as well as the techniques used in analysing the data. The chapter concluded with the research ethics of the study. Figure 3.12. below is a representation of a simplified version of the Research Onion by Saunders et al. (2007) as applicable to this study.

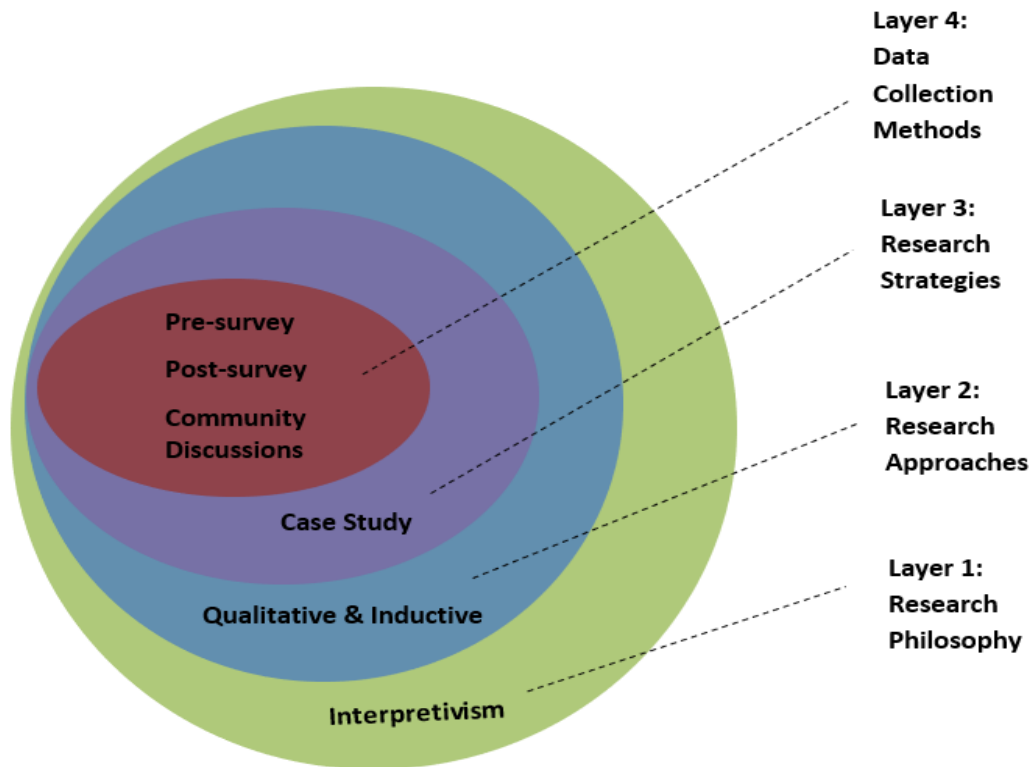


Figure 3.12 Research Onion (adapted from Saunders et al., 2007)

# CHAPTER 4 RESULTS

## 4.1 INTRODUCTION

Chapter 4 discusses the results of the data obtained during the survey process. Detailed analysis was done to provide a detailed explanation of the findings.

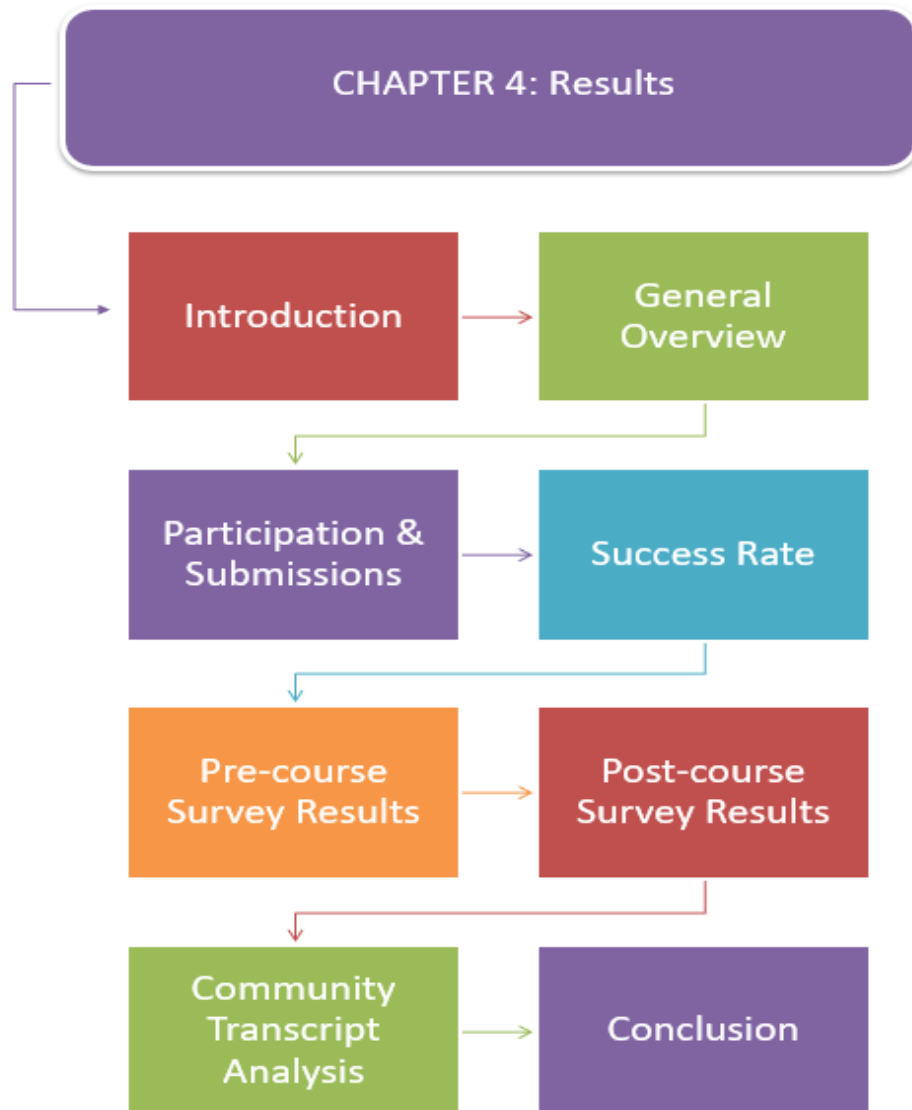


Figure 4.1: Map of Chapter 4

As mentioned previously, the participants completed two surveys, pre and post course. The results and findings have been explained in three sections. The first section focusses on the participation and submissions of assignments as well as the success rate of the assignments completed by the participants. Section two focusses on the community transcripts (which is the main component of this study) and the results for this section are split into the different presences and indicators. Section three focusses on the pre-course and post-course survey results. The results for this survey have be organized into pie charts.

## **PARTICIPATION AND SUBMISSIONS**

Participation in the group-work activities during the face-to-face course was excellent, and the participants also commented on the positive experience (through their reflection phase). All of the groups participated in the online activities and submitted the first two group assignments. Not all of the groups submitted the last lesson plan. However, not all group members participated during the online phase either. Those educators who participated during the online phase commented positively on the experience of working online with colleagues from all over the country, sharing experiences and challenges, and creating an ICT enhanced lesson together within the lesson studies paradigm.

The total hours spent on the online system were 682.21 hours, and the average time spent per person was 12.87 hours.

## **SUCCESS RATE**

53 educators participated in the face-to-face course. Four of them did not participate at all in the online phase. Ten participants only contributed to one assessed activity, and ten only to two assessed activities. Twenty-nine participants contributed to more assessed activities and completed the online phase successfully.

## 4.2 GENERAL OVERVIEW OF THE CODES

The messages are classified according to the three presences of the Community of Inquiry Model developed by Garrison et al. (2001): (1) Cognitive presence, (2) Social presence, and (3) Teaching presence. These three presences reflect the critical thinking process (as discussed previously in Section 3.7.)

In this study, each presence was combined with broad descriptors (as explained in Section 3.7.1). (1) Cognitive presence: (a) Triggering event, (b) Exploration, (c) Integration, and (d) Resolution. (2) Social presence: (a) Emotional expression, (b) Open communication, and (c) Group cohesion. (3) Teaching presence: (a) Instructional management, (b) Building understanding, and (c) Direct instruction.

The coding scheme that was used (as discussed in Section 3.7.1) reflected the presence, for example, the “Triggering event” descriptor was coded as CP1 and the “Exploration” descriptor was coded as CP2 and so on. An overview of the results of the community transcripts is presented in Table 4.1 below.

Table 4.1: Overview of coding results for community transcripts.

Message descriptors and indicators	Code	Number of messages per phase (N=1276)	Percent of messages per phase
<b>Cognitive Presence</b>			
Triggering event (sense of puzzlement)	CP1	116	9%
Exploration (information exchange)	CP2	152	12%
Integration (connecting ideas)	CP3	117	9%
Resolution (apply new ideas)	CP4	122	10%
<b>Social Presence</b>			
Emotional expression (emotions)	SP1	190	15%
Open communication (risk-free expression)	SP2	179	14%
Group cohesion (encouraging collaboration)	SP3	104	8%

<b>Teaching Presence</b>			
Instructional management (discussion topics)	TP1	109	9%
Building understanding (sharing personal meaning)	TP2	101	8%
Direct instruction (focusing the discussion)	TP3	86	7%

From Table 4.1, it can be seen that the messages posted within the community by the members fitted all three presences and categories/indicators from the Practical Inquiry Model (Garrison et al., 2001).

Table 4.1 shows that there were 116 triggering events (sense of puzzlement) messages (9% of all messages sent); 152 exploration (information exchange) messages (12% of all messages sent); 117 integration (connecting ideas) messages (9% of all messages sent); and 122 resolution (apply new ideas) messages (10% of all messages sent). Furthermore, there were 190 emotional expression (emotions) messages (15% of all messages sent); 179 open communication (risk-free expression) messages (14% of all messages sent); 104 group cohesion (encouraging collaboration) messages (8% of all messages sent); 109 instructional management (discussion topics) messages (9% of all messages sent), 101 building understanding (sharing personal meaning) messages (8% of all messages sent), and 86 direct instruction (focusing the discussion) messages (7% of all messages sent).



Figure 4.2 below represents the total number of messages posted as a percentage.

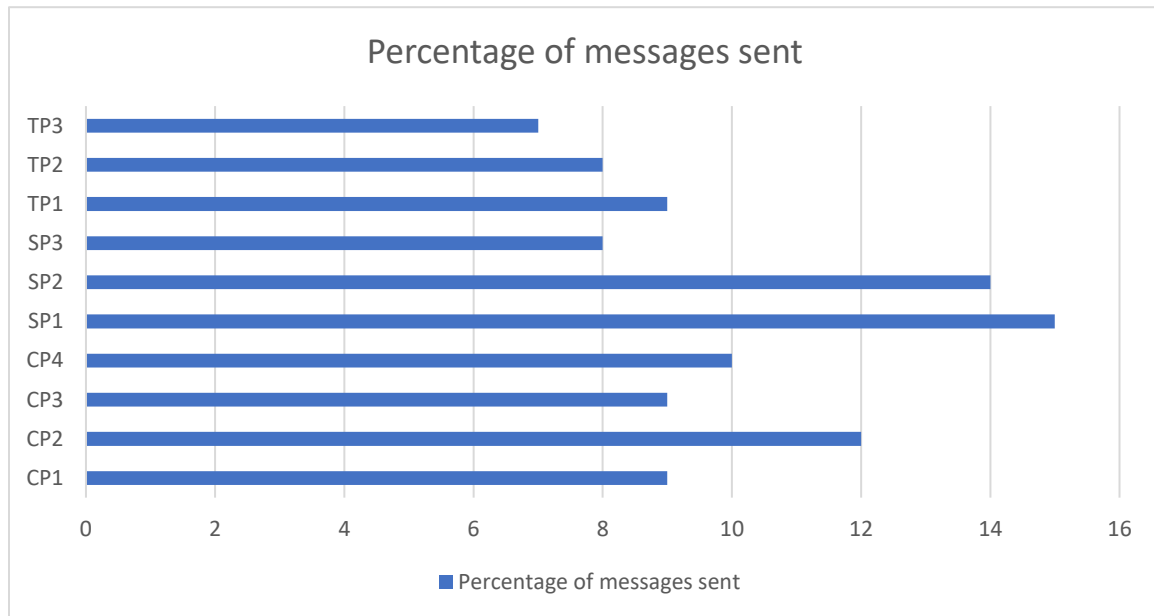


Figure 4.2: The total number of messages posted as a percentage

### 4.3 DISCUSSION FORUM MESSAGES

The discussion in this section will now focus on providing and illustrating explanations of the code descriptors: (1) Cognitive presence: (a) Triggering event, (b) Exploration, (c) Integration, and (d) Resolution. (2) Social presence: (a) Emotional expression, (b) Open communication, and (c) Group cohesion. (3) Teaching presence: (a) Instructional management, (b) Building understanding, and (c) Direct instruction.

