

University of Southern Queensland

**ENCOURAGING LEARNER  
INTERACTION, ENGAGEMENT AND  
ATTENTION IN THE VIRTUAL  
CLASSROOM**

**(AN INVESTIGATION INTO THE PHENOMENON OF MULTITASKING).**

A Dissertation submitted by

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For the award of

Doctor of Education

2016

# ABSTRACT

The use of virtual classrooms (VC) in the Vocational Education and Training (VET) sector is becoming increasingly popular due to the ability for learners from any location to access education online in real time with a teacher, and to participate in an environment that simulates a face to face classroom. However, a major area of concern that has emerged is the tendency for learners to multitask (task switch) rather than remain attentive and focused on the content being delivered.

This study was designed to investigate whether learners are task switching while participating in a VC and whether this affects the teaching and learning that occurs. Using Moore's (1993) transactional distance theory as the theoretical framework, this study explored whether a teacher's design of the VC session, selection and use of the VC tools and management of activities can encourage learners to focus on the relevant learning activity without task switching.

The study was conducted at the Canberra Institute of Technology and twelve individual case studies were analysed, each comprising one teacher and their learner cohort. A design based methodology involving two iterations was conducted, with the first being held in semester 2, 2011 and the second in semester 1, 2012. A mixed methodology was selected to ensure the richness of the data. Instruments for data collection included an entry and exit survey for teachers and learners, an end of session poll from the learners, a blog journal from the teachers, an e-diary from the researcher, a Wimba analytic tracking log, a detailed session observation tool and interviews from support staff.

Findings from the study suggest that learners do task switch while participating in VC sessions and that this can have a negative effect on the teaching and learning that occurs. It is therefore critical to ensure support is provided for teachers to design, develop and deliver sessions that encourage maximum attention and therefore reduce the opportunity for learners to task switch.

The study also found that, while there is no exact formula for the level of structure and autonomy needed to reduce the potential for learners to experience transactional distance, high levels of structure and low levels of autonomy work best for a VC session to maintain the attention of the learners. A further finding was that

the nine types of dialogic interactions that occur in a VC amongst teachers, learners, content and interface should all be considered and facilitated for the success of a session.

An outcome of this research was the development of a set of strategies to support both teachers and learners when using a VC, including the importance of institutional support and effective, timely training for teachers and learners. A further outcome of this research was the suggestion for the creation of guides for teachers and learners and the importance of ensuring adequate support is provided for both teachers and learners.

This research concluded that there is significantly more research required in the use of VCs and, in particular, around the issue of task switching.

While the findings from this study have been directed to assist teachers and learners in the Vocational Education Sector, findings can be transferred to other educational sectors including both K-12 and the university sector. It is hoped that these findings will lead to additional discussion and research on the use of VCs and in particular to the issue of how to retain the attention of learners while they are participating in a VC session.

# CERTIFICATION OF DISSERTATION

I certify that the ideas, experimental work, results, analyses and conclusions reported in this dissertation are entirely my own effort, except where otherwise acknowledged. I also certify that the work is original and has not been previously submitted for any other award.

\_\_\_\_\_  
Signature of Candidate

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## ENDORSEMENT

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Date

# ACKNOWLEDGEMENTS

Many people have helped me during the dissertation process. Those who deserve acknowledgement include the teachers and learners who took part in this study. Without their willingness to participate and their dedication, there would not have been a study.

I would also like to express my appreciation and gratitude to my two supervisors, Professor Peter Albion and Associate Professor Henriette van Rensburg, who provided me with encouragement, expertise and support and without whose invaluable feedback and constant reassurance this thesis would not have been possible. I would also like to thank my editors, Alex Matti and April Newton, for their assistance with the structure, formatting and proofreading.

I would also like to thank the Canberra Institute of Technology for allowing me to conduct the research with their teachers, learners and support staff and for supporting me throughout the journey. I would like to thank my colleagues from the Flex:Ed team for their invaluable support and their willingness to participate in the study. A special mention goes to Amy Holland for assisting in collecting the data and to Rebecca Trynes for assisting in diagram design.

I would also like to thank the e-learning gurus who have inspired and encouraged me over the years, starting with Gilly Salmon who started me on my journey into e-learning during my time with Qantas Online College, and to Rena Palloff and Keith Pratt for being so giving in their advice and support. Also to Ruth Clarke and Jonathon Finkelstein who were instrumental in encouraging me in the possibilities of the use of VCs with VET learners. I would also like to acknowledge the previous work by Shauna Schullo and Matt Bower, whose research on VCs inspired me to conduct this study. Finally, I would like to thank Jyothi Jayaram and Cathy Baxter, who introduced to me to the exciting world of using VCs during my time working for the Australian Flexible Learning Framework.

On a personal level this thesis is dedicated to my three sons, Benjamin, Justin and Lachlan, and my sister Tracey for their love and support throughout my journey. To my sister, your love, support and unwavering belief that I could finish this thesis was invaluable. You have been my rock throughout this process and without you this

thesis would not be possible. To my sons, there were many obstacles placed in my path during my journey to complete this thesis, and while it would have been easy to give up, I wanted to be a role model for you, to show you if you put your mind to it, anything is possible, and to uphold our family motto: “you can if you think you can, and if you think you can’t you won’t.”.

I would also like to acknowledge the late Mrs Marjorie Wilson, without whose love, guidance and support I would not have been able to complete my high school education and for instilling at an early age the importance of further education.

I would also like to thank my very supportive friends for constantly keeping me on track and telling me to stop “task switching” and focus. Special mention must go to Linda Fox whose support over the last years was invaluable, with her constant Nike “just do it” statements, and to Astrid Smith, for supporting me throughout this process and for telling me “get off Facebook and do your thesis,”. Also, to Carol Crivici, for her support, particularly in the beginning stages; and to Sue Sinclair for her constant encouragement and support. Finally, thank you to all my other family and friends, who supported me through this journey. I DID IT!

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# CHAPTER 1 – INTRODUCTION

*To do two things at once is to do neither.*

Publilius Syrus. Roman Slave. First Century B.C.

## 1.1 INTRODUCTION AND BACKGROUND INFORMATION

In 2012 the Council of Australian Governments (COAG) agreed to a National Partnership Agreement on Skills Reform in the Vocational and Education Training sector (VET) (COAG, 2012). A major outcome sought by this agreement was more accessible training for working age Australians and, in particular, a more equitable training system which provides greater opportunities for participation in education and training. The use of technology, and in particular virtual classrooms (VC), offers an opportunity for VET learners who may have difficulty attending traditional face-to-face training to not only have access to training, but also be able to actively participate with the teacher and other learners in real time.

The use of VCs to provide more interactive learning experiences for distance learners is becoming more widespread (Bower et al., 2015; Cornelius, 2014; Flexible Learning Advisory Group, 2013; Training Industry Report, 2014). An Australian survey was conducted in 2011 (Bower et al., 2014) to determine the types of rich-media synchronous technologies that Australian and New Zealand tertiary educators had been using and why they were using them. The results from the 750 respondents found there had been a steep increase in the use of VCs (called web conferences in this survey) in the previous ten years from 2% in 2001 to 42% in 2011, with the usage doubling between 2008 and 2010.

In the VET sector in Australia, leading e-learning research is conducted by the National VET E-learning Strategy (funded by the Australian government). Prior to 2011, this research did not include the use of VCs; however, after a request from the researcher, VC statistics were included for the first time in the 2011 E-learning Benchmarking Survey. Feedback was collected from more than 6000 VET students from 250 registered training organisations across Australia. These statistics showed that 44% of the learners had participated in a VC. In 2013 the strategy completed a

comprehensive survey of almost 2000 VET teachers and trainers from 677 registered training providers from across Australia and the survey revealed similar numbers, with 43% having used a VC environment in a course.

With this high reported use of VCs in the VET sector and the expected future climb in usage, there was an increasing need to ensure that the delivery of sessions in a VC platform was just as effective as the teaching and learning that occurs in a face-to-face session. Previous research had shown that for many learners the experience of learning online had been particularly isolating.

VCS offer teachers the opportunity to provide a more human, real time interaction and make it possible for learners to sense intimacy with both their teacher and fellow learners.

The purpose of this research was to explore methods and strategies teachers can employ to focus learner attention on the relevant learning activity and limit their tendency to engage in distracting activities. A final outcome of this research was the development of a set of guidelines, strategies and professional development tools for Vocational Education and Training teachers to use when designing and delivering VC sessions to encourage learner attention.

## **1.2 WHAT IS A VIRTUAL CLASSROOM?**

VCS are sometimes called web conferencing, web-based seminars, webinars, virtual meetings, virtual conferences, e-conferencing and online conferencing. For the purpose of this study the term “Virtual Classroom” was used to describe an online space where teachers and learners can collaborate in real time and enable interactions that closely resemble face to face class experiences. The National VET E-learning Strategy resource “Design e-Learning” describes VCS as “a range of technologies, teaching strategies, presentations and learning activities which encourage and promote real time voice interactions between a group of learners and trainers online” (National VET E-learning Strategy, 2013, p. 1). Clark and Kwinn (2007, p. 4) further describe a VC as “instructor led synchronous computer learning environments attended by participants online at the same time but in different locations.” VCS allow any teacher or learner with a computer and internet access to participate in a VC session.

Some VC platforms commonly used in the VET sector in Australia include VET Virtual (no longer operational), Elluminate (now known as Blackboard Collaborate),

Adobe Connect, WebEx, Big Blue Button, Go to Meeting and Wimba (no longer operational). This study used the Wimba platform. At the conclusion of this study, Wimba ceased to be supported because the company had been bought by Blackboard and the product supplanted by Blackboard Collaborate. A screen capture of the Wimba platform can be found in Figure 1.1.

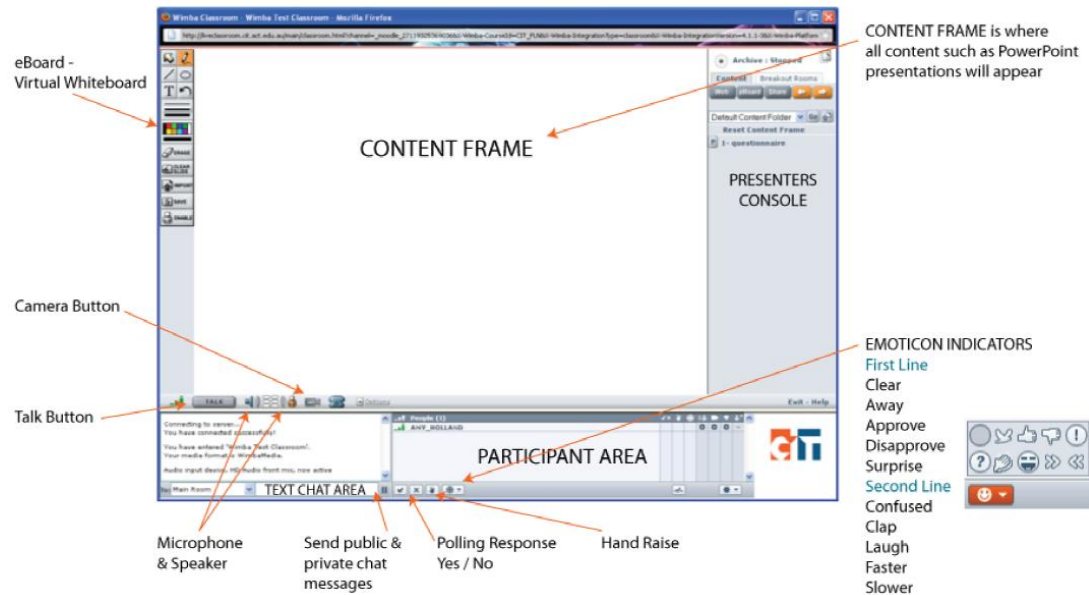


Figure 1.1: A screenshot of the Wimba platform © Canberra Institute of Technology, 2011.

The Wimba classroom contained the following tools that were used by teachers and learners in this study.

**Audio (microphone)** – Teachers and learners could use the audio tool to communicate verbally. The teacher could choose to disable microphone access to learners if required.

**Chat (text)** – Teachers and learners could use the chat function to comment and ask questions using their keyboards.

**Whiteboard (e-board)** – The board allowed teachers to upload PowerPoint slides or create a blank whiteboard.

**Whiteboard drawing tools** – This tool allowed either teachers or learners or both to write on either the blank whiteboard or a PowerPoint slide. Drawing tools included pen, shapes, text and a pointing tool.

**Tick/cross (polling)** – Learners could give a yes/no instant response to the teacher by choosing a tick or a cross.

**Hand raise** – Learners could interact with the teacher by “raising their hands” similar to raising their hand in a face to face session.

**Emoticons** – Learners could use this tool to let the teacher know if they were away from the session, and approve or disapprove of a comment. They could also display emoticons such as surprise, confusion, laughter, applause or let the teacher know they wanted the session to run faster or slower.

**Webcam** – A teacher was able to use a webcam to display a live video stream. Teachers could display an image of themselves delivering the session or any other image they would like to share. Learners were also able to use the webcam.

**Desktop/application sharing** – This tool was used by teachers to share their screen or to view a learner's screen when permitted by the learner.

**Recording** – The session was able to be recorded. These recordings could be viewed by learners at any time and could be navigated to any section.

The following tools were not used by any teachers in this study.

**Polling** – Teachers could create multiple choice questions for learners to answer. The teacher could choose to display the results to the learners.

**Breakout rooms** – The teacher could create separate rooms for learners to break into groups for group discussions.

At the Canberra Institute of Technology teachers and learners accessed a Wimba room from a link within the Institute Learning Management System – Moodle. All Wimba participants were required to run through a set up wizard prior to participating in a session (see Figure 1.2).

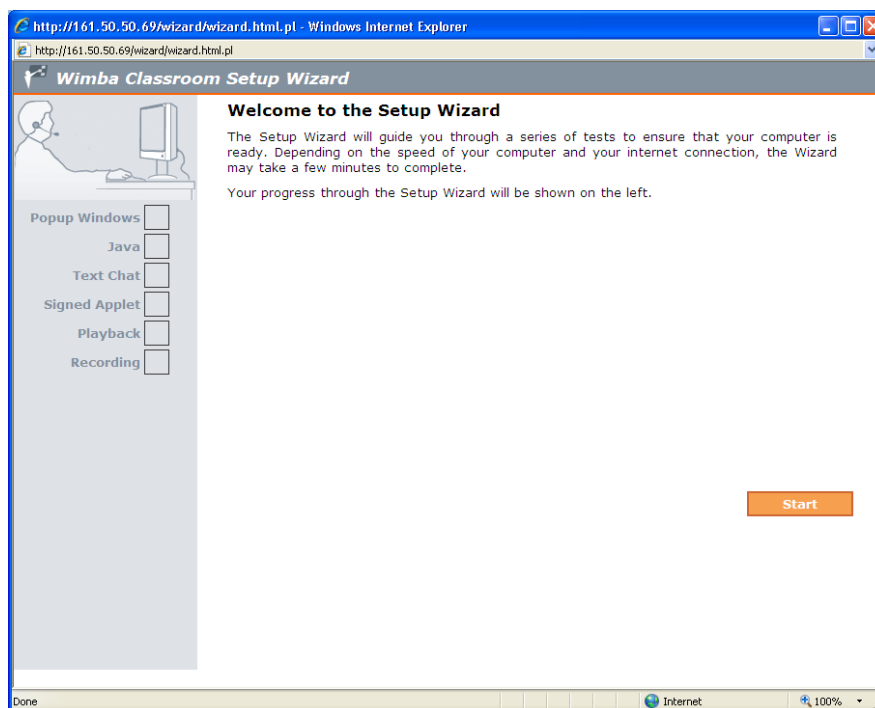


Figure 1.2: A screenshot of the Wimba wizard from the Canberra Institute of Technology Wimba platform © Canberra Institute of Technology, 2011.