#### 4.3.1.1 *Triggering event (sense of puzzlement)*

The total number of messages in this phase was 116, which represents 9% of the total (N=1276). These types of messages are only the trigger for the community discussions and the aim was to inspire or provoke further discussion. The messages in this phase looked at how the problems posed increased the members' interest. These types of messages were normally posted in the beginning to show

interest or confusion in a specific thread. Table 4.2 below serves as a breakdown of this descriptor.

Table 4.2: Triggering event

<i>Message descriptors and indicators</i>	Number of messages per phase (N=1276)	Percent of messages per phase
<b><i>Cognitive Presence</i></b>		
<i>Triggering event (sense of puzzlement)</i>	116	9%

Here are some examples of the messages found in this phase:

*“Good morning. I’m struggling to get the link where I am supposed to upload my journal. Please help me”* Section 10 of the community transcripts, lines 20 – 21.

*“[name] did you get [name], who’s going to upload our plan? Does it need to be uploaded with photos? How do I upload it?”* Section 23 of the community transcripts, lines 20 – 22.

#### **4.3.1.2 Exploration (Information exchange)**

The total number of messages in this phase was 152, which represents 12% of the total (N=1276). These types of messages are information exchange dialogue, and the brainstorming of ideas and suggestions as a response to triggering event messages. The messages in this phase also looked at how members utilised a variety of information sources to explore the problems posed in the course. It also focused on how the members brainstormed and found relevant information that helped them to resolve content-related questions, especially when it came to the planning and reflection phase of the lesson. Table 4.3 below serves as a breakdown of this descriptor.

Table 4.3: Exploration

Message descriptors and indicators	Number of messages per phase (N=1276)	Percent of messages per phase
<b>Cognitive Presence</b>		
Exploration (Information exchange)	152	12%

Here are some examples of the messages found in this phase:

*“If you are looking for a classroom management app, TeacherKit is the best for you. This top educational app makes it easier to manage the classroom. This, in fact, can help you record the student’s attendance, add notes for the lesson, performance checking, grade recording and more...”* Section 10 of the community transcripts, lines: 62 - 69.

*“Hi everybody! All my students must create different types of learning interventions, and every exam they surprise me with wonderful new apps. One I saw tonight, is: Stop Motion Studio. It is super easy to create animated gifs with it. You and/or your learners can use it. Here is the QR of the URL and I attached a gif that I created within seconds. Such fun!”* Section 11 of the community transcripts, lines: 1 - 8.

#### **4.3.1.3 Integration (connecting ideas)**

The total number of messages in this phase was 117, which represents 9% of the total (N=1276). These types of messages offered solutions to other members’ problems in school context situations. The messages in this phase also looked at how members described ways to test and apply the knowledge created in the course, especially the knowledge learned during the face-to-face session. Table 4.4 below serves as a breakdown of this descriptor.

Table 4.4: Integration

Message descriptors and indicators	Number of messages per phase (N=1276)	Percent of messages per phase
<b>Cognitive Presence</b>		
Integration (connecting ideas)	117	9%

Here are some examples of the messages found in this phase:

*“Guys I have also taught the lesson it well really well but there are still areas of improvement which we need to attend to.”* Section 23 of the community transcripts, lines: 61 – 62.

*“Let’s do this one on triangles, I have a lesson in mind but let’s choose more apps to use. What do you think?”* Section 29 of the community transcripts, lines 22 – 23.

#### 4.3.1.4 Resolution (apply new ideas)

The total number of messages in this phase was 122, which represents 10% of the total (N=1276). These types of messages showed how the solutions offered in the integration phase were applied. The messages in this phase focused on how the members used the combination of new information to answer the questions raised in the course activities. Table 4.5 below serves as a breakdown of this descriptor.

Table 4.5: Resolution

Message descriptors and indicators	Number of messages per phase (N=1276)	Percent of messages per phase
<b>Cognitive Presence</b>		
Resolution (apply new ideas)	122	10%

Here are some examples of the messages found in this phase:

*“...Continue to use the knowledge acquired from the training in my day to day teaching at my workplace. Keeping the communication channels with the colleagues I met during the training open so that we can share good practice.”*

Section 2 of community transcripts, lines: 82-85.

*“Learners used tablets successfully. The lesson was fun and interesting. Learners didn’t take long to identify types of quadrilaterals because they could search on their own. They shared information quickly and easily. Pictures automatically displayed when typing in the word.”* Section 27 of the community transcripts, lines 1 – 7.

#### **4.3.1.5 Emotional expression (emotions)**

The total number of messages in this phase was 190, which represents 15% of the total (N=1276). These types of messages showed the emotions of the members. It further explained how the members felt during their challenges and successes. The messages in this phase focused on whether the members felt comfortable/uncomfortable conversing through the online medium, participating in the course discussion, and interacting with other members. Table 4.6 below serves as a breakdown of this descriptor.

Table 4.6: Emotional expression

Message descriptors and indicators	Number of messages per phase (N=1276)	Percent of messages per phase
<b>Social Presence</b>		
Emotional expression (emotions)	190	15%

Here are some examples of the messages found in this phase:

*“Wow [Name], saw your pictures, they look really great.”* Section 24 of the community transcripts, line 181.

*“Nice one [name], I always wanted an app that could help me monitor the classroom. Surely this is the one.”* Section 10 of the community transcripts, line 69 - 70.

#### 4.3.1.6 Open Communication (risk-free expression)

The total number of messages in this phase was 179, which represents 14% of the total (N=1276). These types of messages showed how members interacted with each other in terms of their agreements and disagreements. The messages in this phase focused on whether the members felt that their point of view was acknowledged by the other participants. Table 4.7 below serves as a breakdown of this descriptor.

Table 4.7: Open communication

Message descriptors and indicators	Number of messages per phase (N=1276)	Percent of messages per phase
<b>Social Presence</b>		
Open communication (risk-free expression)	179	14%

Here are some examples of the messages found in this phase:

*“Thanks [name] for your efforts, kindly continue to lead us. Please tell us what we must do for the next submission.”* Section 18 of the community transcripts, lines 10 – 11.

*“Hello [name], it is so wonderful to have you on the program. Let us work hard in ensuring that technological kids are not deprived of what is meant for them.”* Section 9 of the community transcripts, lines 98 – 100.

#### 4.3.1.7 Group cohesion (encouraging collaboration)

The total number of messages in this phase was 104, which represents 8% of the total (N=1276). These types of messages showed how the members encouraged other members to participate in group discussions. The messages in this phase focused on how the online discussions helped to develop a sense of collaboration amongst the members. Table 4.8 below serves as a breakdown of this descriptor.

Table 4.8: Group cohesion

Message descriptors and indicators	Number of messages per phase (N=1276)	Percent of messages per phase
<b>Social Presence</b>		
Group cohesion (encouraging collaboration)	104	8%

Here are some examples of the messages found in this phase:

*“Hi guys just a reminder that we have another assignment due Friday let’s try to communicate about it.”* Section 25 of the community transcripts, lines 39 – 40.

*“Colleagues in Group 1, we are behind schedule please submit your lesson plans and let’s modify, update, agree and submit our final lesson plans. Let’s communicate! I have attached and submitted my lesson for your critique. Shall we have our discussion now?”* Section 12 of the community transcripts lines 42 – 45.

#### 4.3.1.8 Instructional management (discussion topics)

The total number of messages in this phase was 109, which represents 9% of the total (N=1276). These types of messages showed how the facilitators were helpful in guiding the members towards understanding the course topics, which helped clarify the members’ thinking. Table 4.9 below serves as a breakdown of this descriptor.

Table 4.9: Instructional management

Message descriptors and indicators	Number of messages per phase (N=1276)	Percent of messages per phase
<b>Teaching Presence</b>		
Instructional management (discussion topics)	109	9%

Here are some examples of the messages found in this phase:

*“Good day to all participants! Welcome to the Samsung course... Please do the following as a first activity: Please reply to this message, that we can all see when you ‘have arrived’. Also, tell us something about yourself – where you work, what you do and what you love in life! Then keep coming back to this discussion throughout this phase and continue interacting with the other participants.”* Section 9 of the community transcripts, lines 1 – 8.

*“Let me know what cool apps you find while you are exploring. Thank You.”* Section 4 of the community of transcripts, line 17

#### **4.3.1.9 Building understanding (sharing personal meaning)**

The total number of messages in this phase was 101, which represents 8% of the total (N=1276). These types of messages showed how the facilitators were helpful in identifying areas of agreement and disagreements in the course topics, which helped the members to learn. Table 4.10 below serves as a breakdown of this descriptor.

Table 4.10: Building understanding

Message descriptors and indicators	Number of messages per phase (N=1276)	Percent of messages per phase
<b>Teaching Presence</b>		
Building Understanding (Sharing personal meaning)	101	8%

Here are some examples of the messages found in this phase:

*“I see you are a bit lonely here! Let’s see if we can find your other group members! I’ll see what I can do.”* Section 18 of the community transcripts, lines 42 – 43.

*“Group 5, It seems that the group has gone beyond quiet. But [name] seems to work hard. Please show some activity soon. Thank you for the work that you put in until now. We are in awe of what you have achieved. We will soon start marking*



*your assignments that you have submitted. Keep working hard on the coming assignment and keep checking ClickUP to see what we expect.”* Section 18 of the community transcripts, lines 52 – 56.

#### **4.3.1.10 Direct instruction (focusing the discussion)**

The total number of messages in this phase was 86, which represents 7% of the total (N=1276). These types of messages showed how the facilitators helped to focus the discussion to ensure that the members benefitted from the discussions and to keep the discussion on track and relevant to the course topics. Table 4.11 below serves as a breakdown of this descriptor.

Table 4.11: Direct instruction

Message descriptors and indicators	Number of messages per phase (N=1276)	Percent of messages per phase
<b>Teaching Presence</b>		
Direct instruction (focusing the discussion)	86	7%

Here are some examples of the messages found in this phase:

*“Can you maybe also comment on the Day 1 and Day 2 forum?”* Section 7 of the community transcripts, line 7.

*“It looks good! I would love to see more information. Such as exactly which apps you are using (maybe include the developer name, and a picture of the app icon). Also, the reflection on your experience and how you changed the lesson from the original plan. Also, any PowerPoint or activity sheets, etc. that you used.”* Section 18 of the community transcripts, lines 37 – 41. Conclusion

In conclusion, this chapter presented all the major findings of this research resulting from the analysis of the data collected. This was achieved by using a survey questionnaire and community transcripts. The major findings in this chapter are

further discussed in the next and final chapter of this research. Figure 4.32 serves as a summary of the messages posted based on the codes for each presence.

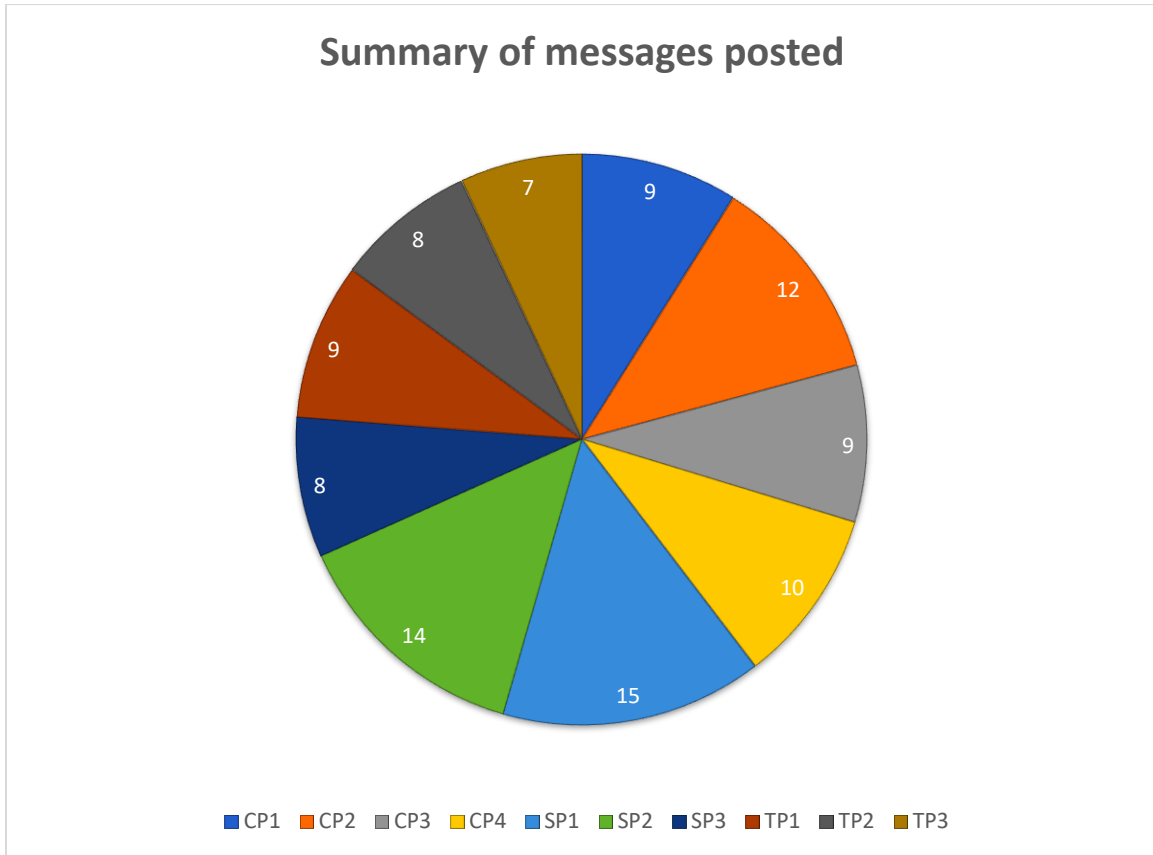


Figure 4.3: Summary of the messages posted as a percentage

## 4.4 SURVEY RESULTS

### PARTICIPANTS' FEEDBACK – BEFORE THE COURSE

An online survey was distributed to the participants before the course. The summary is depicted in Figure 4.4 below. (N=53)

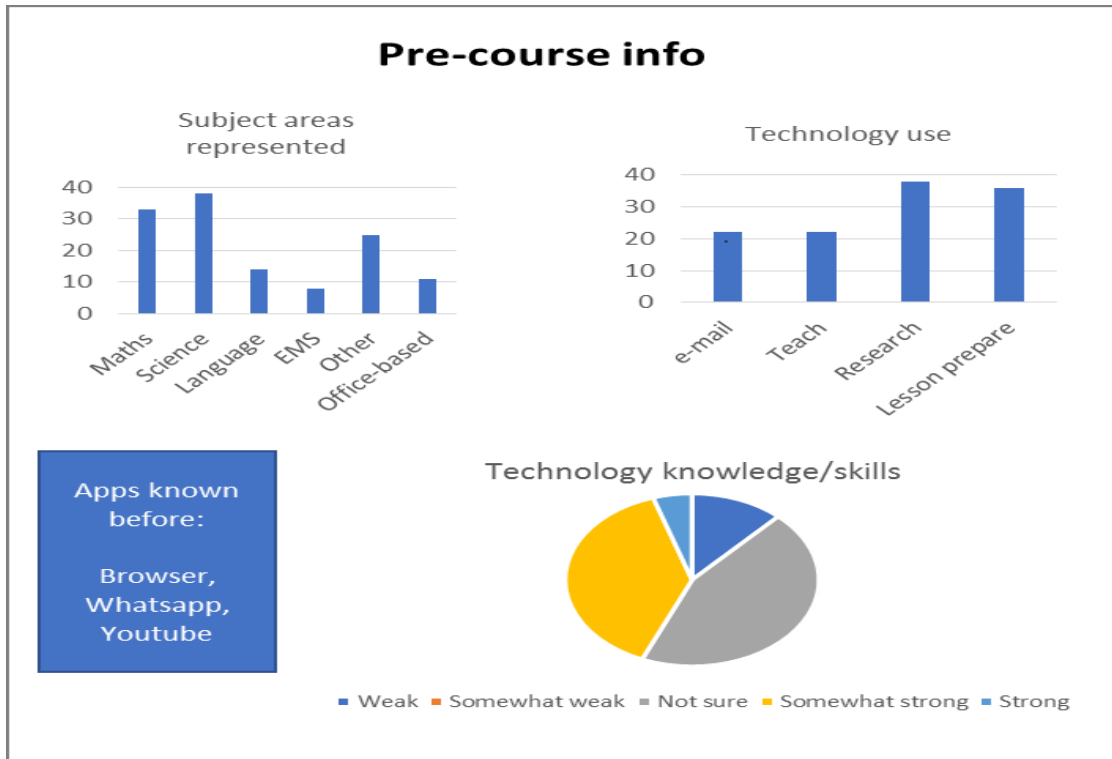


Figure 4.4: Pre-course survey information

The main subject-areas represented were mathematics, science, language, and Economic and Management Sciences. Quite a few participants were office-based officials. The technology used before the course included e-mail, teaching and lesson preparation (using PowerPoints), and online research. The mobile applications known to the participants before the course were browser-apps, WhatsApp and YouTube. Most of the participants indicated that their knowledge of the use of technology in teaching was unclear, weak or somewhat weak. A few indicated that their knowledge was strong, and about a third somewhat strong.

## PARTICIPANTS' FEEDBACK – AFTER THE COURSE (SURVEY)

An online survey was distributed to the participants at the end of the online phase. As explained in sectioned 3.8.1.1. the post-course survey was integrated into the Col framework and has been represented and explained in figure 3.5, therefore, the following section has been divided into the three presences, namely, cognitive, social and teaching. The results thereof are presented in the figures below.

### SOCIAL PRESENCE

The social component focusses on the interaction between members.

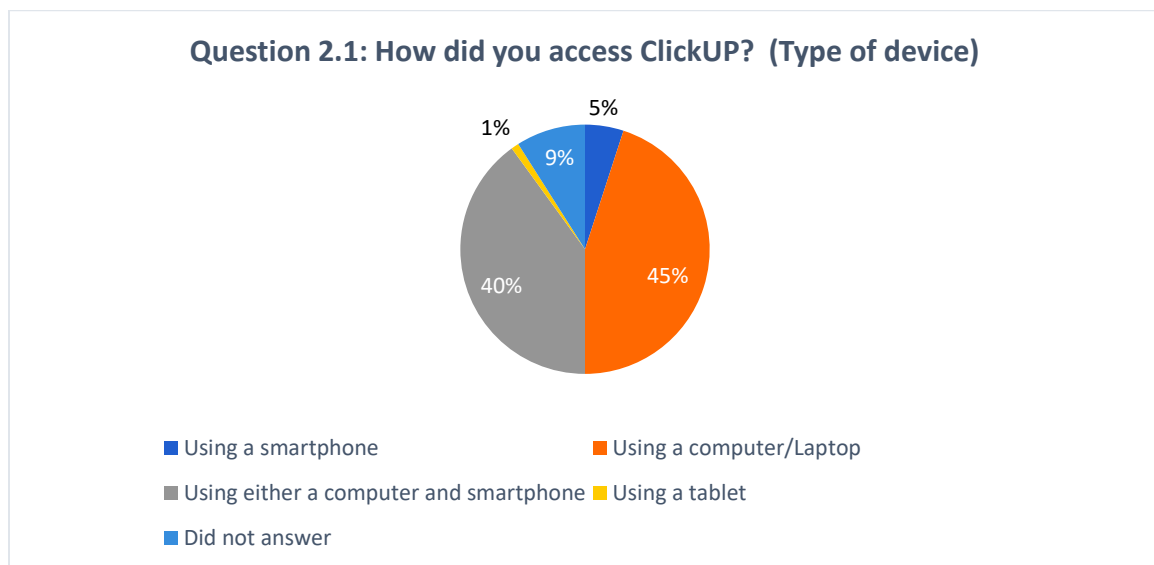


Figure 4.5: Summary of responses to question 2.1. (N=53)

It is clear from the information given in this pie chart (Figure 4.5) that five percent of the teachers accessed ClickUP with their smartphone. Forty-five percent of the teachers did so through a computer or laptop. Forty percent of the teachers used either their computer or a smartphone, while one percent of the teachers could only do so via a tablet. The rest did not answer the question.

Here are some examples of the messages found in this phase:

*"I have accessed ClickUP with my computer."* Question 2.1 of the survey, Response no. 20.

*"I used my Android phone."* Question 2.1 of the survey, Response no. 42.

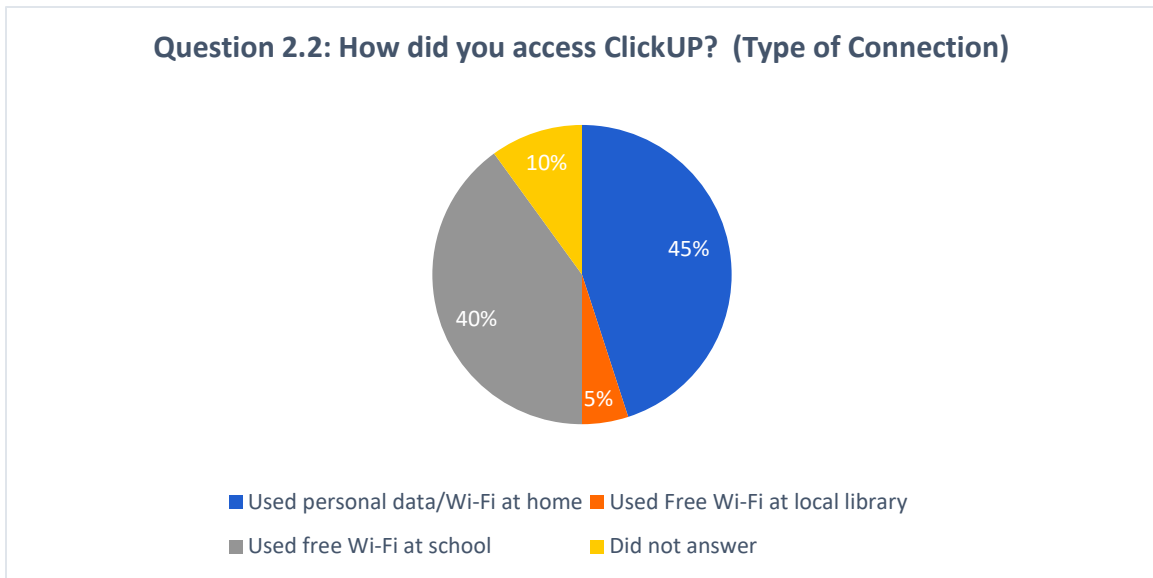


Figure 4.6: Summary of responses to question 2.2. (N=48)

From the information shown in this pie chart (Figure 4.6), forty-five percent of teachers used their personal data/Wi-Fi at home. Five percent of the teachers used the free Wi-Fi available at the local library. Forty percent of the teachers used the free Wi-Fi available at school or their personal data. The remainder of the teachers did not answer the question.