The use of VCs (and in particular the ability to record sessions) offers an opportunity for VET learners who are unable to attend face to face classes due to childcare commitments, illness, injury or disability and other reasons. The use of the VC also provides additional opportunities for regional and remote learners, learners working shift work and apprentices (Clark & Kwinn, 2007; Hofmann, 2004). It also offers an opportunity to reduce the Institute’s carbon footprint by reducing the consumption of petrol while also saving money and time, with teachers and learners able to log in from any location (Wasowski, 2008). VCs allow remote participants to experience a session by listening and viewing the teacher, asking or answering questions using the audio tool, making comments or asking questions using the chat tool and generally allow learners to engage “in a similar manner to on-campus students” (White, Ramirez, Smith, & Plonowski, 2010, p. 35).

### 1.3 ENVIRONMENT

The research was conducted at the Canberra Institute of Technology (CIT). CIT is a large multi-campus institute comprising five teaching colleges situated across six campus locations in the Australian Capital Territory in Australia. CIT is part of Australia’s Vocational Education and Training system (VET) and delivers qualifications ranging from Certificate 1 to Bachelor degrees under the Australian

Skills Quality Authority (ASQA). It is a registered training organisation (RTO). In the period during which this research was conducted in 2011 and 2012 statistics included:

- over 21,000 learners ranging in age from 16 to 70 years of age of which more than 1000 were international learners
- 1000 full-time staff members of which approximately 800 were academic staff members
- 3261 subjects were delivered of which approximately 500 were delivered completely online, with 60% of all subjects containing some online content
- 85% of learners studied with CIT part-time.

## **1.4 JUSTIFICATION FOR THE RESEARCH**

In 2010, CIT implemented a new integrated Online Learning Environment, “eLearn”, which included a learning management system (Moodle), a learning object repository (Equella) and a VC (Wimba). With the implementation of this new online environment the use of VCs by CIT teachers increased dramatically from only a few teachers using a VC to over 55 teachers by the end of 2011. With the VC option becoming more popular it was seen by CIT leaders that teachers would need to be supported with the appropriate strategies to ensure the teaching and learning that occurred in the VC sessions was as effective as the teaching and learning that occurred in a face-to-face session. The Canberra Institute of Technology was keen to ensure that teachers incorporated good practice teaching and learning methods when using this new integrated system; hence CIT fully supported this research.

The initial impetus for this research resulted from a previous informal study at the Institute in 2010, when the Institute collected feedback from teachers using the VC. While most of the feedback was positive, the issue of learners not fully participating in a VC was identified. Teachers reported learners emailing, texting, talking on the phone, talking to peers, looking after their children and pets and even cooking dinner. Feedback included:

- a Year 12 physics teacher found many of her learners were ‘multitasking’ during her session by watching children, emailing and watching previous recordings

- a refrigeration teacher asked “how can we tell if the students are actually taking in what we are trying to teach them?”
- a hotel management teacher expressed frustration by stating she was aware her learners were often ‘multitasking’ in her session by either texting or checking emails or both.

## **1.5 THEORETICAL FRAMEWORK**

The underpinning theoretical framework for this research was transactional distance theory (Moore, 1973, 1989, 1993, 2013). Moore claimed

It is the separation of learners and teachers that profoundly affects both the teaching and learning. With separation there is a psychological and communications space to be crossed, a space of potential misunderstanding between the inputs of instructor and those of the learner (Moore, 1993, p.22).

Research in online education continues to argue the importance of interaction for effective teaching and learning to occur (Todhunter & Pettigrew, 2007; Schullo, 2005; Bower et al., 2014). This research was intended to investigate if the potential for misunderstanding between the instructor and learner could be overcome using the variety of interactive and communication tools used in the VCs, considering Moore’s (1973) three elements of structure, dialogue (including interaction between teachers, learners, content and the interface) and autonomy.

## **1.6 RESEARCH QUESTIONS**

The purpose of the study was to explore methods and strategies teachers can employ to focus learner attention on the relevant learning activity and limit their tendency to engage in distracting activities. This included a teacher’s design of the VC session, selection and use of the VC tools and management of activities and content. The following research questions informed the research:



1. How can teachers design content and/or activities to encourage interaction, engagement and attention while participating in a Virtual Classroom?
2. What training, guides and support do VET teachers and learners require in order to provide an environment that supports learners in a Virtual Classroom?

## 1.7 METHODOLOGY

This research used a design based research (DBR) model with two iterations over two semesters. Iteration one consisted of six individual case studies, and iteration two consisted of six individual case studies (a total of twelve case studies over the duration of the study). Each case study consisted of a teacher and their learner cohort. The study used a mixed methodology for the data collection and included both qualitative and quantitative data. The teachers participated in the research on a voluntary basis. Of the twelve teachers, the majority were full-time teachers with two part-time, and one casual teacher, and were from a mix of teaching faculties. A total of 75 learners participated in the study with 85% of learners studying full-time. There was a mix of learners from different levels of qualifications ranging from Certificate III to Advanced Diploma level.

## 1.8 ACRONYMS AND DEFINITIONS

The following definitions were used in this study.

**CIT** – Canberra Institute of Technology.

**eLearn** – the Canberra Institute of Technology online learning environment, which included a learning management system (Moodle), a learning object repository (Equella) and a VC (Wimba).

**E-learning** – defined as the use of computer technology to deliver education or training courses to learners. Such courses may be studied online, offline, by any mixture of these modes, and may also involve blended modes where there is interaction with a live or virtual teacher or trainer. E-learning gives the learner choice of what, when and where they study (National VET E-learning Strategy, 2012).

**Flex:Ed** – a department of the Centre for Education Excellence at the Canberra Institute of Technology. Flex:Ed staff members' role is to provide advice and guidance to teaching staff in building capability in contemporary vocational education and training (VET) sector practice. This includes leadership in course

design, facilitating skill development, compliance, quality assurance and continuous improvement and evaluation and research.

**Transactional Distance (TD)** – a physical separation between participants (learners and teachers) that causes a psychological and communicative chasm in the distance educational environment (Moore, 1973). Moore lists three major elements of TD as structure, dialogue and autonomy.

**VET** – Vocational Education and Training.

**Virtual Classroom (VC)** – a range of technologies, teaching strategies, presentations and learning activities which encourage and promote real time voice interactions between a group of learners and teachers online (National VET E-learning Strategy, 2012).

## **1.9 CHAPTER CONCLUSION**

This chapter provided a brief overview of VCs. It also explained the background to the study including the research questions, a description of the Canberra Institute of Technology where the study was undertaken, and a discussion about the importance of researching the use of VCs in the VET sector. The use of Moore's (1973,1993) transactional distance theory was presented as the underpinning theoretical framework and the methodology for the study using design based research with mixed methods data collection was mentioned.

Chapter 2 will address literature relating to the use of VCs in education with a focus on VET. The chapter will also discuss the issue of transactional distance for online learners and how this can be overcome using the VC. The chapter will investigate the issue of learner distraction, the importance of quality staff professional development and training, and the need for quality instructional design techniques in a VC.

Chapter 3 will outline the research methodology used in this study and explain the rationale behind using a design based research methodology with mixed method data collection. The chapter will also include a description of the instruments that were used to collect the data and how these data were collected and analysed.

Chapter 4 will present the results of the data analysis for each of the six case studies in the first iteration and the six case studies in the second iteration; and

Chapter 5 will triangulate the data analysis from the two iterations and discuss the results.

Chapter 6 will discuss the final answers to the two research questions, the limitations that applied to this study, and will conclude with future directions for the VC and suggestions for future research.

## CHAPTER 2 – LITERATURE REVIEW

*Task switching is hard because we do not control what is on our mind. Despite our efforts, the original task continues to occupy our mental bandwidth. Although we can control where our time goes, we cannot fully control how our bandwidth is allocated.*

Sendhil Mullainathan, American Economist, 2014.

The purpose of this chapter is to explore current literature pertaining to the use of VCs and how it relates to the issue of learners becoming distracted and disengaging from a session. The chapter will first discuss the history and growth of e-learning and associated use of VCs both globally and within Australia. It will then outline previous research conducted on the use of VCs in education, including the advantages and disadvantages of using VCs in education. The chapter will point out gaps in research that this study addressed. Transactional Distance Theory, the theoretical framework for this research, will be discussed with emphasis on the importance of learner participation and engagement, as well as aiming for the correct balance of the elements of structure, dialogue and learner autonomy. The prevalence of task switching in distance education and how this can hinder teaching and learning will then be addressed. The chapter will conclude with a discussion about online pedagogical approaches, including professional development strategies for teachers and the importance of good instructional design that aims to promote maximum engagement by the learners.

In the last decade the use of VCs has increased at a steep rate and this pattern is predicted to increase (Bower et al., 2012, 2014; Schullo, 2005). The use of VCs to support teaching and learning and to facilitate interaction and collaboration is becoming mainstream in many higher education environments globally (Bower et al., 2012, 2014; Martin et al., 2012; Roughton et al., 2011). A key reason for this increase is the introduction of new and improved VC platforms. Another key reason is the implementation of the Australian Government's National Broadband Network (NBN) (National VET E-learning Strategy, 2013).

At the time this study commenced in 2009, there was scarce literature on the use of VCs globally however in recent years there has been an increase in the research about the use of VCs. However, there are still gaps in the research and in particular

in the use of the VCs in VET in Australia, and in learner's task switching and not engaging fully with sessions.

This study aims to add to the body of research on the use of VCs. While the study has taken place in the VET sector, findings and outcomes can be applied to other educational sectors, and in particular the university sector.

## **2.1 PROGRESS OF E-LEARNING IN AUSTRALIA**

In Australia the government provides funding under the National VET E-learning Strategy (2012–2015). A major strategic goal is to enable the Australian training sector to take advantage of the rollout of the National Broadband Network (NBN) and to strengthen the Australian training sector's use of new learning technologies (National VET E-learning Strategy, 2013). This strategy superseded the former Australian Flexible Learning Framework (2000–2011). A key role for the strategy/framework is to conduct regular surveys with both teachers and learners in their use of e-learning. The first official benchmarking survey was conducted in 2005 and involved 1724 respondents from registered training organisations, VET learners, teachers and trainers from across Australia (I & J Management Services, 2005). The findings of this survey were that 6 to 8% of subjects included some form of e-learning. The most recent survey conducted was in 2013 and involved 1991 VET teachers and trainers from 677 registered training providers from across Australia (Flexible Learning Advisory Group, 2013). While this survey did not include learner data (as indicated by the dotted lines in the following figure) results indicated that 48% of VET training included some form of e-learning (see Figure 2.1).

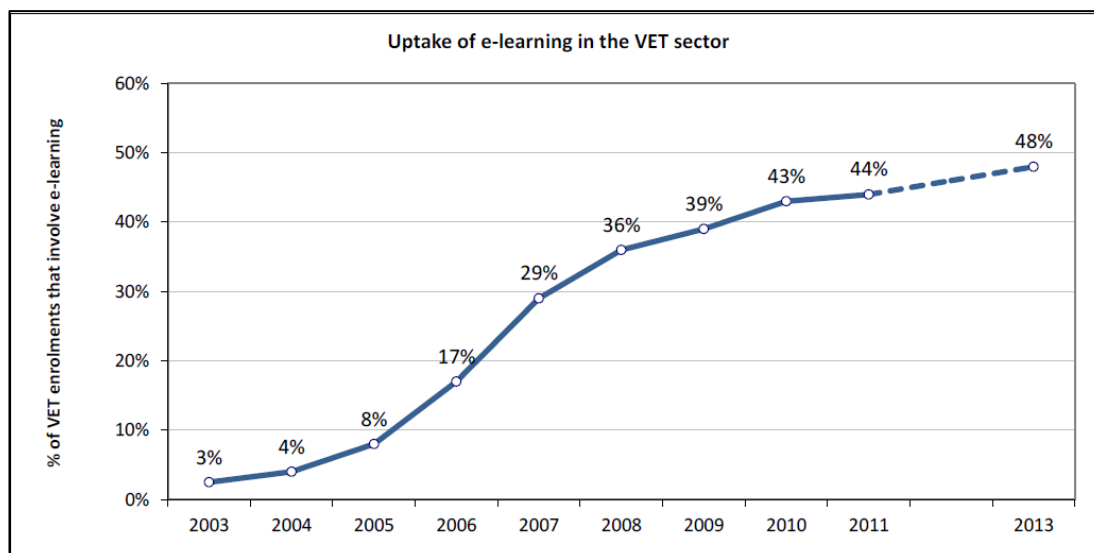


Figure 2.1: Uptake of E-learning in the VET sector (E-learning Benchmarking Survey, 2013, p4 © 2013 Commonwealth of Australia). Used under a Creative Commons Attribution 3.0 (<http://creativecommons.org/licenses/by/3.0/au/>)

This was a dramatic growth over a period of only ten years. The National VET E-learning Strategy indicated this growth was due to online courses offering anytime, anywhere learning and providing flexibility for both teachers and learners. However, the strategy also argued one of the major challenges for online teachers was designing effective online content for online delivery (Flexible Learning Advisory Group, 2013).

The current strategy has a particular emphasis on the use of new technology to take advantage of the implementation by the government of the National Broadband Network NBN (Flexible Learning Advisory Group, 2013). The NBN which has commenced rollout, will reach all Australians by 2021 and be capable of providing broadband speeds of up to 100 megabits per second. The strategy collected data about the expected impact of the NBN on the implementation and use of new learning technologies with VET institutes in a survey in 2013. Forty-three per cent of respondents rated this expected impact as high and another 51% rated it as moderate (Flexible Learning Advisory Group, 2013). One of the key technologies that will benefit from the introduction of the NBN is the use of VCs and therefore it is vital to ensure effective strategies for the use of VCs to encourage excellent teaching and learning are researched.

## **2.2 VIRTUAL CLASSROOM GROWTH**

There has been limited statistical data collected about the use of VCs in training and education. The first major research was conducted by the eLearning Guild which commenced surveys in 2002. Statistics were collected about the use of synchronous e-learning. For the purpose of their reports the guild defined the term synchronous learning as “any learning intervention that uses technology to allow people that are not all in the same place to convene, at the same time, and learn something, either from an instructor or from each other” (eLearning Guild Report, 2008, p. 2). These 2002 statistics reported that the percentage of organisations that were delivering synchronous e-learning was 60% and in the 2004 statistics this increased to 73%, an increase of 22% in a two year period (eLearning Guild Report, 2005).

In the Guild’s most recent global survey report, “Synchronous Learning Systems” (eLearning Guild, 2008), respondents included 1238 guild members from 1032 different organisations across the world and the data showed that 63.7% of members used synchronous e-learning.

Another global survey was conducted by GP Strategies and Training Industry Incorporated in 2010 and included responses from 114 organisations. Twenty-seven per cent of respondents reported using VCs, which are referred to as virtual instructor-led training (VILT) in their report. The survey also reported 84% of organisations grew their use from 2008 to 2009 and 89% expected their use to grow further in 2010 (GP Strategies and Training Industry Inc., 2010).

The first United Kingdom research study into Virtual Classrooms, “Harnessing Live Online Learning,” was conducted in 2011. Survey results were collected from 180 VC practitioners with 40% of respondents reporting they were currently using VCs (Towards Maturity, 2011). A more recent survey, the “2014 Training Industry Report” was conducted across the United States from both large and small companies with 72% of respondents stating they were using VCs/webcasting or video broadcasting in 2014 (Lakewood Media Group, 2014).

## **2.3 VIRTUAL CLASSROOMS GROWTH IN AUSTRALIA**

The first major survey of VCs in Australia was conducted by the National VET E-learning Strategy (Australian Flexible Learning Framework) in the 2011 E-learning Benchmarking Survey (National VET E-learning Strategy, 2011). Approximately six

thousand VET learners from 250 registered training organisations across Australia were surveyed and results revealed that more than 44% of learners surveyed had participated in VCs which they referred to as “web based seminars/presentations”.

The National VET E-learning Strategy also conducted a survey in 2013 and involved 1991 VET teachers from across Australia (National VET E-learning Strategy, 2013). While this survey was conducted only with teachers and the previous survey was only of learners, they both produced similar findings with 44% of teachers surveyed having used a VC with their learners.

The most recent study was conducted by Bower et al. (2014) who collected data from 1700 respondents from universities across Australia and New Zealand in 2011. The results found there had been a steep increase in the use of VCs (called web conferences in this survey) in the last ten years from 2% in 2001 to 42% in 2011, with the usage doubling between 2008 and 2010 (see Figure 2.2).