Here are some examples of the messages found in this phase:

*"I have accessed ClickUP using the computer and internet at school."* Question 2.2 of the survey, Response no. 16.

*"I used my own internet at home."* Question 2.2 of the survey, Response no. 24.

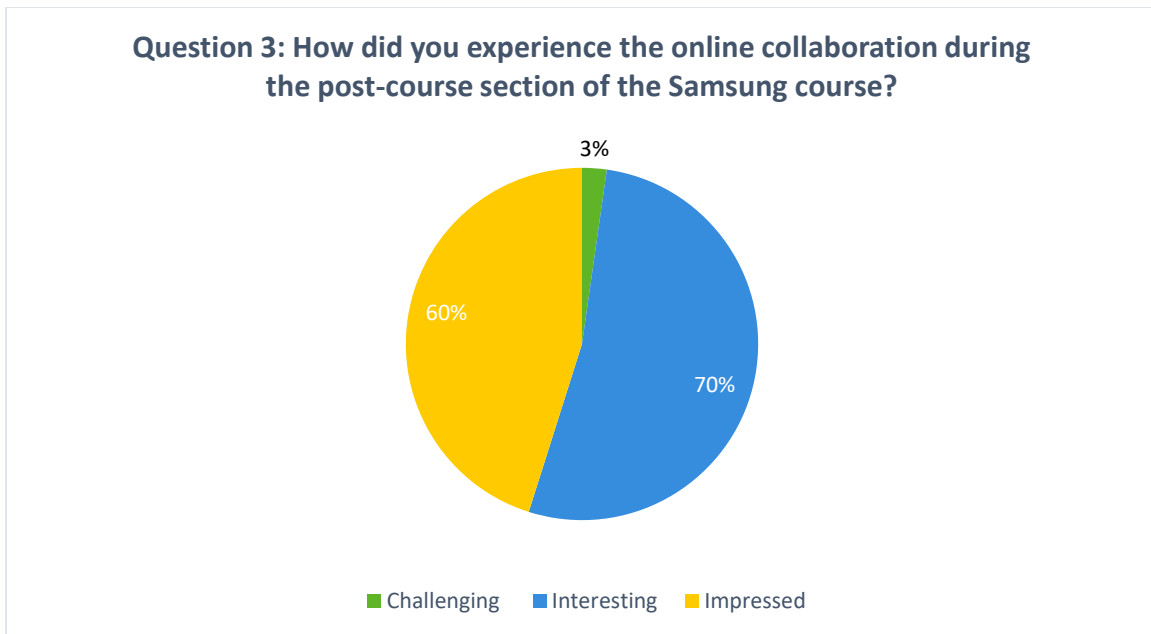


Figure 4.7: Summary of responses to question 3 (N=71)

As shown in this pie chart (Figure 4.7), three percent of teachers found the course challenging as they had problems with either the submission of work or their group members, or internet connectivity. Seventy percent of the teachers found it interesting and felt that they had learnt a lot from the course, which would indeed benefit them in the future. Sixty percent of the teachers were rather impressed with the interaction between peers and the instructors. A positive aspect was that the instructors did not leave them in the dark even after the course was complete. The fact that they could communicate with other teachers was a major advantage.

Here are some examples of the messages found in this phase:

*“I had a lot of challenges with this course, one of the major issues was submitting the assignments and resources.”* Question 3 of the survey, Response no. 32.

*“I found the course to be interesting and beneficial as I have learned many new skills to incorporate technology in my class.”* Question 3 of the survey, Response no. 61.

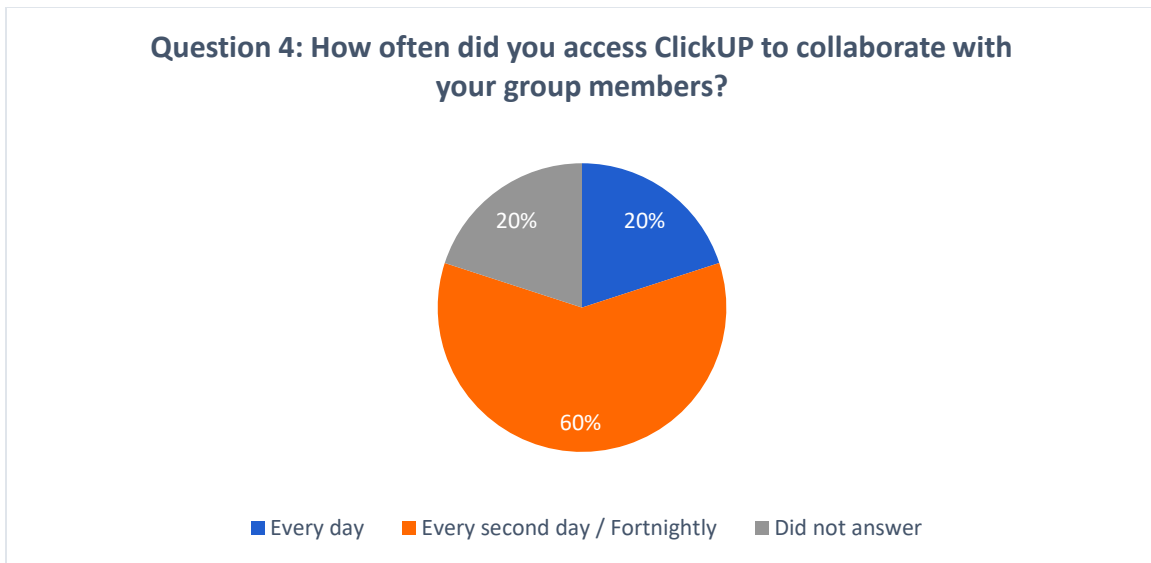


Figure 4.8: Summary of responses to question 4 (N=43)

As displayed in this pie chart (Figure 4.8), twenty percent of teachers accessed ClickUP every day, while sixty percent of the teachers did so every second day or fortnightly. The teachers who had accessed ClickUP regularly had communication with their group members. Those who had accessed it once a week complained that they were “working on their own” or that their group members failed to respond to their messages. One group would communicate via WhatsApp and found a common time when they could all access ClickUP together.

Here are some examples of the messages found in this phase:

*“Our group accessed ClickUp on a daily basis, I realised that because of our frequent discussions the assignment phases were easy.”* Question 4 of the survey, Response no. 10.

*“I had internet problem, so I could only log on about once a week and this was difficult for me because I missed messages from my group.”* Question 4 of the survey, Response no. 41.



Figure 4.9: Summary of responses to question 6 (N=48)

It is clear from the information given in this pie chart (Figure 4.9) that ten percent of the educators found it challenging due to other commitments or limited internet access. Ten percent of the teachers found it challenging at first, but managed to figure out how to use ClickUP thanks to the facilitators. Seventy percent of the educators said that it was helpful and excellent, and stated that it was a good means of learning from other educators.

Here are some examples of the messages found in this phase:

*“I found the online phase very difficult because I did not have internet regularly.”*

Question 6 of the survey, Response no. 08.

*“I received a lot of help from my group during the online phase.”* Question 6 of the survey, Response no. 13.



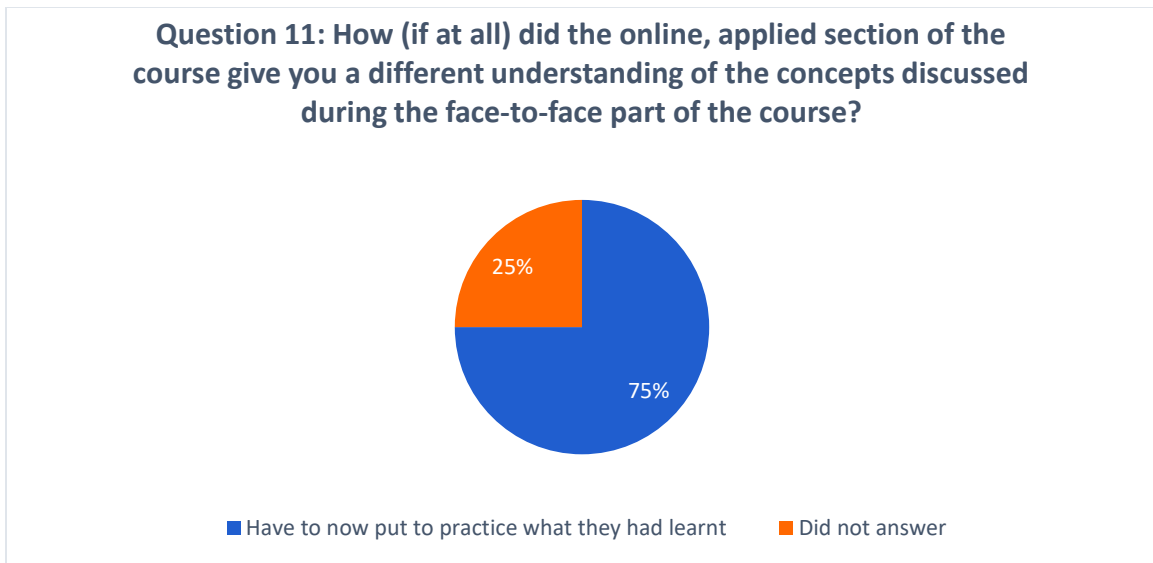


Figure 4.10: Summary of responses to question 11 (N=40)

It is clear from the information given in this pie chart (Figure 4.10) that seventy-five percent stated that they had to put into practice what they had learnt in the course. The teachers felt that they could work at their own pace and share and collaborate with others. It gave them a sense of independence in terms of finding their way around what worked for them and what did not, as well as providing the opportunity to share ideas with other colleagues. The rest left the question unanswered.

Here are some examples of the messages found in this phase:

*“Members have shared resources and links that allowed me to use apps in the classroom and this enhanced my lesson.”* Question 11 of the survey, Response no. 19.

*“The online course helped me to work at my own speed and also was easy to communicate with other members since I lived far.”* Question 11 of the survey, Response no. 30.

## TEACHING PRESENCE

The teaching component focusses on the method of delivery of the content.

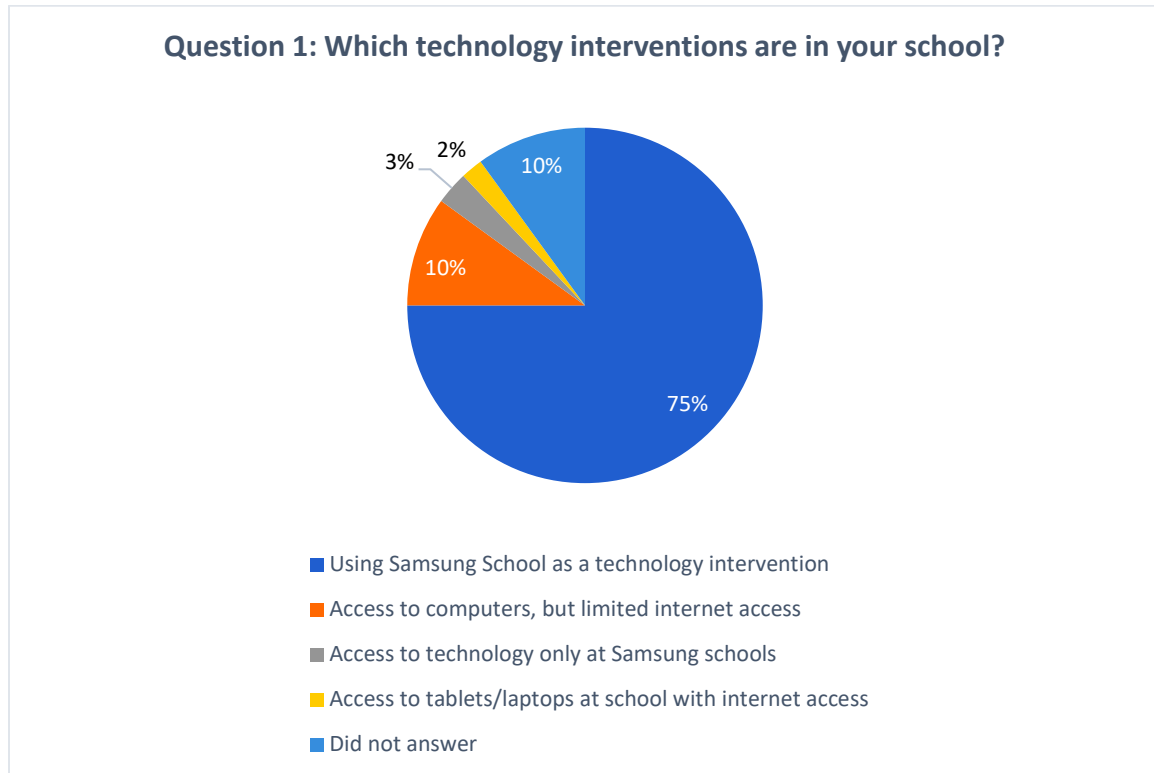


Figure 4.11: Summary of responses to question 1 (N=48)

The evidence from this pie chart (Figure 4.11) shows that seventy-five percent of the teachers used the Samsung School as a technology intervention. Ten percent of the teachers had computers; however, internet access was limited or did not work. Two percent of the teachers only had access to technology at the Samsung School, while three percent of the teachers had access to tablets and laptops at school with internet connectivity. One teacher was an ICT coordinator who used to conduct workshops for colleagues on how to use a “solar powered internet school”. However, the container provided by Samsung was broken. The remainder of the teachers did not answer the first question.

Here are some examples of the messages found in this phase:

*“Our school is currently using tablets, so I used that with the school internet connection.”* Question 1 of the survey, Response no. 15.

*“I used my personal laptop but internet connection was a challenge.”* Question 1 of the survey, Response no. 22.

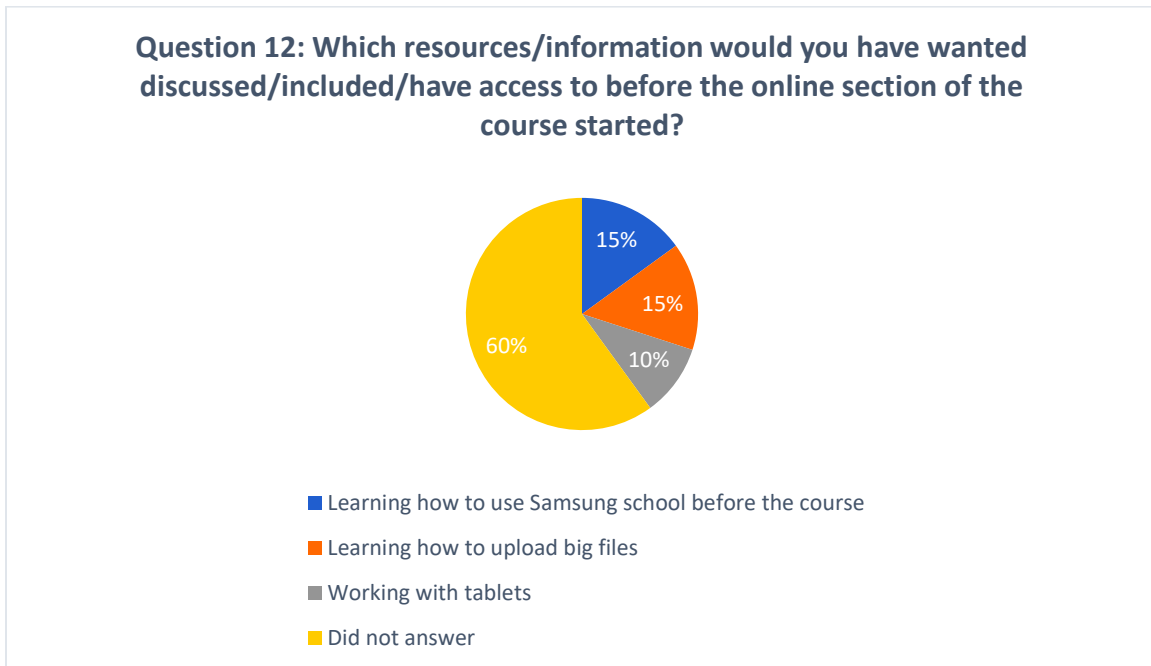


Figure 4.12: Summary of responses to question 12 (N=21)

From the information shown in this pie chart (Figure 4.12), fifteen percent of the educators felt that learning how to use the Samsung School before the course started would be useful. Fifteen percent of the educators felt that learning how to upload big files, pictures and videos online could have been emphasised more during the course (they should have had a practice session). Ten percent of the educators felt that working with the tablets beforehand and perhaps being given one would have been easier. This would have been the case as they would be familiar with how to use the tablet and due to familiarity with the tablet, perhaps their tasks would have been made easier.

Here are some examples of the messages found in this phase:

*“The uploading and submission of large files and assignments should have been explained more during the face-to-face phase.”* Question 12 of the survey, Response no. 08.

*“More hands-on approach on how to use tablets etc.”* Question 12 of the survey, Response no. 15.

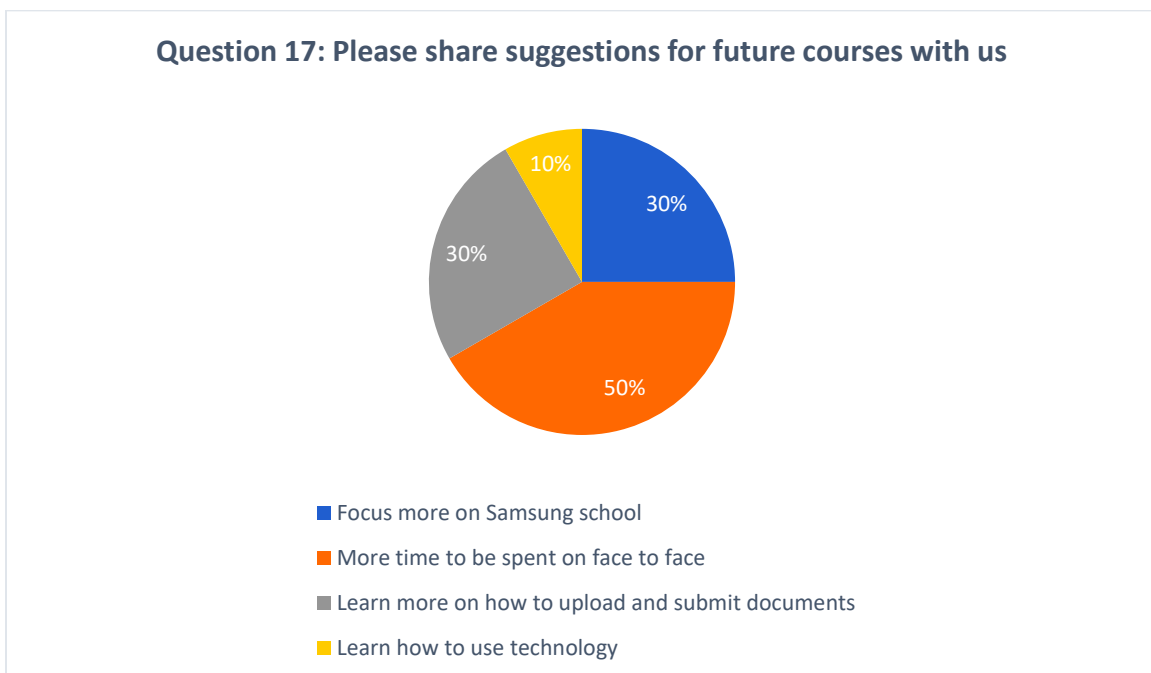


Figure 4.13: Summary of responses to question 17 (N=64)

From the information shown in this pie chart (Figure 4.13), thirty percent of the educators felt that the focus should be more on the Samsung School during the first day instead of how to use the device as the device works very similarly to a cell phone. Fifty percent suggested that there should be more time to work together face to face. Thirty percent felt that they needed to learn more on how to upload and submit documents, while ten percent learned how to use technology only and planned to move away from using paper-based manuals.

Here are some examples of the messages found in this phase:

*“I feel the face-to-face session should be longer, it rushed and there were many things to remember.”* Question 17 of the survey, Response no. 59.

*“More focus on how to use the system for example, uploading documents.”* Question 17 of the survey, Response no. 46.

## COGNITIVE PRESENCE

The cognitive presence focusses on the online process as a leaning tool as well as the lesson study approach and the course itself.

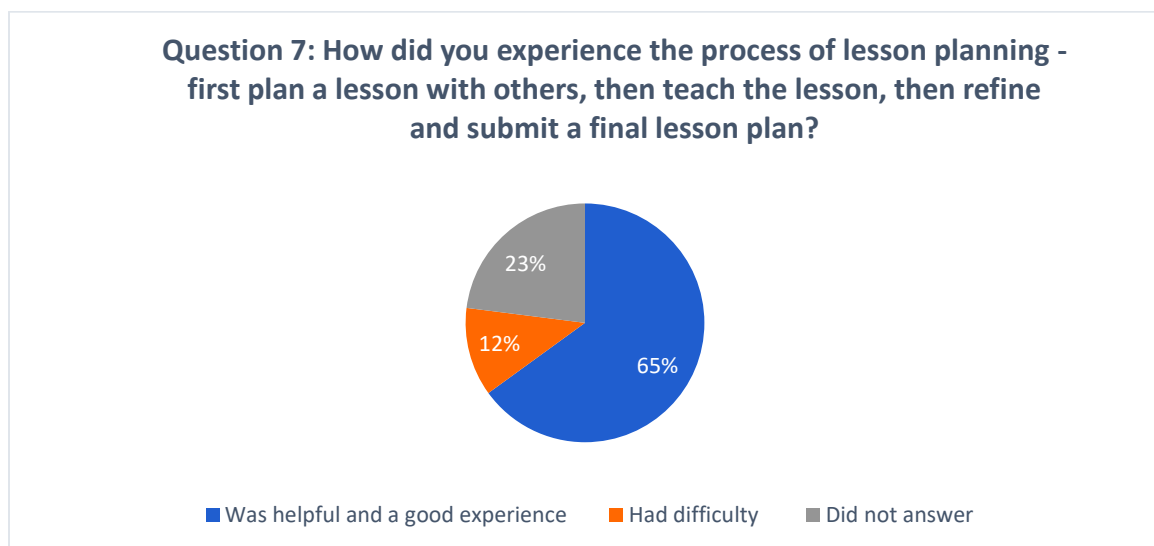


Figure 4.14: Summary of responses to question 7 (N=41)

From the information shown in this pie chart (Figure 4.14), twelve percent of the teachers had difficulty submitting their lesson plans online. Sixty-five percent of the respondents found it helpful and thought it was a good experience of sharing ideas. Since the teachers could communicate with each other, it made things much easier as they could communicate not only their ideas but also the difficulties and challenges that they experienced. The rest of the educators did not answer.