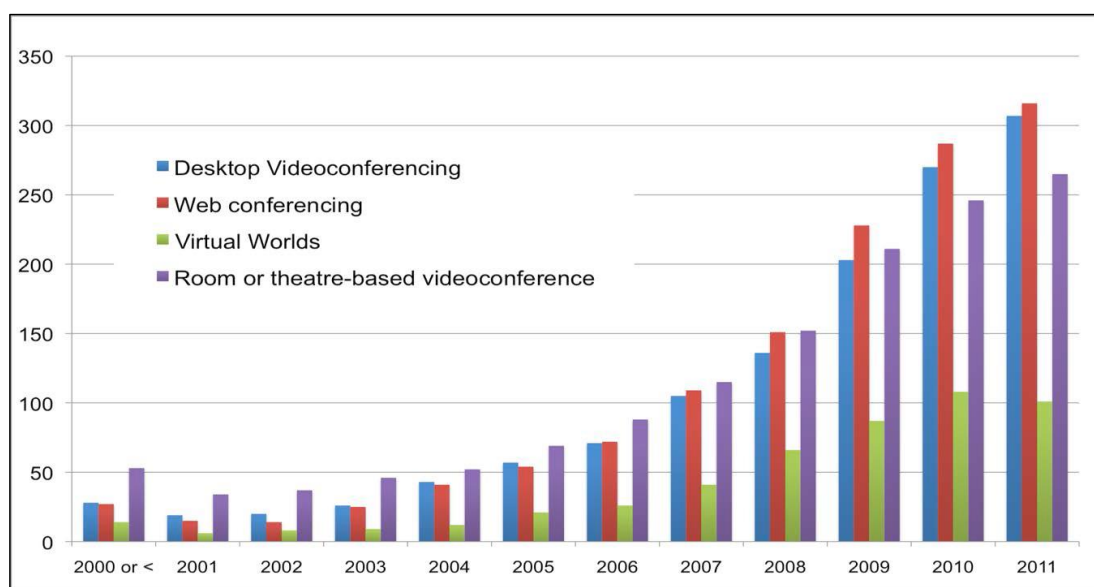


Figure 2.2: The use of rich media real time collaboration tools by years (Bower et al. 2014 p.28). Used under a Creative Commons Attribution 4.0 (<http://creativecommons.org/licenses/by-sa/4.0/>).

The high rate of the growth and usage of VCs both globally and in Australia highlights the importance of ensuring VET teachers have access to good practice professional development and guidelines about the use of the VC platform.

## 2.4 VIRTUAL CLASSROOMS RESEARCH

At the time this study commenced (2009) there was scarce literature on the use of VCs either globally or in Australia (Bower, 2008; Schullo, 2005). One of the first



studies was by Schullo (2005), who researched the use of VCs in the university sector in the United States and argued that there were still gaps in research. The area lacking in research in particular was the use of VCs to deliver sessions to learners in geographically dispersed areas, and research to include specific strategies to overcome challenges such as “social isolation, lack of immediacy, feedback, and insufficient interaction” (2005, p. 13). Bower, who was one of the first educators in Australia to research the use of VCs, also claimed in his doctoral thesis in 2008 that “there is sparse literature addressing how to utilise web-conferencing environments to engage more interactive and collaborative approaches to learning” (2008, p. 2).

Both Schullo (2005) and Bower (2008) researched the use of VCs in the university sector. Schullo (2005) observed the use of a VC as a supplement to existing distance courses to determine if and how it enhanced the distance education environment. The study involved ten university teachers and their learner cohorts from a university in the United States. A relevant finding was the importance of effective professional development for teachers. Schullo further argued that the most significant guidance that can be provided to instructors and producers is planning and practice.

Bower’s study addressed the question “How do the interface, task type and activity design influence collaborations and learning in a web conference environment?” (Bower, 2008, p.10) Bower recorded dialogue between teachers and learners in 24 VC sessions (learning episodes) held over three semesters. One major finding from Bower’s research was that teaching and learning in a VC is different from working in face to face environments because all interactions are mediated through the technology. A second major finding from Bower’s research was that the greatest impact upon the quality and quantity of interactions and collaboration in a VC session was the design of the session by the teacher.

Other research conducted prior to this study commencing included studies of Universities implementing VC platforms (Ng, 2007; Reushle & Loch, 2008) and comparisons of using VCs to other online delivery methods (Grant & Cheon, 2007; Parker & Martin, 2010).

Ng (2007) reported on the implementation of a VC for online tutoring at the Open University of Hong Kong. Interview data were collected from six tutors and eight students to examine teaching effectiveness and opportunities for interaction. Findings

suggested that both teachers and learners were positive about the use of the VC; however, some concerns were raised including the issue of technical challenges. Reushle and Loch (2008) reported on the trial of implementing a VC in a regional Australian University. The research involved feedback collected from learners and 20 VC teachers. A key finding included the importance of teacher training. The study reported positive feedback with the authors finding VCs can provide “access, convenience, flexibility, utility, speed, and cost” (Loch & Reushle, 2008, p. 569).

Grant and Cheon (2007) conducted a study in the United States comparing two groups of university learners, with one group using video conferencing and the other group using audio conferencing. A major finding was the issue of technical difficulties for both groups and the importance of overcoming these difficulties for effective teaching and learning to occur. A more recent comparison study was conducted by Parker and Martin (2010) who investigated learner perceptions of the features and characteristics of a VC by comparing two groups, one who participated in an online VC course and the other in a blended course. The learners in the online course rated the VC features and characteristics higher than learners in the blended course.

In the last five years there has been an increase in the study of VCs with many institutions now investigating ways to support their teachers and learners in using this technology.

In a study by McBrien et al (2009), responses from 67 American university learners from six different courses were collected. The study investigated ways in which a VC affects learning experiences. Findings were that the majority of learners had a positive experience; however, the study also raised concerns about too many stimuli, and the importance of overcoming technical problems in order to create a positive learning experience for all learners.

Roughton et al. (2011) conducted a study about the challenges of using a VC involving 53 professors in the United States. Findings included the importance of institutional support and clear guidelines for the teachers in their use of a VC. Martin et al. (2012) conducted a study in the United States of one teacher and 21 learners in their use of the VCs and found that “student interaction, and hence learning, was aided by the live communication that occurred through the VC” (Martin et al., 2012 p. 228).

Cornelius (2014) interviewed four teachers from four different higher education institutes in the United Kingdom about their experiences of teaching in a VC. All four teachers described teaching in a VC as demanding, and findings included the importance of effective training, support and guides for teachers.

All studies argued there is a need for further research into best practice models for the use of VCs in the education sector.

Other publications on the use of VCs in published work by recognised VC practitioners are predominantly “how-to books” based on the authors’ extensive experience in delivering VC sessions and include; “Four Steps to Effective Virtual Classroom Training” (Clark, 2005); “Learning in Real Time” (Finkelstein, 2006); “The New Virtual Classroom” (Clark and Kwinn, 2007); “Virtual Presenters Handbook” (Courville, 2010); “144 Tips on Synchronous E-Learning”(Brandon, 2008); “Live and Online – Tips and Techniques and Ready to use Activities for the Virtual Classroom” (Hofmann, 2004); “From Keyboard to Chalkboard – Transitioning to the Virtual Classroom” (Clay, 2012) and “The Successful Virtual Classroom: How to Design and Facilitate Interactive and Engaging Online Learning” (Christopher, 2015).

The most recent comprehensive study on VCs in higher education in Australia is the study by Bower et al. (2014), who investigated how rich-media technologies such as web conferencing, desktop video conferencing and virtual worlds could be used to effectively unite remote and face to face learners in the same live classes. This research included seven case studies of which four were specific to web conferencing. An outcome of this research was the creation of a “Handbook for Educators” (Bower et al., 2014) which included a blended synchronous learning design framework. While this framework was developed for blended synchronous delivery, this study will use the framework as a basis for developing a set of guidelines for teachers in the use of VC sessions.

There remains limited research into the use of VCs in the VET sector in Australia, with only two known studies. The first is by the National VET E-learning Strategy, with this research providing only statistical data on the use of VCs by learners in 2011 and teachers in 2013 (National VET E-learning Strategy, 2011, 2013). The second is by Todhunter and Pettigrew, who conducted research in 2008 for the National Centre for Vocational Education and Training (NCVER) (Todhunter

and Pettigrew, 2008). This research focused on the effectiveness of using a VC with VET learners. The study was limited in participation with five teachers and 40 learners over a single term studying the perceptions, expectations and practical experience. While the study provided feedback about the perceived advantages and disadvantages for both teachers and learners, the paper did not provide any concrete guidelines or ideas for improvement.

This researcher was unable to locate any literature relating to specific guidelines for VET teachers when delivering content using the VCs. This gap will be addressed in this study.

## **2.5 THE ADVANTAGES AND DISADVANTAGES OF VIRTUAL CLASSROOMS**

In most literature about VCs a key focus of the studies is the advantages and disadvantages of the use of VCs. Key findings include that the attitude of teachers and learners to embrace the use of technology is critical to the success of the VC sessions (Loch & Reushle, 2008; Martin et al., 2012; Schullo, 2005; Todhunter & Pettigrew, 2008).

### **2.5.1 ADVANTAGES**

A common theme to emerge was the greater opportunity for interaction, collaboration and immediacy in the use of a VC. The eLearning Guild Report in 2005 identified immediate interaction with instructors and collaboration with other learners as a key benefit (The eLearning Guild, 2005). Loch and Reushle (2008) reported that learners using a VC agreed that there was a more personal feeling of interaction between learners and teachers, which is not normally found when studying externally, and that VCs helped to alleviate feelings of isolation.

Grant and Cheon (2007) corroborated this benefit with their finding that the VC permitted knowledge exchange in real time and learners were able to immediately ask questions and get prompt feedback.

Todhunter and Pettigrew (2008) found that the collaboration and interactivity afforded by a VC enabled a greater sense of connection to the learning experience for both learners and teachers and significantly increased levels of communication amongst learners and teachers.

Another common theme was the flexibility VCs afford with learners able to participate from any location (Bower et al., 2015; Todhunter & Pettigrew, 2008). Other reported advantages included reduced travel costs (eLearning Guild, 2005; Grant & Cheon, 2007; Todhunter & Pettigrew, 2008); and the potential to reduce an institution's carbon footprint (Towards Maturity, 2011).

### **2.5.2 DISADVANTAGES**

Many potential problems with using the VC were addressed in the literature.

Technology issues and challenges were key themes to emerge. Issues including bandwidth and firewall access were found in Martin et al. (2012) and Roughton et al. (2011). Further technical problems listed were to do with hardware, software set-up or connections (eLearning Guild, 2008). Research by Todhunter and Pettigrew (2008) found that learners were unforgiving of technical glitches and that they required appropriate broadband and technical equipment such as headsets. Bower (2011) claimed when learners had issues with practical usability with software this hindered their learning experience.

Another theme discussed was the issue of the potential for learners to task switch and therefore not fully participate in the VC session (Christopher, 2015; Clark and Kwinn, 2007; Clay, 2012; Courville, 2010; Hofmann, 2004; Harnessing Live Online Learning Report, 2011). This will be discussed in more detail later in this chapter.

The lack of effective training of teachers in the use of the VC platform was also discussed (Harnessing Live Online Learning Report, 2011; Hofmann, 2004; Loch & Reushle 2008; Todhunter & Pettigrew 2008). Roughton et al. (2011) argued the lack of knowledge or skill in using the VC platform and frustration with the complexity of managing the tools can hinder teaching and learning. Learners not being competent or comfortable using the VC platform due to lack of training was also mentioned by Bower (2011) and Loch and Reushle (2008).

A further disadvantage is that VCs require a set date and time for sessions and this contradicts the promise of "anytime, anywhere" learning (Roughton et al., 2011).

As mentioned above there are many advantages to using the VC; however, there remains many concerns and issues. This study will add to this research by investigating the perceptions of the VC by both teachers and learners and will further investigate if these perceptions affect the level of engagement in the session. The study will go on to investigate how to overcome some of the common concerns and

issues including the potential for learners to task switch and the importance of training in the use of VC tools for both teachers and learners.

## **2.6 TRANSACTIONAL DISTANCE THEORY IN VIRTUAL CLASSROOMS**

One of the most well-known theories discussed in distance education is Moore's theory of transactional distance (Moore, 1973, 1989, 1993, 2013). Moore contended that to reduce transactional distance it is important to include appropriate levels of three elements: dialogue, structure and learner autonomy.

Moore (1993) defined dialogue, the first element of the theory, as an interaction or series of interactions having positive qualities and stated that

whether dialogue occurs, its extent and nature is determined by the educational philosophy of the individual or group responsible for the design of the course, by the personalities of teacher and learner, by the subject matter of the course, and by environmental factors (1993, p. 23).

On discussing technology Moore (1993) argued that

the most important evolution in distance education has been the development of the highly interactive telecommunication media. Their use has added the possibility of faster dialogue with the teacher and by computer conferencing more individual dialogue (1993, p. 32).

Moore (1993) defined structure, the second element of the theory, as "the elements in the course design, or the ways in which the teaching program is structured so that it can be delivered through the various communications media" (1993, p. 26). Moore (1973) stated structure is variable and can depend on the communications media being used, on the characteristics of teachers and learners and also constraints imposed by educational institutions. In his most recent writing Moore (2013) argued that

a teaching institution using synchronous video conferencing on the web (a potentially highly dialogic medium), but holding the view that the role of the learner is to assimilate

information by listening and taking notes, might design its courses with highly structured lessons and dialogue limited to asking factual questions of the teacher and receiving answers (2013, p. 70).

Moore (2013) argued the importance of having the right balance of structure and dialogue specific to the learner cohort and subject field for the success of delivery. This study investigated how teachers can ensure the structure (management, design including content and activities, and selection and use of tools) of a VC session will encourage positive engagement by learners.

Moore (1993) listed the third element of the theory as autonomy and defined this as the role of the learners in deciding what to learn, how to learn and how much to learn. It is also related to the degree of self-directedness by the learner.

Moore (1993) argued that transactional distance is not a fixed quantity but rather a variable which results from the changing interplay among dialogue, the structure of the program and the autonomy of the learners. Moore (1993) on discussing the use of technology argued that “in the hands of progressive teachers, teleconferencing gives opportunity not only to reduce distance but also to increase the autonomy of learners” (1993, p. 92). While not discussing VCs in particular this implies that a VC would offer even more opportunity to reduce transactional distance.

Further research in transactional distance theory in technology delivered education is found in the work of Moore and Kearsely (2005). Figure 2.3 depicts their traditional transactional theory diagram. However, they argued that in distance education (where the course is dependent on media and technology) there should be more structure and proportionally less dialogue simply by virtue of the content being encoded in media.

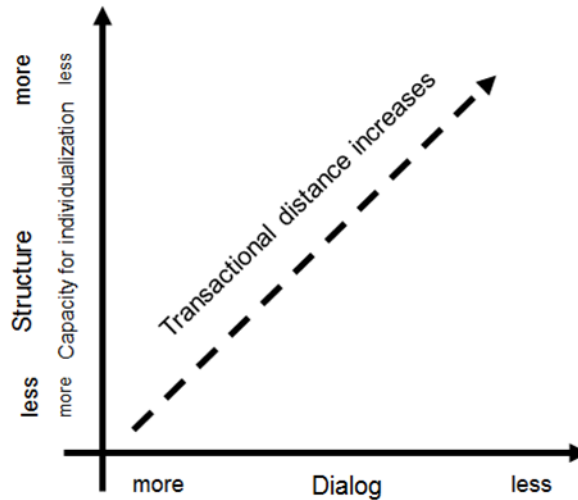


Figure 2.3: Moore and Kearsely (2005) transactional distance theory.

Fahey (2004) developed Figure 2.4 based on Piccard's (1999) research into the use of audio conferencing. Fahey argued that "a key issue in selecting a mix of other technologies to be used with audio conferencing is the relative importance of relationship building vs. information exchange" (2004, p. 158). While Fahey's diagram is focused on relationship building and information exchange, there are many similarities to Moore and Kearsely's (2005) transactional distance diagram (if the direction of the arrows on Fahey's diagram is reversed). Relationship building can be viewed as dialogue, and information exchange could be perceived as related to structure and autonomy. A combination of these discussions was investigated during this study.