Here are some examples of the messages found in this phase:

*“I had a good experience with my group, we shared resources and communicated regularly.”* Question 7 of the survey, Response no. 05.

*“I found it challenging because I didn’t have time to do the planning according to my group.”* Question 7 of the survey, Response no. 10.



Figure 4.15: Summary of responses to question 8 (N=38)

As shown in this pie chart (Figure 4.15), thirty percent of the educators experienced problems with internet connection. Forty percent of the educators found working in a group challenging as communication was a problem or work was not being done by fellow group members. One percent of the educators had a problem with presenting the lesson as it was exam time. The educators used file exchange to share the lesson plan, which they found was easy and quick to use. The rest of the educators did not answer this question.

Here are some examples of the messages found in this phase:

*“Teaching the lesson according to the objectives made by the group.”* Question 8 of the survey, Response no. 35.

*"I did not have a reliable internet connection."* Question 8 of the survey, Response no. 29.

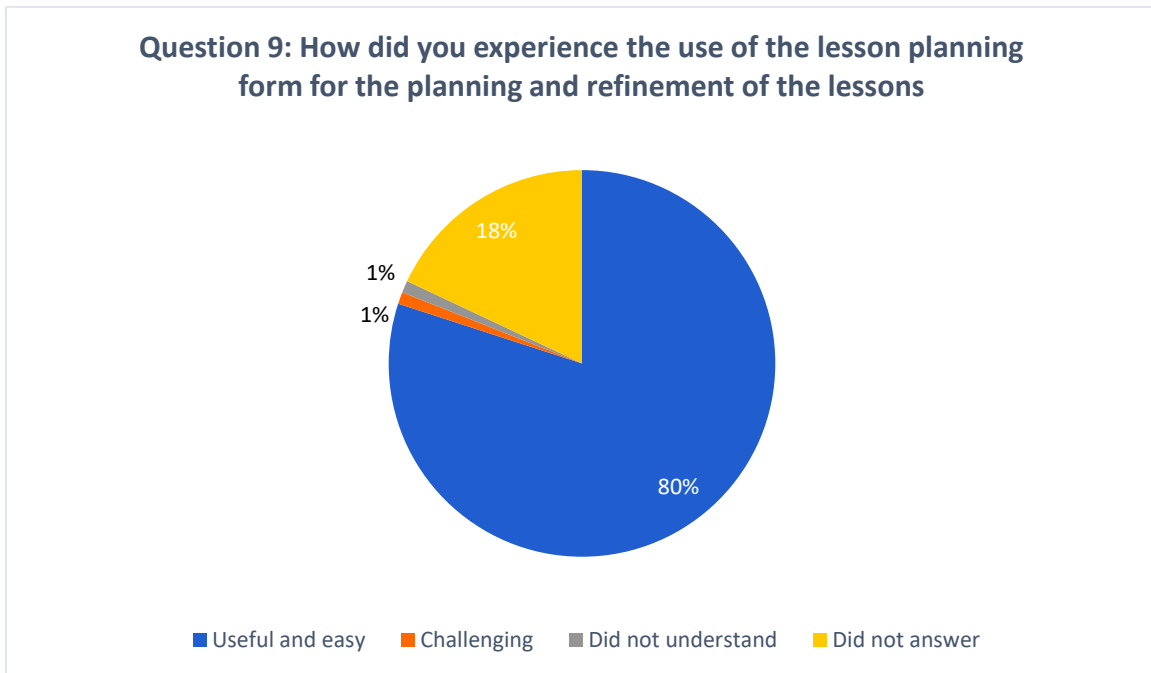


Figure 4.16: Summary of responses to question 9 (N=44)

As displayed in this pie chart (Figure 4.16), eighty percent of the educators thought it was useful and easy to use. It served as a good guide as the educators could see what worked for them and what did not. One percent of the educators did not understand the 'symbols', while one percent of the educators found it challenging as they did not have any 'Samsung equipment'. The rest left the question unanswered.

Here are some examples of the messages found in this phase:

*"I found the process to be very easy and effective."* Question 9 of the survey, Response no. 05.

*"It was challenging."* Question 9 of the survey, Response no. 11.

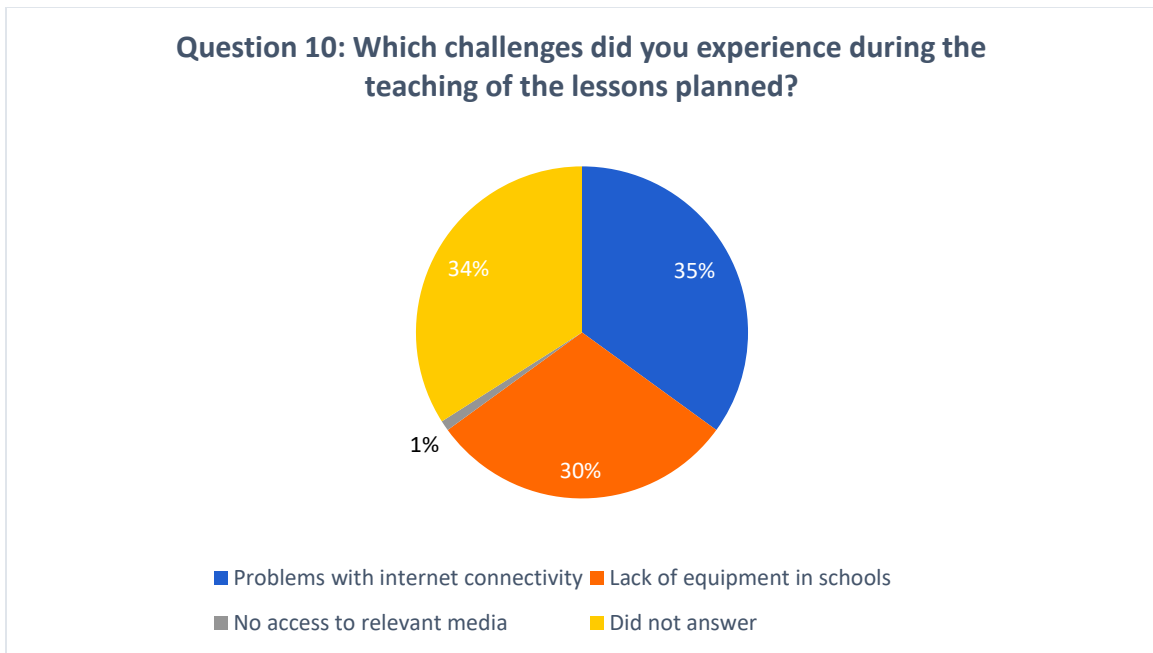


Figure 4.17: Summary of responses to question 10 (N=52)

The evidence from this pie chart (Figure 4.17) shows that thirty-five percent of the educators had problems with internet connectivity. Thirty percent of the educators complained about the lack of equipment in their school. This made it difficult to conduct or complete the lesson. One percent of the educators had no access to relevant media, while another found it challenging to maintain ‘enthusiasm’. The rest of the educators did not answer this question.

Here are some examples of the messages found in this phase:

*“Our school did not have laptops or projectors to conduct the lessons.”* Question 10 of the survey, Response no. 15.

*“It was difficult due to the internet connection problems.”* Question 10 of the survey, Response no. 31.



## OVERLAPPING OF PRESENCES

The rest of the survey questions fit into the overlapping presences. Based on the responses of the participants these results could not be classified into one presence.

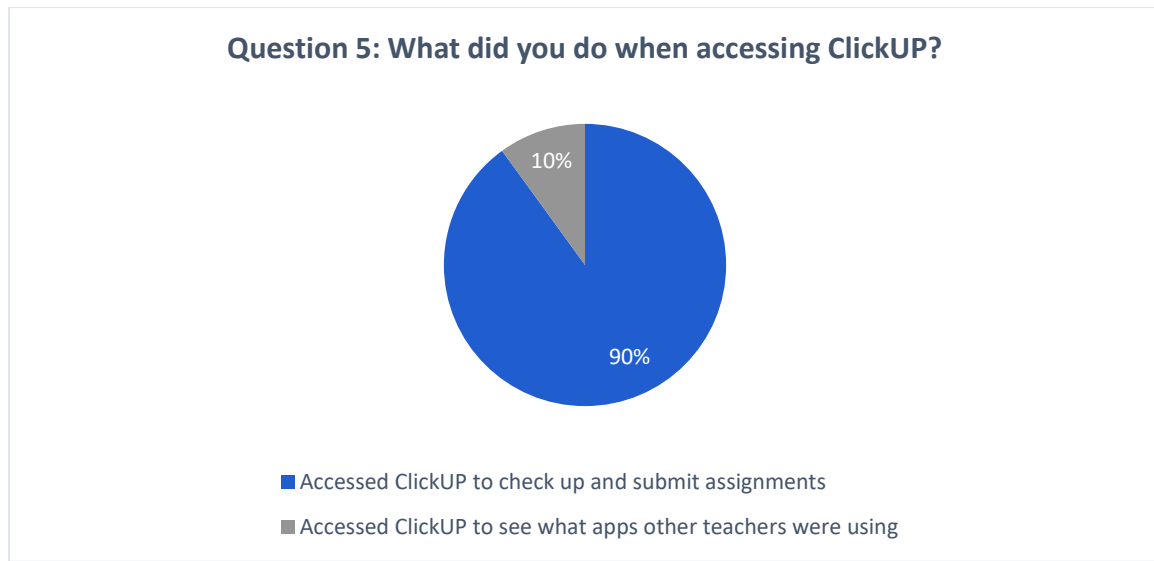


Figure 4.18: Summary of responses to question 5 (N=53)

The evidence from this pie chart (Figure 4.18) shows that ninety percent of the users accessed ClickUP to check up and submit assignments. Ten percent of the educators used it as a means of seeing what apps other teachers were using, and used it as a means of communicating about useful apps to use in the classroom. All users would read and post comments. One teacher mentioned that they had posted pictures.

Here are some examples of the messages found in this phase:

*"I used it to submit assignments."* Question 5 of the survey, Response no. 25.

*"I accessed ClickUp to use the resource section."* Question 5 of the survey, Response no. 41.

**Question 13: What worked well for you during the Samsung course - from the first day we met face-to-face until the end of the online collaboration and last submissions?**

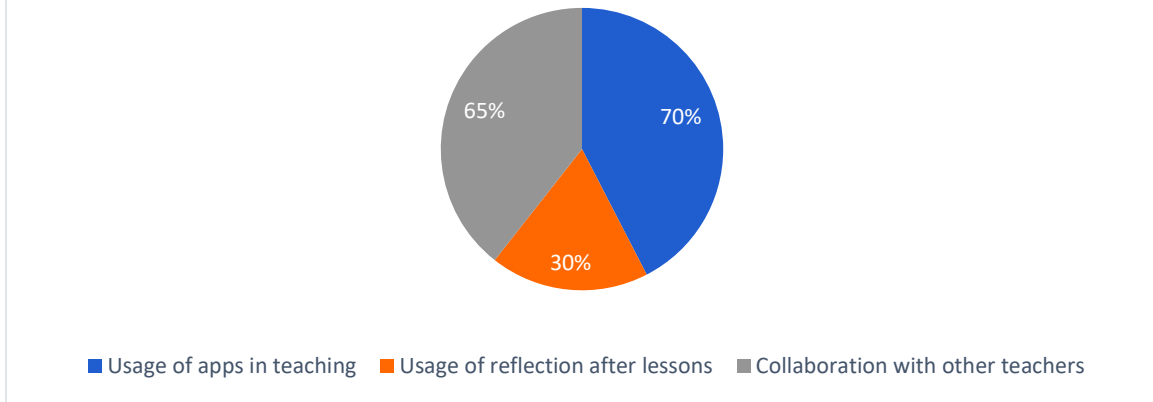


Figure 4.19: Summary of responses to question 13 (N=88)

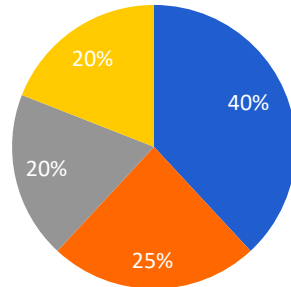
As shown in this pie chart (Figure 4.19), seventy percent of the teachers stated that making use of apps during their lesson enhanced the lesson and made their work easier. Thirty percent stated that the usage of reflections after lessons was useful as the educators knew where they could improve. Sixty-five percent felt that collaboration with other teachers and reading about their experiences while teaching was helpful. The teachers could select more than one answer for this question.

Here are some examples of the messages found in this phase:

*“The collaboration amongst my peers is what worked well for me.”* Question 13 of the survey, Response no. 84.

*“The use of the different apps for Life Sciences helped me to enhance my lesson. I got these apps from the resources shared section.”* Question 13 of the survey, Response no. 75.

### Question 14: Which section/topic/experience in the course did you find the most valuable?



■ Choosing, usage and sharing of apps    ■ Lesson planning and preparation  
■ The ability to share ideas and experience    ■ Online facilitation

Figure 4.20: Summary of responses to question 14 (N=56)

As displayed in this pie chart (Figure 4.20), forty percent of the educators felt that the choosing, usage and sharing of apps was useful. Twenty-five percent felt that the lesson planning and preparation were the most valuable. Twenty percent felt that the ability to share ideas and experiences, despite being in different provinces, was valuable. Twenty percent felt that online facilitation was valuable.

Here are some examples of the messages found in this phase:

*“I found the sharing of apps to be the most useful.”* Question 14 of the survey, Response no. 28.

*“The lesson planning phase was the most valuable.”* Question 14 of the survey, Response no. 17.

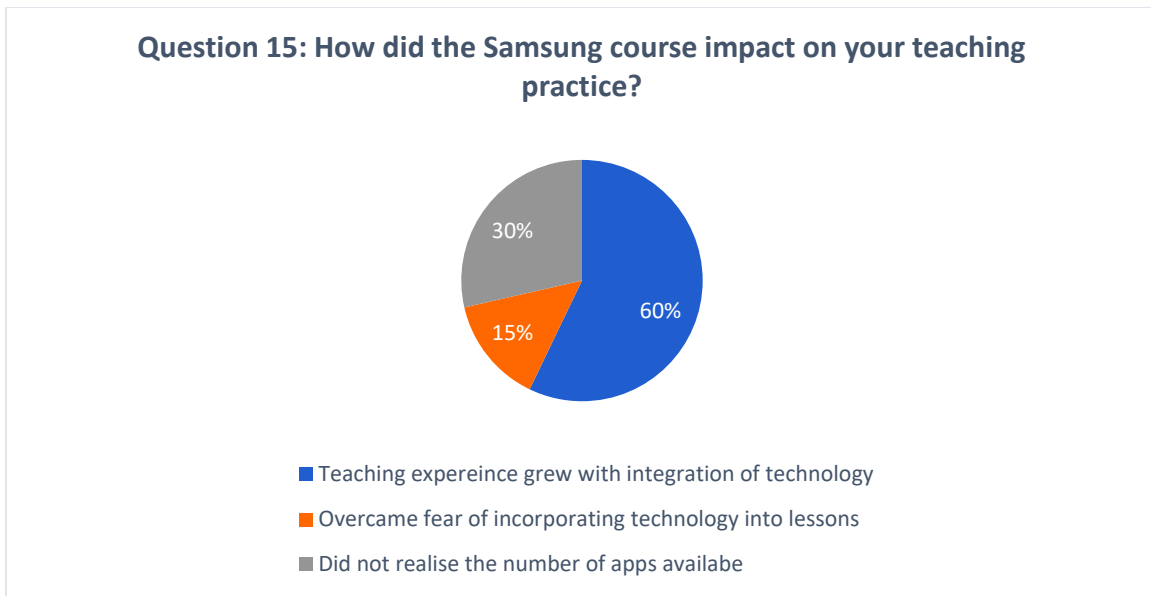


Figure 4.21: Summary of responses to question 15 (N=56)

The evidence from this pie chart (Figure 4.21) shows that sixty percent of the educators’ teaching experience grew with the integration of technology. Fifteen percent of the teachers overcame the ‘fear’ of incorporating or allowing students to use tablets in the class, and realised how interactive and fun a class can be with the integration of technology. Thirty percent did not realise the number of apps available for learners to use in a class, which enhance the lesson and break monotony.

Here are some examples of the messages found in this phase:

*“I feel more confident using apps in my classroom. I don’t feel so overwhelmed to use technology in the class.”* Question 15 of the survey, Response no. 22

*“I was shocked to find out how many useful apps there were for the subjects that I am teaching.”* Question 15 of the survey, Response no. 40.

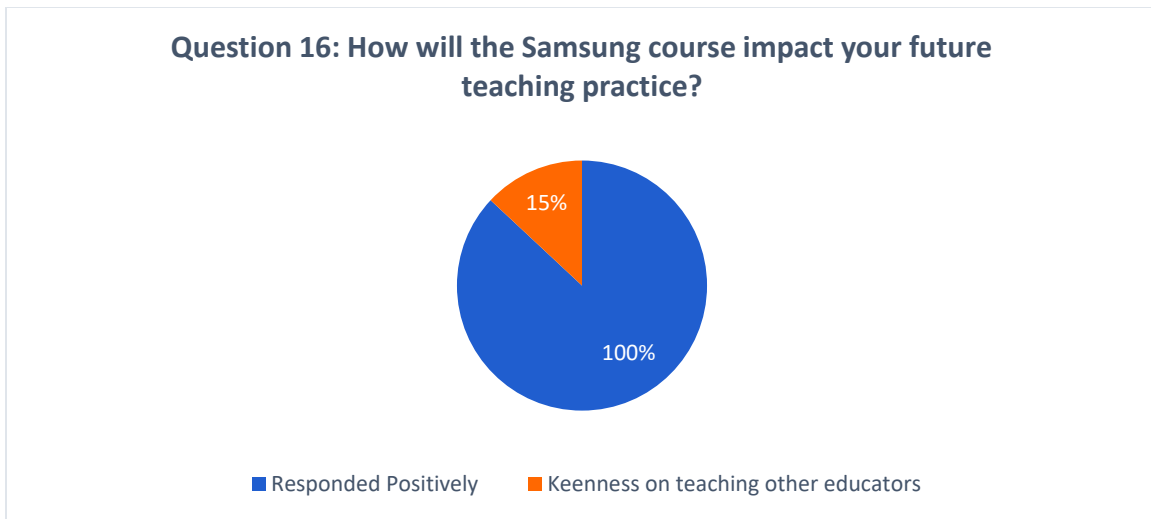


Figure 4.22: Summary of responses to question 16 (N=63)

It is clear from the information given in this pie chart (Figure 4.22) that all of the respondents (100%) responded positively that they planned to integrate technology into their teaching. They realised how simple it can be and how it enhances the lesson. Another advantage is that learners also feel encouraged to come to class to see what is going to happen next. Productivity and efficiency are key when it comes to integrating technology into a lesson. Fifteen percent of the teachers showed keenness to encourage and teach other educators how to integrate technology into their classrooms as well.

Here are some examples of the messages found in this phase:

*“It provided me with the skills needed to integrate technology in my classroom.”*

Question 16 of the survey, Response no. 37.

*“It was very valuable as I can now teach other teachers in my school on the process of utilizing technology in the class.”* Question 16 of the survey, Response no. 53.

# **CHAPTER 5 INTERPRETATION AND CONCLUSION**

## **5.1 INTRODUCTION**

This chapter discusses the conclusions drawn from the data analysis and the results based on the data collected from the survey and community transcript analysis. The primary research question of the study was:

- How can an Online Community of Inquiry support teachers to plan for teaching with technology?

The secondary questions guiding this study were:

- 1) How did the social presence in the Col framework support teachers to plan for teaching with technology?
- 2) How did the cognitive presence in the Col framework support teachers to plan for teaching with technology?
- 3) How did the teaching presence in the Col framework support teachers to plan for teaching with technology?

## **5.2 HOW DID THE SOCIAL PRESENCE IN THE COI FRAMEWORK SUPPORT TEACHERS TO PLAN FOR TEACHING WITH TECHNOLOGY?**

The online community existing for the members during the course functioned successfully. The members participated frequently, exchanged resources, and provided deep and meaningful reflection. It was evident from the community transcripts that the dialogues exchanged between the members and facilitators served as a stepping stone for members to develop their teaching styles and methods that would benefit the learners. The social element of the community assisted the participants to develop a sense of collaboration, and increased their subject knowledge through peer-focused learning (lesson study approach). It also served as a platform that allowed the members to receive advice and criticism on teaching styles/methods that would change or effect learning objectives or that

would serve as a solution to the challenges encountered in the classroom or when planning to teach using technology.

The members were provided with opportunities to express their views/ideas and to respond to other members' messages (either providing solutions to problems posted or mentioning similarities to the problems that they had encountered themselves). It was frequently mentioned by the members in the community transcripts how the collaboration aided in providing solutions to the challenges at school and allowed them to develop professionally through the feedback that they received from the presentation of their lessons. Not all of the groups interacted for the same amount of time and thus not all of the groups succeeded in the course. Based on the community transcripts, some groups communicated more once they felt comfortable conversing through the online medium.

### **5.3 HOW DID THE COGNITIVE PRESENCE IN THE COI FRAMEWORK SUPPORT TEACHERS TO PLAN FOR TEACHING WITH TECHNOLOGY?**

The participants who replied to trigger messages (sense of puzzlement) quickly found methods/solutions that resulted in the changes made to a specific member's teaching styles/method. This served as a platform that enabled quick responses to the constant changes required in education; this was reinforced by the messages found within the community transcripts. The community, through the lesson study approach, supported the awareness that teaching methods were persistently altering and that the participants had been able to meet this change through the reflection and refinement and re-teaching of their lessons to find the best possible outcome. Several changes required to be made by the participants were due to the challenges that they experienced in the classroom or in preparation to teach the class. This allowed the community to be a source for problem solving. There were 117 messages recognised from the community transcripts (see Table 4.4) responding to problem questions.

A key component of the cognitive presence is the allowance of deep, meaningful reflection and autonomous study. The cognitive presence merged the construction

of new ideas and existing knowledge in a method that allowed the members to reflect on their assumptions and integrate these into their own concepts. Changes between the dialogue of course-related issues and non-course related issues arose within the community. The members made use of the course resources and other types of content (feedback from peers and facilitators) to create new knowledge by combining the process with informal exchanges in which academic matters (related to the content of the course) were communicated in a relaxed, comfortable setting, ensuring flexibility for the members.

#### **5.4 HOW DID THE TEACHING PRESENCE IN THE COI FRAMEWORK SUPPORT TEACHERS TO PLAN FOR TEACHING WITH TECHNOLOGY?**

By examining the facilitator's activities, the researcher was able to identify how the facilitators created a friendly and collective community focused on guiding, supporting and motivating the members of the community. The facilitators created opportunities for members to interact and get to know each other. Members who found it difficult to upload their videos/lesson plans/assignments were assisted by the facilitators. This was done through creating a tutorial on how to upload on the LMS to ease the process and lessen the difficulties experienced by the members. A face-to-face session was also implemented before the online community was created to provide an introduction to the course.

Teaching presence was maintained within the community through the clarification of goals/objectives, direct instruction (in terms of finding ways for members to carry on through their challenges). This focussed the discussions so that the focus was not lost. Strategies were used to increase and maintain group cohesion by emailing members of certain groups reminding them to participate in their group, finding new groups for members that were 'working alone' and not getting assistance from the current group. This was done by greeting members and addressing them by name, sharing personal feeling/meaning regarding the work that members submitted and by providing positive reinforcement through feedback.