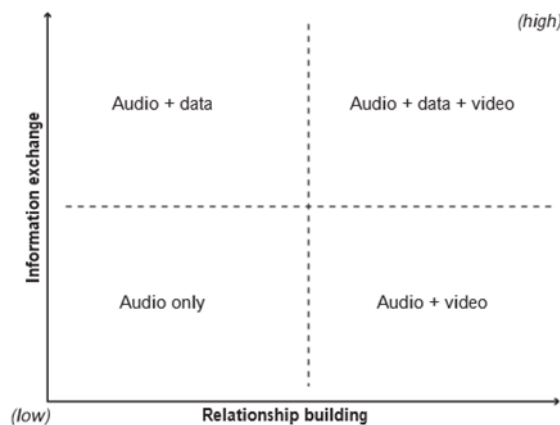


Figure 2.4: Fahey (2004) diagram of Piccard's (1994) analysis.

This study explored how the levels of the three variables of dialogue, structure and autonomy in the VC session can affect transactional distance and enhance the sense



of presence by the teacher, thereby reducing the opportunity for learners to “do something else”.

### **2.6.1 DIALOGUE AND INTERACTIONS**

The major theme to emerge from reviewing current literature was the importance of interaction in distance education and how interaction can have the greatest impact on the success of the learner (Bower, 2008; Bower et al., 2014; Moore, 1973, 1989, 1993, 2013; Moore & Kearsely, 2005; Schullo, 2005). A further theme which emerged was that, while the advances in technology afforded more opportunity for interaction, there continue to be challenges for teachers to use this technology in a way that will ensure optimal learning (Bower, 2008; Martin et al., 2012; Moore, 1993, 2013; Moore & Kearsley, 2005; Schullo, 2005).

Moore (1993) argued that while all three elements of dialogue, structure and autonomy are important, the quality of the dialogue is most critical. Moore (1993) categorised the types of dialogue that occur in distance education into the following interactions: learner-content interaction; learner-instructor interaction (which includes the reciprocal instructor-learner interaction); and learner-learner interaction. However, more recent research that incorporates the use of technology in education has seen further interactions introduced to the mix. Hillman, Willis and Gunawardena (1994) defined a further type of interaction: learner-interface. Anderson and Garrison (1998) introduced three other types of interaction: teacher-teacher, teacher-content and content-content. This study will also include the further interactions of teacher-interface and content-interface. This research will investigate each of these interactions (as discussed below) that occur when a teacher and learner participate in a VC session and the effect these interactions have on the teaching and learning that occurs.

#### **LEARNER-TEACHER INTERACTION**

This is interaction between the learner and the teacher or content expert. Moore (1993) argued that this includes the teacher maintaining interest, motivating the learner to learn, making presentations, counselling, support and encouragement. Martin et al. (2012) also argued that this interaction is highly desirable as the teachers can stimulate and/or maintain learner interest in what is to be taught.

### **LEARNER-CONTENT INTERACTION**

This is the interaction between the learner and the content of the session. Moore (1993) claimed without this interaction there cannot be education as it is the process of intellectually interacting with the content that results in improvements in the learner's understanding of the content. Martin et al. (2012) further argued that this is the "process of interacting with the content, which changes the understanding, perspectives, and cognitive structures of a learner's mind" (2012, p. 3).

### **LEARNER-LEARNER INTERACTION**

Moore (1993) stated that "teleconferencing media allows a new form of dialogue that can be called inter-learner dialogue" (1993, p. 32). He argued that this dialogue occurs between learners and other learners and further argued that by audio conference, video conference and computer conference, groups can learn through interaction with other groups and within groups. There are enormously significant implications in this potential in every process of teaching – learning, in that each individual learner can interact with the ideas of others. He further claimed this is something that has not been available before in either distance education or conventional education.

### **LEARNER-INTERFACE INTERACTION**

Hillman, Willis and Gunawardena (1994) defined a fourth type of interaction, learner-interface interaction, as "a process of manipulating tools to accomplish a task" (1994, p. 34) and argued that the learner must understand not only the procedures of working with the technology interface, but also why these procedures obtain results. Martin et al. (2012) argued that this interface needs further exploration and is critical to the success of learner performance in the VC.

### **TEACHER-CONTENT INTERACTION**

Anderson and Garrison (1998) introduced a further interaction of teacher and content interactions and this interaction is considered essential as it is the interaction expected from most teachers in higher education. Anderson (2004) stated this interaction is the "development of content and learning activities by the teachers. It allows teachers continuously to monitor and update the content resources and activities that they create for learner learning" (2004, p. 46).

### **TEACHER-TEACHER INTERACTION**

Anderson and Garrison (1998) also introduced the interaction of teacher with teacher and argued that this usually occurs in the context of professional development or training, and particularly in peer learning of teaching competencies.

### **CONTENT-CONTENT INTERACTION**

Anderson and Garrison (1998) also introduced content-content interaction and argued that this is the interplay between the content of a session or a course. Anderson (2004) argued that this is a newly developing mode of educational interaction in which content is programmed to interact with other automated information sources, so as to refresh itself constantly and to acquire new capabilities. Content-content interaction is also necessary to provide a means of asserting control of rights and facilitating tracking of the use of content by diverse groups of learners and teachers.

### **TEACHER-INTERFACE INTERACTION**

This interaction between the teacher and the technology has not been a main focus of research literature. However, in a VC where the teacher must interact with the interface constantly this interaction warrants further research (Bower, 2008; Bower et al., 2014; Martin et al., 2012; Schullo, 2005).

### **CONTENT-INTERFACE INTERACTION**

This interaction is between the content and the interface and also has not been shown much attention in educational studies. However, the display of the content in the VC (interface) is a critical component in the success of a VC session and thereby this interaction warrants further research (Bower, 2008; Schullo, 2005).

## **2.6.2 TRANSACTIONAL DISTANCE THEORY – VIRTUAL CLASSROOM RESEARCH**

Recent studies have supported Moore's theory and have found that including interactivity (such as the use of the VC tools) in an online course will reduce transactional distance (Martin et al., 2012; McBrien et al., 2009; Schullo, 2005). Moore (1993, p. 25) himself stated that "by manipulating the communication media it is possible to increase dialogue between learners and their teachers, and thus reduce transactional distance." Albion (2008) also argued that

the addition of audio and video content to online learning environments using recorded content or applications, such as Elluminate, Skype or Wimba, that support direct interaction of learners with an instructor or other learners may enhance the sense of presence and reduce transactional distance (2008, p. 4).

One of the first major studies on the use of VCs and transactional distance was the work of Schullo (2005), who researched the use of a VC (called synchronous web based courses in her study) at university level in the United States. The study included five case studies, each consisting of a teacher and their learner cohort over one semester. The main foci of this study were the pedagogical strategies used by teachers, tool use by teachers and perceptions of both teachers and learners in the use of a VC. Schullo found that with the added benefits that a VC can provide, dialogue, structure and learner autonomy can be adjusted to fit the needs of the instructor, the learners and the content of a course. (2005, p. 250). Schullo argued that

optimising educational interactions using a combination of learner-instructor, learner-learner and learner-content interactions, while limiting problems due to learner-interface interaction, is the key to successful online learning. In addition, as educational interaction is optimized, dialogue should increase therefore decreasing transactional distance (2005, p. 253).

Schullo created a detailed synchronous web based course observation tool based on Moore's transactional distance theory. This current study adapted this tool to record the interactions that occurred in the VC sessions.

Another study incorporating transactional distance and VCs is the work of McBrien et al. (2009) who claimed the use of the VC

Offer[ed] instructors the potential for meaningful real time interactions and improved opportunities for students to communicate at a geographical distance. Considering that dialogue requires two way interaction, distance education tools involving virtual classrooms have the power to increase

dialogue more than one-way methods of communication  
(McBrien et al., p. 4).

While the findings of this study were mostly positive, with the VC perceived to encourage a greater level of social interaction, the learners commented that issues with the technology affected the quality of their interactions. The learners believed the quality of their interactions was also affected by the potential for distraction due to the multifaceted capability of the technology with listening, writing and viewing videos or PowerPoint presentations being overwhelming. McBrien et al. (2009) highlighted the importance for the teacher to manage these issues to ensure effective teaching and learning. This current study investigated the gap in focus on these learner-interface and teacher-interface interactions.

McBrien et al. (2009) identified holes in Moore's theory in regards to the use of the VC by stating Moore's 1993 theory, while offering a method to understand distance in online courses, fails to address the fact that there are many overlaps in the elements and that "online learning is a complex phenomenon that demands a holistic analysis" (McBrien et al., 2009, p. 1).

They disagreed with Moore's argument that higher structure would lead to higher transactional distance as findings from their research suggested that learners preferred a more structured session to reduce their experience of distance. This statement agrees with research by Moore and Kearsley (2005), where they argue that being dependent on instructional technology resources means that communication between the learner and a distant teacher/designer must be more structured. This issue was investigated in this current study.

One of the most recent studies on transactional distance in VCs is the work of Martin et al. (2011, 2012). Findings included that "interaction is crucial to learner satisfaction in online courses. Adding synchronous components (VC technologies) to online courses can facilitate interaction" (2012, p. 249). They also added that learners agreed with the idea that the VC aided interaction. They argue that

human interaction is the key for success in any classroom,  
both face to face and online. In an asynchronous online  
setting, the human element might be missing or at times  
minimal, whereas in a synchronous online setting, such as the

VC, the human element is significant and adds to the success of the class (Martin et al. 2011, p. 252).

### **2.6.3 SUMMARY**

Since Moore first introduced the theory of transactional distance in 1973 there has been a steady increase in technology advances in distance education. This section discussed the importance of not only researching interaction between learners, teachers and content but also including additional interactions that take into account the importance of learners, teachers and content interacting with the interface. In the case of this current study the interface is the VC. While there has been some research into the use of VCs to reduce the sense of transactional distance felt by learners there is still more research needed. This research aimed to fill these gaps in current research.

## **2.7 TASK SWITCHING**

The discussion above has highlighted the importance of effective interactions to engage learners and ensure there is less feeling of transactional distance and better engagement. Hence, it follows that it is critical to investigate any issues that may occur that could affect the quality of the interactions and the levels of engagement. Helping learners to “pay attention” has always been a major focus for educators. The ability to focus the mind is a prerequisite to learning and a basic element in classroom motivation and management. However, one important feature that is becoming more prominent in education is the prevalence of learners to do two things at once. This is a particular issue with today’s youth, who have grown up with the internet and are media task switchers who switch between watching television, texting, making a posting on their Facebook page and studying.

### **2.7.1 GENERAL LITERATURE ON TASK SWITCHING**

There is much debate about the definition of multitasking and even whether human multitasking is possible. Rosen (2008) a fellow at the US Ethics and Public Policy centre claimed that

when we talk about multitasking we are really talking about attention: the art of paying attention, the ability to shift our

attention and more broadly to exercise judgment about what objects are worthy of our attention (2008, p. 109).

Gasser and Palfrey (2009) conducted research as part of the Digital Natives project conducted at Harvard University. They contended there are two types of multitasking:

- parallel processing – this is defined as doing two things at once; however, one task is usually automatic for example reading a book while listening to music
- task switching (divided attention) – this is defined as the process of rapidly changing from one task to another for example reading a book and responding instantly to a text message (Gasser & Palfrey, 2009).

This study will concentrate on the area of task switching or the issue of dividing attention as this is the area that concerns learners using the VC.

The last decade of research has discovered that learners are often task switching. Research conducted by McMahon and Pospisil (2005) found that ‘multitasking’ was evident, with two thirds of the learners reporting that they task switch and have lots of things “on the go” at once. A more recent Australian study by Judd (2012) investigated 3372 computer session logs of 1279 university learners. Judd found that 70% of sessions involved some ‘multitasking’.

While it is becoming clear that current learners are task switching there is also mounting evidence that task switching has an effect on learners’ ability to accomplish tasks effectively, with studies recording a reduction in performance levels and/or an increase in errors (Ralph et al., 2014; Kirschner & van Merriënboer, 2013; Junco & Cotten, 2011; Lin et al., 2009; Ophir et al., 2009; Strayer, 2001) and a reduction in knowledge retention (Levitin, 2015; Risko et al., 2013). There is also evidence that task switching may have a negative effect on the time taken to complete a task (Bowman et al., 2010; Judd, 2012; Gasser & Palfrey, 2008; Rubinstein et al., 2001).

### **2.7.2 REDUCTION IN PERFORMANCE LEVELS AND INCREASE IN ERRORS**

Research by Strayer (2001) confirmed that talking on the phone while driving a car is as dangerous as driving while intoxicated. Findings included decreased attention and increased reaction time so that drivers missed half the things they would normally

see, like billboards or pedestrians. This study has convinced many countries, including Australia, that using a mobile phone while driving is dangerous and many have subsequently made it illegal. This is a strong argument that task switching has a negative effect on performance.

A Stanford University study conducted by Ophir, Naas and Wagner (2009) put 100 learners through a series of three tests to investigate what happens to people who 'multitask'. The research found that people who are regularly bombarded with several streams of electronic information do not pay attention, control their memory or switch from one job to another as effectively as those who prefer to complete one task at a time.

Lin et al. (2009) studied media 'multitasking' capabilities by comparing novice and expert reading skills in both 'multitasking' and monotasking conditions. Findings confirmed that all participants performed worse in the test multitasking condition. These findings are supported by a study by Junco and Cotten (2011) who examined the effects of learners 'multitasking' while doing their schoolwork on their grade point average (GPA). This study found that learners who task switched (for example Facebooking and/or texting while doing schoolwork) did achieve a lower GPA and argued that regular task switching can have a negative impact on academic performance.

Kirschner and van Merriënboer (2013) argued that people are not capable of 'multitasking' and can at best switch from one activity to another. They claimed that

switching requires a person to juggle her or his limited cognitive resources to accomplish the different tasks successfully. This juggling leads to greater inefficiency in performing each individual task, namely, that more mistakes are made and it takes significantly longer as compared to sequential work (2013, p. 172).

A further study by Ralph et al. (2014) found that media 'multitasking' leads to an increase in attention related errors.

### **2.7.3 REDUCTION IN KNOWLEDGE RETENTION**

A more recent research into learners task switching in education is that of Risko, Buchanan, Medimorec & Kingstone (2013) who researched learners engaging in



media non-lecture related activities while participating in a lecture. Sixty- four United States university learners were observed, and results demonstrated that engaging in these activities takes attention away from the lecture and this impairs retention of lecture material. They argued that “one of the greatest challenges is to better understand, given our knowledge of the demands of dual tasking, how the distraction posed by this technology influences educational outcomes” (2013, p. 2).

Levitin (2015) argued that task switching comes at a neurobiological cost. It depletes essential neuro-resources that are needed for actually doing things and thinking things. He explained that if children text message and study at the same time, the information from their schoolwork goes into the striatum, a brain region that stores new procedures and skills, rather than facts and ideas. If there is no distraction, however, the information goes into the hippocampus, where it is catalogued in a variety of ways, making it easier to retrieve.

#### **2.7.4 INCREASE IN TIME TAKEN TO COMPLETE TASKS**

Rubinstein, Meyer and Evans (2001) conducted extensive research which involved participants alternating between different tasks or performing the same task repeatedly. The findings revealed that participants lost time or made errors when they had to switch from one task to another.

Gasser and Palfrey (2008) argued that task switching increases the amount of time needed to finish a task. They further argued that it may be impossible to prevent learners task switching. Rather, they believed educators should help learners take control of their learning by educating them about the negative effects of task switching. Judd (2015) supported this argument about the importance of educating learners and suggested learners should be given guidance and tips on how to influence their study habits and better manage their study time.

Bowman et al. (2010) examined the effects of learners using instant messaging while in a classroom. The results indicated that while learners think they are accomplishing more when task switching, findings suggest that they will actually need more time to achieve the same level of performance on an academic task.

Judd (2012) found that all evidence indicates that ‘multitasking’ is more likely to negatively, rather than positively, impact on learning. He argued that

more time and effort will be required to result in the same level of memory encoding, and learning, during a ‘multitasking’ session than a focused or sequential one (2012, p. 366).

### **2.7.5 TASK SWITCHING—VIRTUAL CLASSROOM RESEARCH**

The above research clearly shows that the tendency by learners to task switch can impede their learning. This becomes more of an issue with the VC when learners are geographically dispersed and the teacher is unable to physically see what the learner is doing at a given moment.