## **5.5 HOW CAN AN ONLINE COMMUNITY OF INQUIRY SUPPORT TEACHERS TO PLAN FOR TEACHING WITH TECHNOLOGY?**

The teaching sector is continuously changing. Researchers (Gallimore, Dalton & Tharp, 1986) explain that as new information is spread amongst teachers, there is a demand for constant development so that teachers are knowledgeable, up-to-date and ready to meet these changes. The continuous process of an online community serves as a platform that allows for the constant development of its members. The online community was resourceful and meaningful in its information exchange. This was clear from the total number of messages coded in the transcript analysis (N=1276). All three presences were present in the transcript analysis findings, indicating the sustainability of the community. The members of the community went online when it was convenient for them and completed the required activities, hence allowing for flexibility, which current professional development courses lack. The online community provided guidance and assistance to the members and catered to the continuous changes with the lesson planning, re-planning and refinement of those lessons. The community played a vital role in the creation of meaningful teaching and higher-order learning as it allowed for members to reflect, advise and critique current teaching approaches. The members could then provide the best way to move forward and incorporate technology into the classroom to enhance learning.

Through the core of the three overlying presences (cognitive, social, and teaching), a rich and meaningful experience was created for the members. It was also through the authenticity and relevancy that allowed for this community to be successful. The limitation of location, background or teaching experience of the participants did not hinder the process of development amongst the members as all members were in one place (online) sharing resources, helping, guiding and motivating each other.

## **5.6 COMPONENTS OF A COMMUNITY FOUND IN LITERATURE THAT APPLIED TO THIS STUDY.**

As discussed in the literature study, the components of a community were applied to the community of this study. All four components were found, namely, collective, personal, operational, and manifest. Figure 5.1 outlines the components found within the community used for this study. Elements within the collective component were common objectives (learn how to plan to teach using technology), collective achievement (the completion of the assignments, lesson plans and the course), common collaboration (achieved through the community by allowing members to work together as a group.)

Elements within the personal component were participation and belonging (majority of the members participated frequently, and members felt that they were acknowledged), a common past (all members in the education field), motivation and guidance (facilitators and peers motivated each other within the community and during the lesson study approach.)

Elements within the manifest component were collectively built content (group assignments and lesson plans using lesson study approach), cooperative and shared learning (through the resource and sharing section, and thought positive feedback members learned from each other on how to better their teaching plans), and sustainability (the community was open for a short period, but members interacted through the community till the end of the course.) Elements within the operational component were Joint rules & behaviour (Members were asked to respect each other, comment and interact regularly and stay focused on the topic), Societal communication within a practical and collaborative setting (Group communication within the community), and a Shared social setting (the platform that was created, community, allowed members to work in a collaborative manner).

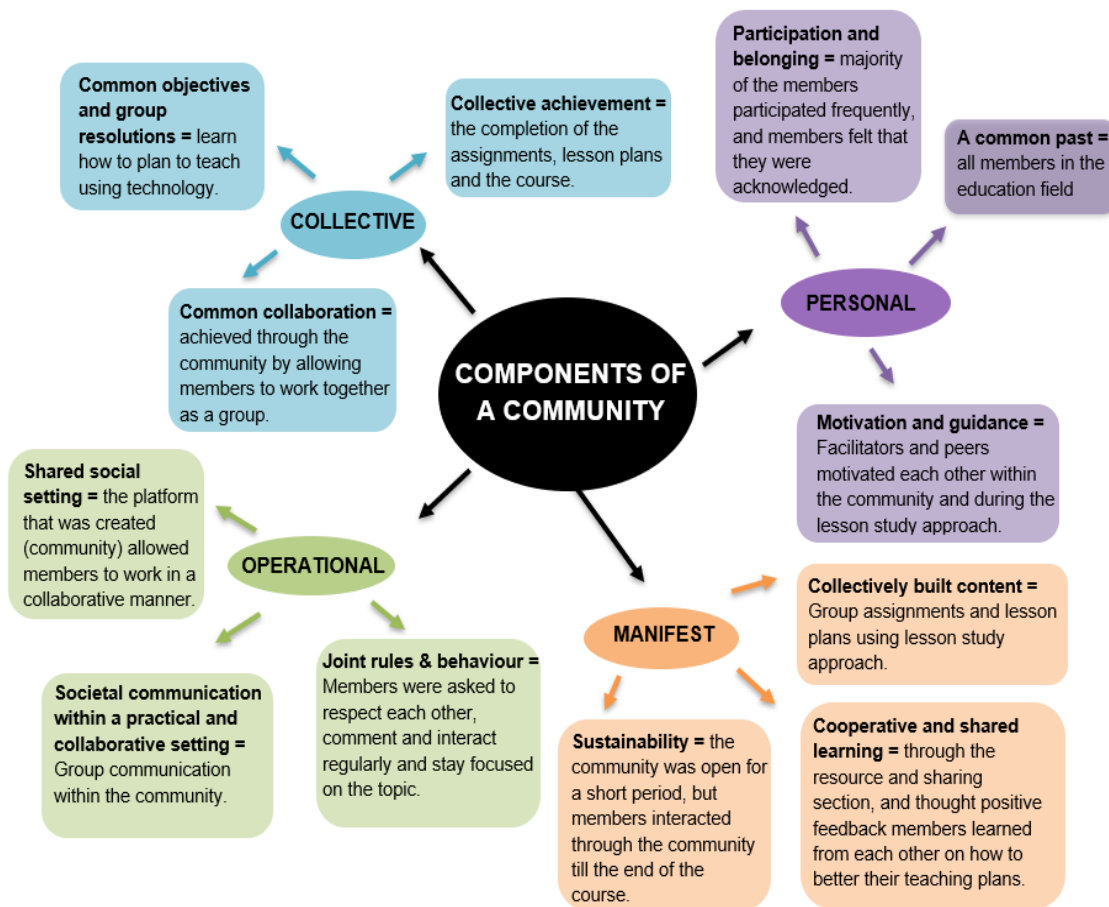


Figure 5.1: Components of a community applied to the community of this study

## 5.7 CHALLENGES

Members within the community struggled to post/upload their assignments. A tutorial was uploaded at a later stage to explain the process. This could have been included during the face-to-face phase, so that the members are not overwhelmed. Not all the members were able to teach in the classrooms, this impacted negatively on the participation of some of the groups, since some of the members were admin staff, they could not present lessons in the class and take part in the lesson study activities. Some of the members couldn't present their lessons because of the school holidays or school examinations taking place, the community could have run for a longer period to allow for a much smoother process. Participation amongst all

members did prove as a challenge, solutions or guidelines for the removal of these barriers that prevent effective and constant participation need to be established. Different discussion forums were created to focus on specific topics, but some members posted the same message in all forums.

## **5.8 RECOMMENDATIONS**

Belonging to an online community creates a platform that provides guidance and learning for educators, as seen in the community transcripts of this study. The opportunity that the community creates for the members to receive professional development, just-in-time learning, guidance, motivation and support serves as an irreplaceable resource for teachers. More teachers need to have access to such communities and thus more online communities need to be established and provided to support the development of teachers. The demand is high for learning establishments that can provide teachers with flexible and reliable learning. Thus, more awareness needs to be made regarding the exposure to and creation of online communities. Online communities enable their members to be in control of their learning. Moreover, this type of learning needs to be recognised as an official alternative to professional learning and development.

## **5.9 CONTRIBUTION OF THE STUDY**

The study was conducted to observe how a community of educators planned to teach using technology by using a lesson study approach.

**Practical Contribution** – The teachers in this study on numerous occasions express the importance of continuous development for teachers to keep up with current education innovations. A study such as this which provided training to a group of teachers to integrate technology into their lessons. An exercise such as this if conducted appropriately can be very fruitful to any school as it creates a chain reaction and can spread technology implementation and integration. The training provided teachers with professional development and the community provided a platform for teachers to share and reflect on their challenges and achievements.

Which also allowed for support, motivation and the exchange of resources which as a result enhanced their critical thinking through collaboration. The lesson study component allowed for the individuals to reflect on their growth and focus on improving their lessons. The value of a community is in the sharing and reflecting of experiences to assist one another.

**Methodological Contribution** – The nature of the action research contributed to a community within which teachers' identity could develop. Using the reflection process in the lesson study approach, it was found that teachers were able to track their own growth. This way they become more aware of their teaching methods. A process such as this mobile learning workshop may stimulate teachers to become more open minded to various teaching methods. This study does not change the research methodology however it utilises action research to structure technical identity within a community.

## **5.10 CONCLUSION**

In this study, the online community was created for teachers, who had taken on two roles, that of the teacher (teaching in the classroom) and learner (learning how to plan for teaching with technology). The three presences of the Col framework allowed the community to develop into a platform that supported the members both professionally in terms of skills and knowledge, and emotionally in terms of support, motivation and guidance through a lesson study approach. The community has shown to be self-motivated, adaptable to the needs of its members, and rich in information exchange and resources. In the end, the community proved to be an efficient platform for meaningful information exchange and the provision of resources.

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## **APPENDIX A**

### Samsung Course

### Pre-Course Survey

#### Administered through ClickUP

1. What is your job-description?
2. Which subjects do you teach and to which grades?
3. Do you have access to WiFi at your institution?
  - I. Yes
  - II. No
  - III. Limited
4. Which mobile devices will you bring to the workshop? Please select all options:
  - I. Samsung Tablet
  - II. Other Android Device
  - III. Apple Device
  - IV. Laptop
  - V. Smart Phone
5. If applicable, please indicate the model and software version of the Samsung device you intend to bring along (if known).
6. What are you currently using the above-mentioned devices for in relation to your job in general?



7. Do you use these devices currently for teaching? If yes, how do you use it and how do your learners use it?
8. What is your most favourite Mobile App and what do you use it for?
9. Rate your knowledge and skills of teaching with technology
  - A. Weak
  - B. Somewhat Weak
  - C. Not Sure
  - D. Somewhat Strong
  - E. Strong
10. Which of the following accounts do you already have set up on your mobile device? Select all relevant.
  - I. Samsung Account
  - II. Google Account
  - III. Gmail Account
11. What are your expectations of the Samsung workshop?

## **APPENDIX B**

### Samsung Course

### Post-Course Survey

#### Administered through ClickUP

1. Which technology interventions are in your school? Samsung School? Other interventions?
2. How did you access ClickUP?  
Which devices did you use (Computer, laptop, tablet, smart phone)?  
Where did you access it – at work, in an internet café, with free Wi-Fi, at home with your own data?
3. How did you experience the online collaboration during the post-course section of the Samsung course?
4. How often did you access ClickUP to collaborate with your group members?
5. What did you do when accessing ClickUP? (Reading other's posts only, reading and replying, posting comments, submit material, download material etc.)
6. How did you experience the online facilitation?
7. How did you experience the process of lesson planning – first plan a lesson with others, then teach the lesson, then refine and submit a final lesson plan?
8. Which challenges did you experience during the online lesson planning process?

9. How did you experience the use of the lesson planning form for the planning and refinement of the lessons?
10. Which challenges did you experience during the teaching of the lessons planned?
11. How (if at all) did the online, applied section of the course give you a different understanding of the concepts discussed during the face-to-face part of the course?
12. Which resources/information would you have wanted discussed/included/have access to before the online section of the course started?
13. What worked well for you during the Samsung course – from the first day we met face-to-face till the end of the online collaboration and last submissions?
14. Which section/topic/experience of the course did you find most valuable?
15. How did the Samsung course impact on your teaching practice?
16. How will the Samsung course impact your future teaching practice?
17. Please share suggestions for future courses with us.