One of the first studies of learner task switching in VCs was conducted by the eLearning Guild (2005) in a report focusing on the current trends in e-learning. The Guild surveyed 4200 respondents asking if they task switched (term used in the question was ‘multitasking’) during a VC session and only 13% said “rarely” or “never” while exactly half (50%) said “always” or “often”. The survey also polled the respondents if they thought this task switching (term used in the question was ‘multitasking’) interfered with their learning, with 14% reporting it did “always” or “often”, 52% reporting sometimes and only 31% reporting that it “rarely” or “never” interferes.

In 2011 a United Kingdom research study into virtual learning (Towards Maturity, 2011) asked respondents what they believed were major barriers to adoption of the VCs and 28% listed the issue of users ‘multitasking’ in training. (Towards Maturity 2011, p. 14). While no other statistics could be found about task switching, many VC practitioners discuss the importance of discouraging learners from task switching. Clark and Kwinn (2007) argued that

the main frustration with the virtual classroom environment is ‘multitasking’. No matter how engaging you are as an instructor, you must still battle the learner’s constant temptation to check emails and multitask (2007, p. 5).

Courville (2010) argued that “the reality is that today’s audience is ‘multitasking’ during your presentation, perhaps even twittering about it in real time. Assume they’re ‘multitasking’ (2010, p. 149). Clay (2012) argued that you “must engage learners repeatedly to keep them from ‘multitasking’ (2012, p. 3).

## **2.7.6 SUMMARY**

This section highlighted two important issues as indicated by the research on task switching. The first is the evidence from literature that there is no doubt that many modern learners are often task switching at a high rate. While there is an increasing body of research into the issue of task switching by learners there has been limited research on the issue of learner task switching while participating using remote technology such as a VC. This study will add to this literature by investigating if learners are task switching while participating in a VC session.

The second issue is the overwhelming evidence of the negative impacts on task performance and learning by learners who are task switching including a decline in productivity, accuracy and efficiency. While research has focused on these negative issues, there remains a gap in the literature for investigating strategies that teachers can employ to discourage learners from task switching and to focus on the task at hand. This research aimed to fill this gap by investigating strategies to discourage the learners from task switching when participating in a VC session and to focus on the content of the session.

## **2.8 PROFESSIONAL DEVELOPMENT TRAINING FOR THE VIRTUAL CLASSROOM**

Research in teaching and learning in distance education argues that staff professional development and training is a critical component in the success of distance education. This is even more critical when teaching in the VC environment due to the lack of body language cues available to the teacher (Clark & Kwinn, 2007; Cornelius, 2014; Todhunter & Pettigrew, 2008). Despite the growing presence of VCs, there is still uncertainty about how best to plan, design and deliver for this medium (Christopher, 2015; Cornelius, 2014).

This section investigates factors that affect professional development for teachers delivering sessions in VCs including skills required by VC teachers such as technical skills, task switching skills, peer support, teachers' workloads, learner training and the need for institutional support.

### **2.8.1 INSTITUTIONAL SUPPORT**

Research by Conti (2012) investigated the skills and best practices necessary for United States K-12 teachers' success in a VC and claimed that

as the popularity of this instructional method continues to increase, concerns have been raised regarding the qualifications and preparation of teachers who take on this new role. Many new and veteran teachers are finding themselves in live, synchronous classrooms with little training or support (2012, p. 5).

Reushle and Loch (2008) conducted research on the introduction of VC teaching at university level in Australia. Findings included that it is

vital that the institutions provide ongoing support and resources for such tools. Therefore, budgeting for the introduction of web conferencing software does need to account for training costs, student and staff support, administrator training, and annual maintenance costs. It should also address the “hidden” costs to faculty staff acclimatising to a new system (2008, p. 26).

Bower (2011) argued the importance of institutional support for training in the VC due to the “inherent complexity of teaching using web conferencing systems it would appear that substantial professional development is appropriate” (2011, p. 79).

Roughton et al. (2011) also believed there should be adequate employee development available to the teachers (professors) who teach synchronous classes. They asserted it is important “to establish clearly defined and understandable policies, procedures, and guidelines for online instruction with regards to synchronous tools” (2011, p. 53). Pelliccione and Broadley (2010) conducted interviews with ten university staff about professional development for teaching in the VC. One of the key implications identified through their research was that clear guidelines and expectations should be developed regarding the structure of the VC sessions.

## **2.8.2 SKILLS REQUIRED BY TEACHERS**

Todhunter and Pettigrew (2008) argued that facilitation skills and the preparation required for teachers to facilitate in a VC are different from those that might be used in face to face learning and teaching situations. Bower (2011) agreed that “teaching effectively in web conferencing environments is not as simple as directly transferring

face to face approaches” (p. 79) and Finkelstein (2006) argued that learning in real time involves complex and demanding tasks. Hofmann (2004) further claimed that all staff involved in the learning process need to acquire the skills they need to master the additional competencies required for a VC.

Research conducted by Training Industry Incorporated (2010) asked the respondents which skills are the most important for a teacher using a VC (called Virtual Instructor- Led Training in this study). While the top three critical skills listed were: general teaching skills or facilitation skills, 61%; topic matter expertise, 59% and understanding audience needs, 38%, the next two highest skills were ease of using technology, 32% and overall VC specific skill training, 29%. Other skills listed included classroom management skills, 23%; training material development capabilities, 11%; instructional design capabilities, 9% and ability to assess ROI, 6%.

The above findings are consistent with the emerging theme from the literature about a teacher’s knowledge and competence in using the VC technology as being critical to the success of the session (Bower, 2011; Loch & Reushle, 2008; Martin et al., 2011). Another skill to emerge was the ability of the teacher to be able to adapt to problems that might occur due to technical issues and the importance of having backup plans when issues arise (Grant & Cheon, 2007; Schullo 2005).

Cornelius (2014) expressed the need for

strategies to manage interactions for example, to bring people into discussions, to ensure everyone is heard, for interrupting those who hog the floor, for handling silences and for managing small group work, which were different from their face to face practise (2014, p. 268).

Martin et al. (2013) found the VC has an initial learning curve for synchronous class sessions to be delivered smoothly without interruptions and claimed “if a faculty member has mastered the technology, there is always the possibility of internet disconnection, system crashing, or a feature malfunctioning and this might interrupt live class delivery” (2013, p. 133).

Ng (2007) contended “the tutor must master the technology as a tutor plays a significant role in promoting a meaningful interactive learning experience for students in synchronous online learning environments” (2007, p. 4).

Bower (2011) observed the following range of different competencies exhibited by teachers using a VC:

- Operational – the ability to operate the tools and functions of the collaborative technology.
- Interactional – the ability to effectively interact to perform a task or solve a problem using the technology (including the ability to apply interactional tactics to collaborate effectively).
- Managerial – the ability to manage a group or class including providing support on how to use the technology and interact effectively.
- Design – the ability to select and organise tools in a way that optimises interaction and best supports activity management (2011, p. 5).

Bucceri and Hemmings (2003) claimed the characteristics of a good VC teacher include:

- willingness to facilitate and not control learners; ability to engage learners and encourage collaboration
- ability to think like a “radio broadcaster”... speak to an audience of one and keep voice up-beat and energized
- willingness to rehearse delivery
- ability to multitask and improvise
- willingness to advocate VC technology and to be patient with technical glitches
- willingness to mentor new e-trainers (p.2).

Another issue to arise in the literature review was the importance of planning and practising to gain confidence. In her study, Schullo (2005) found teachers who planned their lessons carefully and practised using the VC tools were more successful than those who did not. Martin et al. (2011) also discovered in their study that

their preparedness in using the technology plays an important role in the success of the class. Instructors who are proficient in the synchronous technology are able to overcome minor technological

glitches that they might encounter during an online session (2011, p. 254).

A further argument by many practitioners is the suggestion that before a teacher delivers sessions via a VC they should first participate in a live session as a learner (Christopher, 2015; Ng, 2007; Pelliccione & Broadley, 2010). Loch and Reushle (2008) claimed that another important factor is a teacher's confidence in using the technology and found in their study that "some staff members reported that they were afraid of the constant changing of technology, which places them in the ongoing position of a beginner" (2008, p. 26). Martin et al. (2011) reported similar findings stating teachers who are not proficient with technology may be nervous about using synchronous technologies, or if they do try they may be discouraged if their first attempts are unsuccessful.

Another common theme to emerge was the issue of a teacher in a VC requiring task switching skills. Hofmann (2004) and Schullo (2005) both discussed that due to the multifaceted rich environment of a VC, task switching becomes an important skill as teachers must handle many things at the same time so it is important for them to feel comfortable managing multiple tasks simultaneously. Finkelstein (2006) supported this by referring to a VC teacher as having to be a 'ringmaster' "due to having to manage multiple communication channels such as the audio, emoticons, chat, PowerPoint slides and whiteboard drawing tools (rings in a circus) at once" (2006, p. 32). Clark and Kwinn (2007) also claimed cognitive overload is a common experience for new teachers. In more recent literature Cornelius (2014) listed a key skill required by VC as task switching and observed that

the facilitator must be able to jump quickly from one task to another to keep the session moving quickly, while simultaneously keeping an eye on the other activities on the home screen such as ongoing chats, emoticons etc. (2007, p. 276).

She also reported that respondents commented that

the environment was complex and the simultaneous use of different tools and media for communication could be overwhelming and exhausting; that there was a lot to pay attention to, a lot to do (2007, p. 267).

### **2.8.3 TEACHERS' WORKLOADS**

Many researchers reported that teachers are stating that they feel a higher workload is required for the preparation of a VC session (Pelliccione & Broadley, 2010; Todhunter & Pettigrew, 2008). Ng (2007) claimed that VC teachers must be allocated time to plan, time to practise, time to get ready, time to teach and time to support learners.

### **2.8.4 PEER MENTORS (TEACHER-TEACHER INTERACTION)**

Many studies discussed the importance of offering teachers new to the VC a mentor to support them in the use of the new technology (Loch & Reushle, 2008; Schullo, 2005).

Schullo (2005) found that due to the VC being a multifaceted rich environment it is important for a teacher to have an assistant (producer) helping with the different tasks, particularly in the first session, as she argued it is important to have both technical assistance and a “behind the scenes” assistant. Loch and Reushle (2008) claimed that teachers using VCs may find the focus on technology daunting, even for experienced users.

Pelliccione and Broadley (2010) also discussed the importance of having an experienced VC academic staff member (called a peer mentor) for the first three sessions a new teacher is delivering. In the first session the mentor would spend time introducing the various functions to the learners as well as the teachers. They argued this stage was seen as a crucial element of their professional development model with some teachers stating they “would not have survived without it” (2010, p. 754).

### **2.8.5 LEARNER TRAINING**

An interesting issue which arose in the literature review was the importance of not only providing teachers with professional development in the use of the VC, but ensuring that learners are also provided training in the use of the platform (Ng, 2007). Schullo (2005) argued that an important element to success in the VC is proper training and preparation for learners but believed that this only needs to be minimal, with a suggestion of half an hour demonstration for the students to try the tools. Grant and Cheon (2007) supported this by stating that providing “a simple exercise at the beginning of the course can provide learners with positive experience and increase self-efficacy” (2007, p. 214). Bucceri and Hemmings (2003) claimed it



is important for first time users to attend a check-in session before the first session to identify and resolve any technical issue and familiarise themselves with the VC. Bower (2011) believed learner training in the use of the VC platform will not only assist the learners be able to participate effectively in the VC sessions but as the VC becomes more mainstream this will be a skill used by learners in the global workplace.

### **2.8.6 SUMMARY**

This section highlighted the importance of institutions providing ongoing time, support, training, resources and peer support (teacher-teacher interaction) for the success of the implementation and ongoing use of VCs for teaching and learning. This section also highlighted the wide variety of skills required by a teacher for delivering a VC session with emphasis on technical requirements in the VC (teacher-interface interactions). Another issue that arose from the literature was the importance of learners also being provided training in the use of the VC to ensure they are comfortable in this environment and therefore can focus on the content of the session rather than the technology. This study investigated the requirements for professional development training for teachers by investigating what training, support and guides teachers and learners need to be able to deliver and participate effectively in a VC.

## **2.9 INSTRUCTIONAL DESIGN FOR VIRTUAL CLASSROOMS**

Siemens (2002) described instructional design as

the art and science of creating an instructional environment and materials that will bring the learner from the state of not being able to accomplish certain tasks to the state of being able to accomplish those tasks (2002, p. 1).

In the VC the creation of an instructional environment is the practice of arranging the media (audio, graphics, text, video, tools) and the materials to help teachers share knowledge effectively. Further, much of the literature states the importance of designing for interactivity and engagement when designing VC sessions (Bower, 2008; Christopher, 2015; Clarke, 2005; Clark & Kwinn, 2007; Hofmann, 2004; McBrien et al., 2009; Martin et al., 2011). One of the key findings was that because

learners are geographically dispersed and cannot rely on body language and/or eye contact, exercises need to be redesigned to suit the VC technology (Bower et al., 2014; Clark & Kwinn, 2007; Hofmann, 2004). This section investigates the issues with designing for VC sessions to ensure maximum learning and engagement occurs.

## 2.9.1 INSTRUCTIONAL DESIGN MODEL

There are numerous instructional design models that can be used for online learning design processes. The National VET E-learning Strategy (2014) investigated multiple design processes and chose the ADDIE design model (which was originally developed in 1978 for the U.S Army) as the most appropriate for use by online educators in the VET sector. The acronym ADDIE stands for Analyse, Design, Develop, Implement and Evaluate. The Strategy developed a toolkit in 2014 for use by all VET practitioners (Figure 2.5). This design model is used as the instructional design framework for this current study.

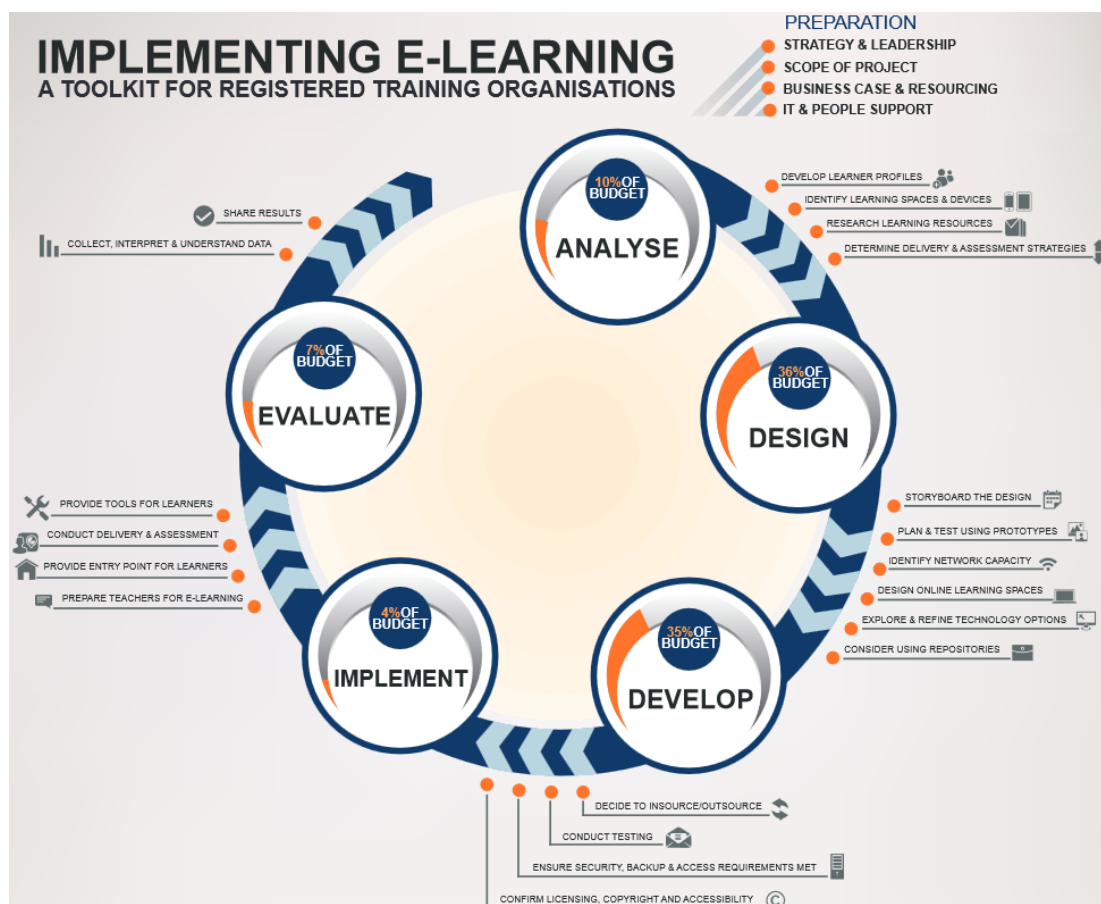


Figure 2.5: Implementing e-learning infographic (Commonwealth of Australia National VET E-learning Strategy 2014) Used under a Creative Commons Attribution 3.0 (<http://creativecommons.org/licenses/by/3.0/au/>)

## **PLANNING AND PREPARATION**

The ADDIE model above includes the planning and preparation stage (analyse and design) as the first step in any development. While preparation by a teacher is critical to the success of any educational delivery, the preparation of a VC is even more important due to the multifaceted nature of the technology. Further, many researchers argued that due to the immediacy of feedback, activities must be planned ahead of time (Bower et al., 2015; Christopher, 2015; Martin et al., 2011). Martin et al. (2011) concluded that “unlike in a face to face class where spontaneous instruction can be delivered, in a virtual setting pre-planned instruction turns out to be more effective and successful” (2011, p. 257).

Clark and Kwinn (2007) agreed that planning (pre-engineering) is a critical component for the success of any VC session including the “content and interaction slides, an outline or summary of the narration to accompany the slides, participant handouts and additional materials such as reference resources, pre-letters, facilitator guides etc.” (2007, p. 232). In more recent literature findings suggest “in addition to even more attention to preparation and planning, trainers need to meet participant’s expectations for content that has been customised and optimised for a VC” (Christopher, 2015, p. 276).

One of the first steps in planning a VC session is deciding the length of time required for a session to be conducted. There was no research found about this topic and only a few mentions of the time frame in literature with Bucceri and Hemmings (2003) listing the optimum length to be between 60 to 120 minutes; Hofmann (2004) stating sessions should go for no more than 90 minutes, or if two hours, it should have a fifteen minute break and Clark and Kwinn (2007) claiming sessions should not exceed 2 hours and any sessions over 90 minutes should include a break. More recently Christopher (2015) claimed sessions should be chunked into sections of 60 to 90 minutes with a break every 45 to 60 min.

### **Planning for Interactivity**

The consensus of all VC practitioners is that a critical component for the success of a VC session is the inclusion of interactivity and learner interaction with the use of emoticons, chat, audio, whiteboard pen feature and other tools (Bower et al., 2015; Chen et al., 2011; Christopher, 2015; Clarke, 2005; Clark & Kwinn, 2007; Hofmann, 2004). However, there has been limited research into the exact time lines for these

interactions or which tools work best for engagement. Clark (2005) believed that it is not the medium that makes the difference; rather it is the way in which the designer or teacher uses the features that are available such as graphics, examples and practical exercises. Christopher (2015) claimed

even though technology tools have grown more sophisticated, they're only as effective as the professionals using them. The magic is not in the sophistication of the technology, but how well the physical and virtual tools are used to create an engaging learning event (2015, p. 276).

Hofmann (2004) listed one of the key skills required for teachers delivering sessions as “activity creation”, which she defined as the ability to create a variety of instructional activities that utilise whiteboard, chat, application sharing, web browsing and breakout room activities. Clark and Kwinn (2007) also believed the ability of the teacher to create effective activities using all tools is a critical aspect to the success of the VC sessions. They break down the tools in the VC into three groups:

- tools for communication – audio and chat
- tools to display visual information – whiteboard and webcam
- tools to promote participant interactions – whiteboard drawing tools, yes, no, hands up, emoticons and polling.

There is also evidence about the importance of the timing of the use of tools to create interactions to effectively engage the learners. Clark and Kwinn (2007) argued that a teacher should change slides every 2 to 3 minutes, engage learners every 3 to 4 minutes and change instructional strategies every 20 minutes. Hofmann (2004) also claimed regular interaction is important and suggested the time frame of one interaction every 3 to 5 minutes.

### **2.9.2 SLIDES AND VISUALS**

Hofmann (2004) and Clark and Kwinn (2007) argued that VC practitioners mention the importance of interactivity but there is little focus on the need for effective visuals. Further, there is much debate about the balance between text, images and activities that should be included on these slides or display board. However,

literature does suggest that meaningful, relevant pictures, major concepts, questions and/or graphics are essential for the success of information transfer in a VC (Brandon, 2008; Clark, 2005; Clark & Kwinn, 2007; Hofmann, 2004; Martin et al., 2011).

Clark (2005) further argued the importance of including visuals and stated that “presentations that rely predominantly on text fail to engage” (2005, p. 60). Hofmann (2004) agreed that slides should be created with a minimum of words. Most sources suggested bullet points work well in a VC but these should be kept to a minimum, with suggestions ranging from between 3–6 bullets per page (Brandon, 2008; Hofmann, 2004). Other suggestions included to use the screen for exercises (interactivity) or to supplement content wherever possible (Hofmann, 2004).

Two practitioners who discussed the creation of effective presentations using PowerPoint slides in the VC are Heacock (2010) and Courville (2010). Heacock (2010) suggested it is important to create movement as he argued our eyes are involuntarily drawn to motion and therefore every time the VC screen changes in some way the learner will look up. He also stated the importance of transforming text into visuals and argued that if you use visuals with voice, a learner must listen and think in order to interpret the information being presented and this leads to enhanced retention of knowledge. He also recommended using the PowerPoint slides as a powerboard – a cross between a PowerPoint and a whiteboard – and listed examples as labelling, pointing, questions, games and group activities. Courville (2010) supported Heacock’s views by proposing the VC presenter should focus on directing attention visually and verbally and on keeping the screen changing.

### **2.9.3 METACOGNITION AND COGNITIVE LOAD**

In a study by McBrien et al. (2009) students reported the task switching capability of the technology including speaking, listening, writing and viewing videos or PowerPoints could be overwhelming for them. Martin et al. (2012) argued that this can cause the students to be overstimulated and the result could be that some of the information transferred could be overlooked by the students. They concluded that instructors must be vigilant and proactive regarding student interaction and communication while teaching in a VC.

Clark (2005) proposed that learning in a VC is better when you explain complex visuals with audio rather than text, taking advantage of the modality effect. She

further argued a complementary visual and auditory message makes best use of the visual and phonetic centres in memory and therefore minimises memory load. She suggested teachers use a narrative to explain visuals on the whiteboard.

Clark and Kwinn (2007) suggested “learning is constrained by our two memory systems: working memory and long-term memory. As a limited capacity processor, working memory can hold only a few chunks of information” (2007, p.149). They argued that due to the nature of the VC it is important to be “especially diligent to manage student cognitive load in a VC” (2007, p. 149) to ensure the chunks of information in the working memory that are transferred to long term memory is the essential content. They provided the following techniques:

- weed out extraneous content
- use only need to know content
- identify and use only content appropriate for a VC
- keep VC sessions brief
- be mindful of the modality effect
- eliminate extraneous themes and games
- use care with webcam
- segment and sequence content
- set ground rules to minimise distractions.

The above discussions show the importance of having the correct balance in a VC of using multiple tools to ensure knowledge is transferred to working memory and to be cautious not to utilise too many VC tools at once and risk overloading the learner.

#### **2.9.4 GUIDES**

There is limited research on the development or implementation of guides for support for either teachers or learners in the use of a VC. Hofmann (2004) contended a competent instructional designer will create guides that support both the teacher and the learner. She stated that the teacher guide should include timing cues, suggested scripting, activity instructions, and a variety of other components critical to ensuring instructional success. This study aims to fill this gap in the literature by exploring the development of guides to support both the teacher and learner in the use of VCs.

## **2.9.5 SUMMARY**

This section discussed literature about instructional design for the VC and introduced the ADDIE design model as the framework for this current study. Issues such as the importance of planning and preparation, the teacher's ability to use multiple tools to encourage regular interactions to engage learners, the need to design effective slides using visuals and the importance of developing guides to support both teachers and learners were discussed. Each of these aspects was investigated in this current study.

## **2.10 RESEARCH QUESTIONS**

The following are the research questions which form the basis of this study.

1. How can teachers design content and/or activities to encourage interaction, engagement and attention while participating in a VC?
2. What training, guides and support do VET teachers and learners require in order to provide an environment that supports learners in a VC?

These questions will be addressed by exploring the nine combined interactions between teachers, learners, content and interface as discussed in this chapter, and how the application of these interactions can encourage engagement and attention from the learners. This will in turn reduce the opportunity for learners to experience transactional distance and reduce the opportunity for the learners to task switch when participating in a VC.

Research question one will be addressed by investigating:

- teacher interactions with the VC (teacher-interface) including the management and design of the session (structure), design of the VC room, activities, selection and management of the tools and management of technology issues
- teacher interactions with the content (teacher-content) including the use of slides
- teacher interactions with the learners and the learners with the teacher (teacher-learner) including the level of autonomy given to the learners with particular emphasis on how to encourage learners to remain focused on the session

- learner interactions with the interface (learner-interface) including the use of tools, and technology
- learner interactions with the content (learner-content)
- learner interactions with each other (learner-learner).

Research question two will be addressed by investigating what training, support and guides VET teachers and learners require to provide a learning environment that supports learners in their learning in a VC. This will include professional development for teachers (teacher-teacher) including instructional design and professional development (teacher-content, content-content and content-interface), training for learners; and support for teachers and learners including the development of support material (guides) for both teachers and learners.

## **2.11 CHAPTER CONCLUSIONS**

This chapter discussed literature and research on teaching and learning in VCs and the gaps in research this study will address. The chapter commenced by presenting literature showing there has been a steep increase in the use of VCs in education globally and that this is expected to increase. While the amount of literature on the use of VCs has also increased in recent years, there still remains a gap in research pertaining to VCs in the VET sector with only two known studies focusing in this area. This study will add to the research.

Moore's (1993) transactional distance was discussed as the underpinning theoretical framework for this study with the importance of including the appropriate levels of dialogue (interactions), structure and autonomy addressed. However, due to the advances in technology since Moore's theory was first proposed, additional interactions were included to take into account the importance of the interactions of learners, teachers and content with the interface. The prevalence of task switching in distance education was then addressed with overwhelming evidence that modern learners are task switching at high rates and further evidence suggesting that this can affect their productivity, accuracy and efficiency in the VC. Analysis of literature pertaining to professional development for teachers discussed the importance of institutional support and the additional skills required for a VC teacher with an emphasis on the ability to exercise the technology. However, a gap in literature relating to the development of training, support and guides for VET teachers was



discovered and this study will aim to address this gap. The chapter concluded with a discussion about instructional design for the VC including planning and preparation, the importance of designing for regular interactivity for the learners, and the importance of slide design. The ADDIE framework was selected as the design model for this study.

# CHAPTER 3 – RESEARCH METHODOLOGY

*Be like a postage stamp – stick to one thing until you get there.*  
Josh Billings. US Humourist. (1818 – 1885).

This chapter explains the research methods and procedures for data collection and analysis that were applied in this research. It begins by discussing the justification for using the design-based research model and explanation for selection of a mixed method for data collection. This will be followed by a description of the instruments used to collect the data. Finally, the processes of data collection and analysis will be explained.

## **3.1 JUSTIFICATION AND RESEARCH METHODS**

### **3.1.1 DESIGN BASED RESEARCH**

The research used a design based research (DBR) model. DBR is an approach designed to enable educators to solve problems while also investigating design principles that may guide and inform future practice in an area (Kervin et al., 2006). Herrington et al. (2007, p.1) claimed that “design based research integrates the development of solutions to practical problems in learning environments with identification of reusable design principles.” An outcome of this research was the creation of guidelines, “how to” guides and professional development strategies.

Prior to the commencement of this study, the researcher had previously developed a set of “how to” guides and professional development training for the Institute teachers using the VC. These resources were produced in consultation with Flex:Ed staff members including educational designers, graphic designers, teachers, and online help desk staff. The researcher developed these guides based on a previous informal study conducted at the Institute and on the researcher’s extensive teaching experience using the VC. However, initial feedback from the Institute teachers had revealed there were areas which required improvement. This research was designed to improve the quality of information provided in the guides and

improve and refine the professional development training. Therefore, DBR was the logical choice to enable this objective to be achieved.

One of the features of DBR is the collaboration of researchers and practitioners in realistic classroom environments (Herrington et al., 2007; Plomp, 2007). This study included collaboration among the researcher, teachers and learners involved in the study. The researcher also collaborated with the staff from the Flex:Ed department in the Centre for Education Excellence.

This study used the Reeves (2006) DBR model as the basis for the study. Figure 3.1 displays the DBR process for this research.

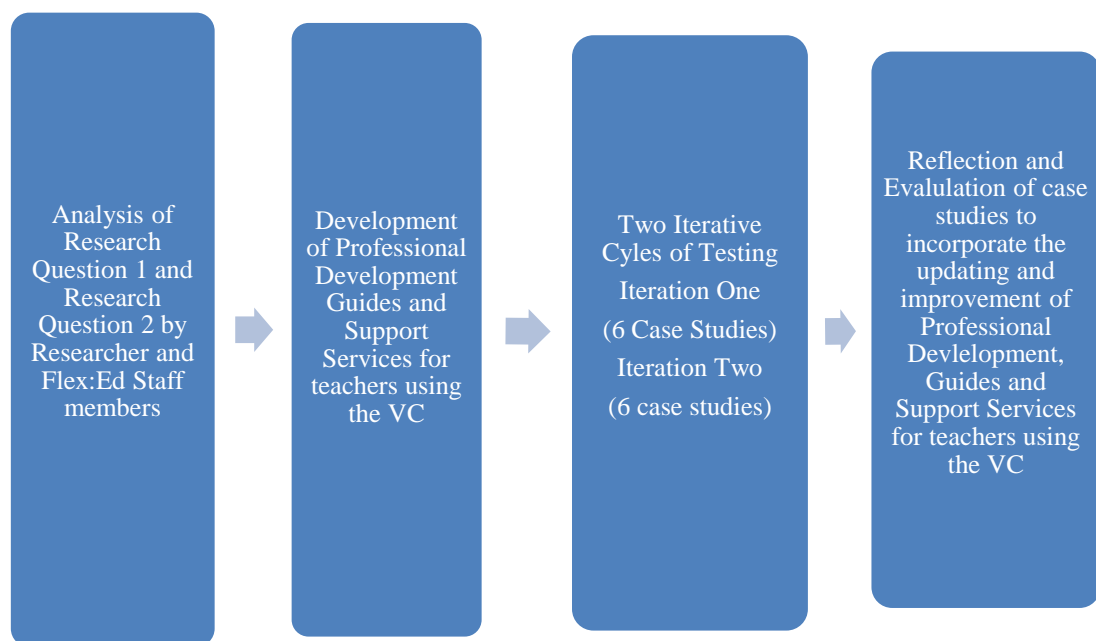


Figure 3.1: Design Based Research Model based on Reeves DBR model (2006) © Kerry Trabinger 2011.

### **Analysis of Problem**

In the first stage, the researcher liaised with the Institute management, Flex:Ed staff members, Institute teachers and learners to address the following research questions.

**Research Question 1:** How can teachers design content and/or activities to encourage interaction, engagement and attention while participating in a Virtual Classroom?

**Research Question 2:** What training, guides and support do VET teachers and learners require to provide an environment that supports learners in a Virtual Classroom?

## Development of Solutions

In the second stage the researcher provided professional development, guides and support for Institute teachers.

## Iterative Cycles of Testing

There were two separate iterations (cycles of testing and refinement of solutions in practice) with the first occurring during semester 2, 2011 and the second in semester 1, 2012 as shown in Figure 3.2.

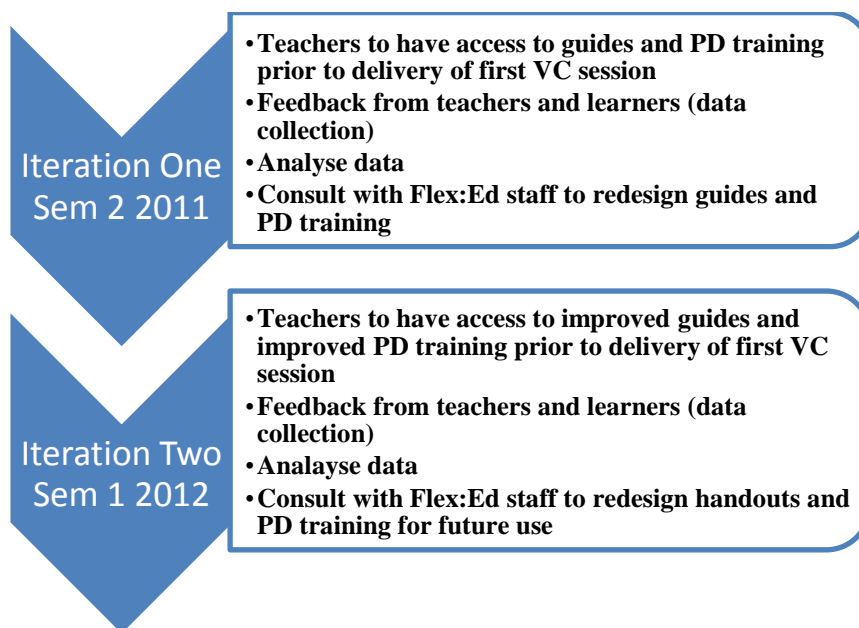


Figure 3.2: Cycles of testing and refinement © Kerry Traber 2011.

Iteration one incorporated the evaluation of six case studies, comprising six teachers, six VC sessions and 28 learners. Iteration two incorporated the evaluation of six case studies, comprising six teachers, nine VC sessions and 47 learners.

## Reflection and Evaluation

The completion of the two cycles of testing was followed by evaluation of both iterations, which included twelve case studies, twelve teachers, fifteen VC sessions and 75 learners. The final outcome was the preparation of a professional development plan for teachers, improved guides for teachers and learners and suggested support requirements for teachers and learners using the VC.

### 3.1.2 CASE STUDIES

Yin (2002, p.13) defined a case study as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between

phenomenon and context are not clearly evident; and in which multiple sources of evidence are used". Merriam (1998) supports this by arguing that a case study is "an intensive, holistic description and analysis of a bounded phenomenon such as a program, an institution, a person, a process, or a social unit" (p. xiii). The phenomenon in this study was in the form of twelve case studies comprising of six individual case studies in iteration one and six case studies in iteration two. Each teacher and their learners comprised a separate case study. Yin (2002) further argued that multiple-case studies are preferred over single case studies, as these offer robust analytical conclusions. Therefore, conducting multiple case studies in this study was appropriate and the main method of data collection. While full data was only collected from six of the twelve case studies, the partial data collected from the other six case studies were included in the overall analysis.

### **3.1.3 MIXED METHODS**

This study used mixed methods for the data collection. Mixed methods is defined by Creswell and Clark (2007, p. 5) "as a method focused on collecting, analysing and mixing both quantitative and qualitative approaches in many phases of the research process". Using both qualitative and quantitative methods in this research assisted in a better understanding of the research problem than could be achieved by using either dataset alone, with certain themes able to be answered by quantitative methods and others by qualitative ones (Creswell & Clark, 2007).

The research included qualitative data collected from interviews with teachers and Flex:Ed staff members, teachers' journals, researcher's e-diary and quantitative data collected from the Wimba tracking logs (Wimba analytical data). Additional data were collected using both qualitative and quantitative tools and included entry and exit surveys from teachers and learners, end of session polls and VC observations.

Triangulation is defined by Kervin et al. (2006, p. 87) as "the comparison of multiple data sources to build a coherent analysis of data". Denzin (1978) argued that the purpose of triangulation is to strengthen the research by using multiple forms, multiple perspectives and multiple methods. Multiple forms, perspective and methods were used in this study. For example, when observing a teacher in a VC session the researcher was able to use the VC observation tool to record observations but also had access to the recording to review and ensure accuracy of data. The

researcher was also able to compare the data recorded in the observation tool to the Wimba tracking log. Using these multiple data sources ensured no interactions were missed and this was important in a VC session where activity could be occurring in many modalities at once including chat, audio, interactive whiteboards and emoticons.

Li et al. (2000) identified three different approaches to analysis in mixed methods research, parallel tracks, crossover tracks or single track. This research used crossover tracks, where analysis was initiated in separate qualitative and quantitative tracks. Then data in one track was transformed and crossed over to the other track for comparison and further analysis.

### **3.2 DATA COLLECTION TECHNIQUES**

The setting for the research study was the Canberra Institute of Technology, Canberra, Australia. The unit of analysis was case studies comprising a teacher and their learners in a series of VC sessions. The researcher advertised for voluntary participants. However, some teachers were approached to ensure a cross-section of centres was represented in the study to ensure richness in the data.

The instruments used to collect the data from teachers, learners, researcher and Flex:Ed staff are described below.

#### **TEACHERS**

The following data collection instruments were used to collect data from the teachers.

##### **Entry Survey**

The entry survey for teachers was conducted using Survey Monkey. Eleven of the twelve teachers completed the survey. To view the entry survey see Appendix A.

Topics included:

- background information, including gender, age, length of service, discipline and area
- previous experience with using VCs, including participating in a session or using the VC for teaching
- attitude to the VC, including advantages, disadvantages and barriers

- training information, including any previous training the teacher had participated in
- guide information, including if they were aware of, or had provided their learners with any guides.

### **Semi-structured Interviews and/or Feedback**

At the conclusion of their final VC sessions the teachers were interviewed and/or asked to provide feedback. Six teachers provided responses either in an informal interview, or by providing written responses to the interview questions. To view the semi-structured interview questions see Appendix B. Topics included:

- training, including any further training the teachers would like in the future
- guides, including which ones they used and any suggested improvements
- strengths and weaknesses of the VC
- tools, design and interaction, including questions about what tools worked well and what tools did not engage their learners
- any ideas for improving their sessions in the future.

### **End of Session Journal**

At the conclusion of each VC session, teachers were invited to post to an online blog journal their thoughts about how the session went and any ideas for improvement. This was unstructured feedback. Three teachers made posts. An example can be found below in Figure 3.3.

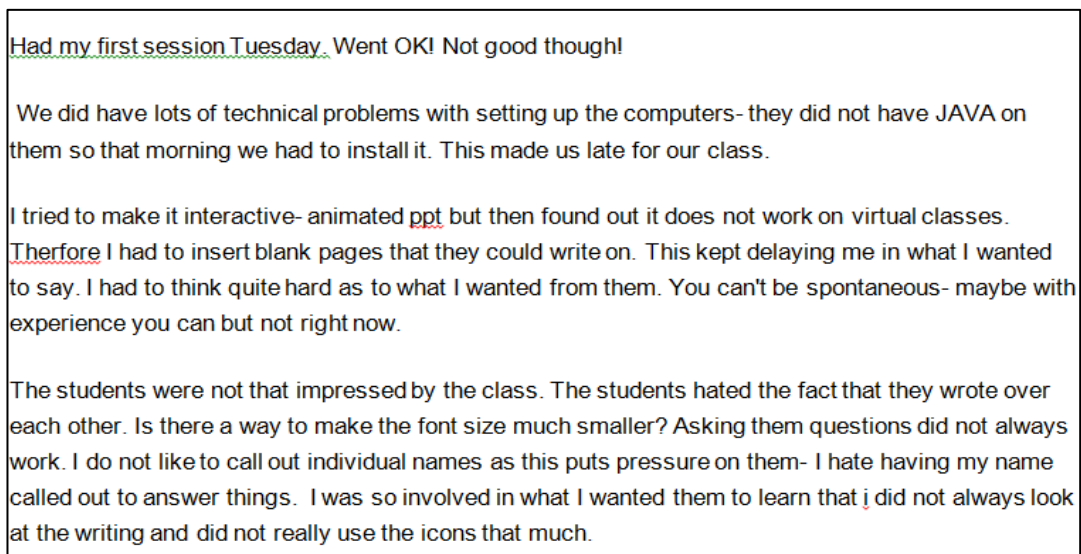


Figure 3.3.: Example of a teacher's blog entry.

## Exit Survey

The exit survey for teachers was conducted using Survey Monkey. Five teachers provided responses. To view the exit survey, see Appendix C. Topics included:

- training information, including any suggested improvements for future training
- guide information, including suggestions for improvement
- tool use by the learners
- task switching by learners, including how often, when and with what
- attitude to the VC, including advantages, disadvantage and barriers.

## Teacher Discussion Space

Each semester a discussion space was created for teachers to post their questions, thoughts, ideas and issues about the study. In iteration one, two teachers wrote posts; however, in iteration two no teachers chose to participate. An example of an iteration one post can be found in the excerpt below in Figure 3.4.

Hi Rachael, yes sorry I have not replied to any of your postings. I have read them but am flat out teaching, developing my virtual classes so that I can be as interactive as possible and developing new curriculum for next year.

I am also trying hard to get my students excited about virtual classes. They did complain a little – I suppose because they had to come to CIT to ensure it all worked and secondly because they had a practical afterwards. I think as they got more comfortable with the idea and how to use it (VC), they complained less. Even though in my last VC – half the class did not turn up and the rest forgot their headphones – or would not buy any.

by Julie – Wednesday, 2 November 2011, 1:46 PM.

Figure 3.4: Excerpt of a post in the teacher discussion space.



## **Unsolicited Feedback**

This included teachers emailing the researcher with questions, comments, issues and concerns. Ten teachers provided this feedback.

## **LEARNERS**

The following data collection instruments were used to collect data from the learners.

### **Entry Survey**

The entry survey for learners was conducted using Survey Monkey. Sixty-four learners participated in this survey. To view the entry survey see Appendix D. Topics included:

- background information, including gender, age, status
- previous experience with using VCs
- attitude to the VC, including advantages, disadvantages and barriers
- task switching questions, including how often
- training information, including questions about any previous training the learners had participated in
- guide information, including if they were aware of or had been provided with any guides.

### **End of VC Session Poll**

At the conclusion of each VC session learners were encouraged to complete a short four question poll which included questions about how many times they task switched, if they did task switch what they did, which tools engaged them the most and which part of the session engaged them the most. Seventy-two responses were received from learners (learners provided a separate response for each session). This poll can be viewed below in Figure 3.5.

End of VC Poll demonstration

**\*1. During this Virtual Classroom (VC) session how many times did you multistask/task switch?**  
**Note - this means to do another task rather than concentrating on the VC session for example texting/checking emails/Facebook/Twitter/any other task**

None  
 Once  
 2 to 5 times  
 6 to 10 times  
 More than 10 times

**\*2. If you did multistask/task switch during this VC session what did you do? Please list all tasks.**  
**example - email/Facebook/Twitter/watched TV**

**\*3. Which tools did the teacher/presenter use that DID engage you the most?**

Emoticons for example tick, cross, thumbs up  
 Whiteboard tools for example drawing on a power point  
 Use of chat  
 Use of webcam  
 Engaging power point (colourful/photos)  
 Teachers voice (audio)  
 None of the above

**\*4. Which part of the session engaged you the most?**

Beginning  
 Middle  
 Towards the end

Done

Figure 3.5: End of VC session online poll © Kerry Trabinger 2011.

## Exit Survey

The exit survey for learners was conducted using Survey Monkey. Twenty-seven learners participated in this survey. To view the exit survey see Appendix E. Topics included:

- background information, including gender, age, status
- previous experience with using VCs
- attitude to the VC, including advantages, disadvantages and barriers
- task switching questions, including how often, when and what with
- tool use by the learners, including which tools engaged them the most
- training information, including questions about training that was provided
- guide information, including if they were aware of the guides and if they were provided any guides by their teacher.

## RESEARCHER

The following data collection instrument was used by the researcher to collect data about her own experiences and responses.

## Electronic Diary

The researcher kept an electronic diary where she recorded thoughts, ideas, and issues throughout the data collection stages. An example of a post can be found below in Figure 3.6.

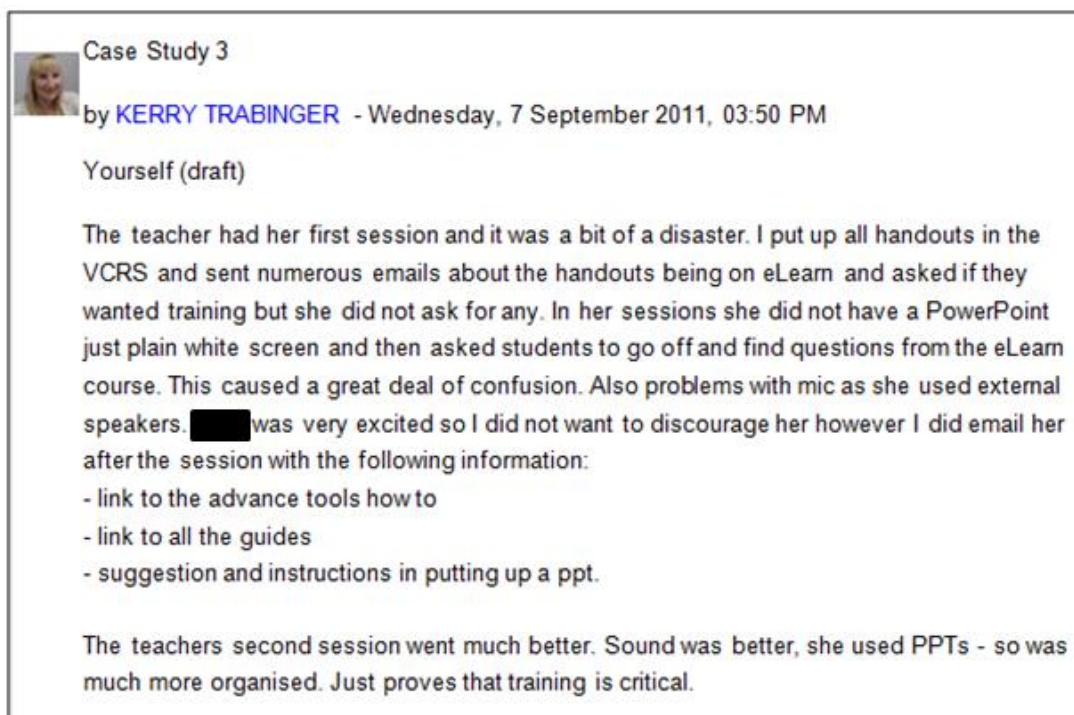


Figure 3.6: Example of researcher's electronic journal entry.

## VIRTUAL CLASSROOM SESSIONS

All VC sessions were observed by the researcher either live or via a recording. This recording could be viewed multiple times by the researcher to assist in validity of results.

### Virtual Classroom Observation Tool

A detailed observation tool was developed by the researcher based on an original VC observation tool created by Schullo (2005). This observation tool was used as the main basis for the data collection and data analysis and was utilised for each VC session. To view the VC observation tool refer to Appendix F. The tool recorded details of the following data:

- structure, including management, content organisation and presentation
- dialogue, including between teachers-learners, learners-learners and learner-content

- technology and tool use by teachers and learners
- autonomy
- task switching from the teacher’s perspective and the learners’ perspective.

### Wimba Tracking Log (Wimba Analytics)

The Wimba analytics recorded the number and length of interactions that occurred between the teachers, learners, content and interface in each VC session. An example can be found below in Figure 3.7. The researcher was able use this log to ensure data recorded in the VC Observation tool for the sessions was accurate, thus ensuring accuracy of the data.

Tue Jun 5 13:10:25 2012	Main Room	said	?
Tue Jun 5 13:10:28 2012	Main Room	status change	is laughing
Tue Jun 5 13:10:31 2012	Main Room	appshow	http://liveclassroom.cit.act.edu.au
Tue Jun 5 13:10:31 2012	Main Room	paint	wiped the eBoard
Tue Jun 5 13:10:35 2012	Main Room	paint	drew an arrow on the eBoard
Tue Jun 5 13:10:42 2012	Main Room	paint	drew an arrow on the eBoard
Tue Jun 5 13:10:43 2012	Main Room	status change	status has been cleared
Tue Jun 5 13:10:53 2012	Main Room	paint	drew an arrow on the eBoard
Tue Jun 5 13:10:58 2012	Main Room	paint	drew an arrow on the eBoard
Tue Jun 5 13:11:08 2012	Main Room	flag change	Removed speaking
Tue Jun 5 13:11:09 2012	Main Room	flag change	Added speaking
Tue Jun 5 13:11:09 2012	Main Room	flag change	Removed speaking
Tue Jun 5 13:11:09 2012	Main Room	flag change	Added speaking
Tue Jun 5 13:11:12 2012	Main Room	status change	is laughing
Tue Jun 5 13:11:14 2012	Main Room	status change	is laughing
Tue Jun 5 13:11:14 2012	Main Room	status change	is laughing
Tue Jun 5 13:11:14 2012	Main Room	flag change	Removed speaking
Tue Jun 5 13:11:14 2012	Main Room	status change	is clapping
Tue Jun 5 13:11:16 2012	Main Room	flag change	Added speaking
Tue Jun 5 13:11:18 2012	Main Room	flag change	Removed speaking
Tue Jun 5 13:11:18 2012	Main Room	flag change	Added speaking
Tue Jun 5 13:11:19 2012	Main Room	status change	is laughing
Tue Jun 5 13:11:21 2012	Main Room	paint	drew an arrow on the eBoard
Tue Jun 5 13:11:24 2012	Main Room	paint	drew an arrow on the eBoard
Tue Jun 5 13:11:25 2012	Main Room	status change	status has been cleared
Tue Jun 5 13:11:27 2012	Main Room	paint	drew an arrow on the eBoard
Tue Jun 5 13:11:29 2012	Main Room	status change	status has been cleared
Tue Jun 5 13:11:29 2012	Main Room	status change	status has been cleared
Tue Jun 5 13:11:29 2012	Main Room	status change	status has been cleared
Tue Jun 5 13:11:34 2012	Main Room	status change	status has been cleared
Tue Jun 5 13:11:35 2012	Main Room	paint	drew an arrow on the eBoard

Figure 3.7: Wimba Tracking Log (Wimba Analytics) © Canberra Institute of Technology 2011.

### FLEX:ED STAFF

The following data collection instruments were used to collect data from the Flex:Ed staff members at the Centre for Education Excellence.

## Semi-structured Interviews and/or Feedback

At the conclusion of each iteration, the Flex:Ed staff at the Centre for Education Excellence were interviewed or provided feedback. Five staff members in iteration one and seven staff members in iteration two provided responses either in an informal interview or by providing written responses to the interview questions. To view the semi-structured interview schedules and/or feedback see Appendix G.

Topics included:

- handouts, including handouts currently being used and suggestions for improvements
- training, including current training and suggestions for improvements
- help desk information for teachers and learners
- headsets
- task switching.

Figure 3.8 shows a sample of responses from the Flex:Ed staff when asked the question: “What are your thoughts on the training we currently give the teachers for the VC? Any other ideas for improving our training?”

Could record some example videos of someone running a virtual session well vs. someone doing it poorly to highlight good and bad practice.

FLO fantastic. A shame that everyone can't do it. The 30 minute virtual session for beginners and the 20 minute virtual session for advanced users – it is good to have this. Can we put the mp4 on the staff site? Is it already on the teacher site?

One on one training. Great that we have different levels of training and that we have the resources for this.

Help for teachers in their first session also really good. Support is essential to get people going.

Can't think of anything. This is good.

Current training enough.

I would try and incorporate some training for the more sophisticated functions as above – longer sessions where everyone gets a go at doing these things. Some people have used the VCs for formative e-assessment – it would be good to have more shared knowledge about this e.g. what Teacher? has done in the VC

Figure 3.8: Flex:Ed staff response to interview question.

### 3.3 RELATIONSHIP BETWEEN RESEARCH QUESTIONS, THEORETICAL FRAMEWORK AND DATA

Table 3.1 presents the relationship between the research questions and the data collection techniques.

Table 3.1: Relationship between research questions, theoretical framework and data collection techniques.

Type of data collection	Teacher entry survey	Teacher interview	Teacher exit survey	Teacher blog journal	Learner entry survey	Learner exit survey	End of VC learner poll	Observation of VC	Wimba tracking log	Research e-Diary	Flex:Ed Staff interview
Research Question 1	X	X	X	X	X	X	X	X	X	X	X
Research Question 2	X	X	X	X	X	X		X		X	X
Quantitative or qualitative?	B	L	B	L	B	B	B	B	N	L	L
Transactional distance theory – Structure		X	X	X		X		X	X	X	
Transactional distance theory – Dialogue		X	X	X		X	X	X	X	X	
Transactional distance theory – Autonomy		X	X	X		X		X	X	X	

N – Quantitative, L – Qualitative, B – Both, X data collection instrument used.

### 3.4 DATA ANALYSIS PROCEDURES

The first step of the analysis was to collate and analyse the data for each individual case study. The qualitative data were collected from the teacher interviews/feedback, teacher blog journal and the researcher e-diary. The quantitative data were collected from the Wimba tracking log (Wimba analytics). Sources that included qualitative and quantitative data were the entry and exit surveys from teachers and learners, learner end of VC poll and the VC observation tool.

Data for each case study were analysed individually to address each research question. Each question was divided into sub-themes with each sub-theme further divided into sections. These are listed below.

***Research Question One: How can teachers design content and/or activities to encourage interaction, engagement and attention while participating in a Virtual Classroom?***

This question was divided into two subthemes. Each subtheme was divided into further sections.

Theme 1: Design of the Virtual Classroom including Content and Activities (Structure)

- Sub-theme 1.1 Management/Design and Timing of content and activities
- Sub-theme 1.2 Selection and Use of Tools

Theme 2: Encouraging Interaction, Engagement and Attention (Dialogue and Autonomy)

- Sub-theme 2.1 Maintaining Attention/Task Switching
- Sub-theme 2.2 Technical Issues
- Sub-theme 2.3 Attitude

***Research Question Two: What training, guides and support do VET teachers and learners require in order to provide an environment that supports learners in a Virtual Classroom?***

Theme 1: Training including Teacher and Learner Training

Theme 2: Guides

Theme 3: Support

At the conclusion of each iteration, qualitative data from interviews with the Flex:Ed staff members were also analysed. The final stage of the data analysis involved a cross case analysis of all twelve case studies and the two end of iteration Flex:Ed interviews.

The following is a summary of the analysis process.

- All surveys and polls were collected using an Institute license with Survey Monkey. These data were analysed using the Survey Monkey tools and divided into the research questions themes and sub-themes.

- All interview data were collected, transcribed, analysed and divided into the research question themes and sub-themes.
- VC observation tool results were recorded, analysed and divided into the research question themes and sub-themes.
- The Wimba tracking log (Wimba analytics) was analysed for the type and number of interactions by teachers and learners.
- The teacher's blog journal and the researcher's e-diary were collected and analysed into the research question themes and sub-themes.

### **3.5 CREDIBILITY AND TRUSTWORTHINESS**

The application of mixed methodology using both quantitative and qualitative data helped strengthen the credibility and trustworthiness of the research by ensuring there were no gaps to the data collected (Creswell & Clark, 2007). Collecting data from multiple perspectives including from the teacher, learner and Flex:Ed staff members ensured that any pre-existing assumption from the researcher was less likely to persist and that data were able to be considered from different perspectives. Repeating this research with two different cohorts of learners and teachers also helped achieve both of these outcomes.

The safety and security of the data were a high priority. During the study physical documents were stored in the locked filing cabinet at the Southside Campus of the Canberra Institute of Technology and will be destroyed after the completion of the study. Electronic data were stored in a database on the secure CIT server and password protected LMS system and also on a password protected personal storage area.

### **3.6 ETHICAL CONSIDERATIONS**

Ethics clearance was granted by both USQ and the Canberra Institute of Technology. The Institute was fully supportive of this research and approved the research participation of Institute teachers and learners.

This was low risk research. Potential risks identified included inconvenience to both staff and learners and time loss for both staff and learners. The time loss to staff and learners was unavoidable. However, participation in the project was targeted and specific and by ensuring that all surveys and polls were conducted online, allowed participants to complete these at times that were convenient for them. In addition,



teachers may have perceived there was risk of economic harm if they were seen to be critical of the Wimba platform and could have been concerned this may affect future promotion opportunities. However, this was overcome by informing teachers that all data collection would be anonymous and confidential. There was also the challenge of being able to recruit enough willing participants. The researcher's role was to excite the teachers into wanting to participate.

There was also a risk that learners would not be honest in admitting that they were not participating 100% and were task switching. This was overcome by informing the learners that all polls and surveys were confidential.

Another general risk was CIT changing the current VC platform from Wimba and/or the VC having technological problems. The risk in relation to CIT changing the platform was minimal as the Institute had signed a contract for a four year period. Wimba did in fact cease to exist in the semester after the completion of the research data collection; however, this did not affect this study. Unfortunately, there were many technological issues which occurred with the use of Wimba during the study but this did not disrupt data collection.

Consent was obtained in writing using the Institute consent form for staff and learners. The letter of consent was signed after the participants were given the Research Information/Invitation Sheet, which included all relevant information about the project (see Appendix H). There were some participants who were learners under 18 years of age. These learners completed a parent/guardian permission information and invitation letter to ensure consent was collected from both participant and guardian.

Participants were made aware that participation in the research was voluntary. The consent form for both staff and learners clearly identified that participation in the research was voluntary and that the participants could withdraw from the study at any stage and this would not affect their status now or in the future.

An incentive prize was offered for learners in each iteration. Teachers were also offered a prize for each iteration. Additional incentives for the teachers were adding participation in this research project in their CV which would assist in the future if they wished to apply to be an Institute eLearn mentor (an eLearn mentor is a role given to one teacher per department). They were also given additional support during the project with the use of VCs with their learners.

### **3.7 ROLE OF THE RESEARCHER**

The researcher held a major role in the Flex:Ed team in the Centre for Education Excellence in the area of VC use, including teacher training, teacher support and guides for the VC. Therefore, the researcher was interacting with the teachers during this research. The researcher did not have any interaction with the learners in the first iteration but in the second iteration the researcher conducted “how to” sessions for the learners. In both iterations the researcher was not active in any of the VC sessions analysed in this research project. To reduce possible bias the researcher included the Flex:Ed team in the research and also ensured data were collected from multiple sources including both qualitative and quantitative data.

### **3.8 CHAPTER CONCLUSION**

This chapter provided a rationale for using DBR with a mixed methodology. The data collection instruments were explained and examples were provided, notably the Wimba logs. The data analysis process was also explained. Issues in relation to credibility and trustworthiness, and limitations were addressed in the context of this research. The following chapter contains a detailed explanation of the data analysis.

# CHAPTER 4: DATA ANALYSIS

*Most of the time multitasking is an illusion. You think you are multitasking, but in reality you're actually wasting time switching from one task to another.*

Professor Bosco Tjan, PhD, 2014.

## 4.1 INTRODUCTION

The data collection for this research was conducted over two semesters. Iteration one was conducted in semester 2, 2011. Based on the data analysis, improvements were implemented and the data collection protocols were adjusted before iteration two commenced in semester 1, 2012.

Data were collected from twelve case studies with each study comprising one teacher and their learner cohort. Each case study will be discussed separately (see Figure 4.1).

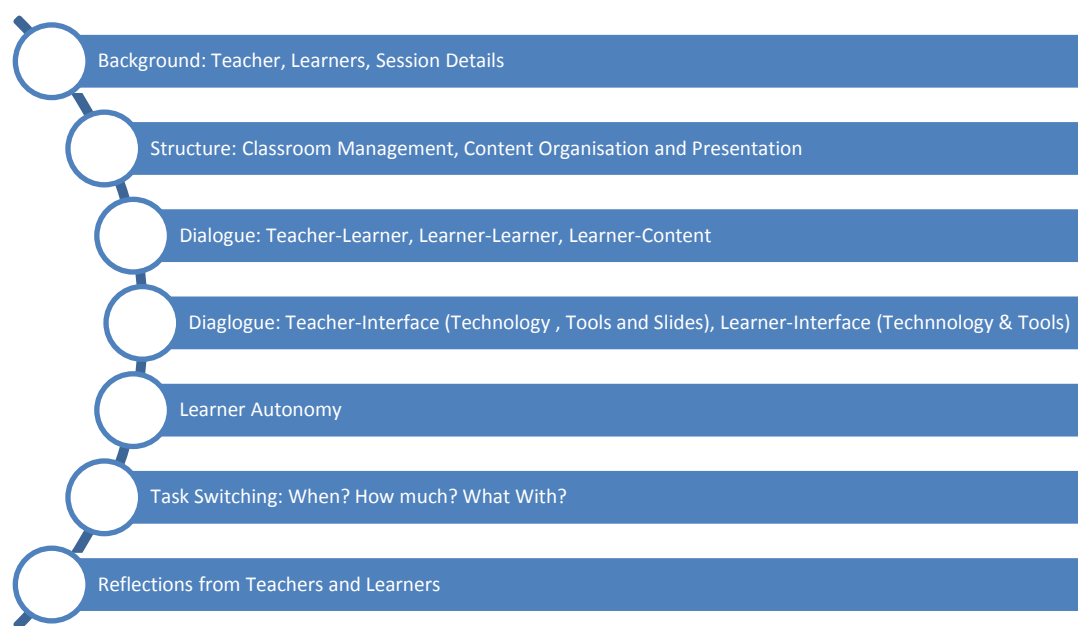


Figure 4.1: Case study topics.

The data for this chapter were collected from multiple sources including data from the researcher, teachers, learners, the Institute's Flex:Ed staff members and Wimba analytics. The researcher's data included the visual observations of the VC session recordings, detailed observation notes and an e-diary. The teachers' data included an entry and exit survey, interview and/or feedback and teacher journals. Learners' data included an entry and exit survey and an end of VC poll. The Wimba analytics

included detailed statistics of each VC session. The Flex:Ed staff members participated in interviews and/or provided feedback at the completion of each iteration.

Teacher identities have been kept anonymous by use of pseudonyms. The learners' identities have been kept anonymous by assigning a number to each learner. This was executed to ensure the privacy of all participants and to align with ethical requirements.

The following tables display a summary of case studies statistics. Table 4.1 displays a summary of the teacher statistics and includes information about teacher experience, previous training and experience in using a VC. Table 4.2 displays a summary of the learner statistics and includes information about learner experience and training in the use of a VC. Table 4.3 displays a summary of the sessions including area and level of study, how many sessions and information about data collected for each case study.

**Table 4.1: Summary of case studies – teacher.**

Case study No.	Pseudonym	Workload	Years of teaching experience	Age	Teacher training	Teacher use of guides	Experience with a VC
<b>ITERATION ONE</b>							
1	Julie	PT	10+	50	FLO	NO	PW TO
2	Rachael	C	5	50	TE	NG	PW TW
3	Betty	FT	5	55+	FLO	NUG	PO TO
4	Karen	*	*	*	NT	*	NE
5	Andrew	FT	5	40	FLO	NO	PW
6	Graham	FT	10	50	NT	NUG	PW
<b>ITERATION TWO</b>							
7	Sarah	PT	2-5	55+	ONE	NG	PW TW PO
8	Natalie	FT	10	50	ONE	NUG	PO
9	Belinda	FT	2-5	55+	FLO	NUG	PW TO
10	Greg	FT	2-5	35-44	FLO	NUG	PW TO
11	Jenny	FT	10	40	ONE	NO	VW VO
12	Bridget	FT	5	50	ONE	NUG	PO TO

FT = full-time, PT = part-time, C = casual, FLO = Facilitating Learning Online course, TE = training by external provider, NE = no experience, NT = no training, ONE = one hour training on how to use VC for beginners, NUG = knew about guides and had used them, NG = knew about guides PW = participant in Wimba sessions, TW = taught sessions in Wimba, TO = taught in other platforms, PO = Participant in other platforms, VW = viewed recording of a Wimba session, VO = Viewed recording of other platform sessions, \* = no data available

**Table 4.2: Summary of the learner statistics.**

Case study No.	Study load	Age	Gender	No. of learners	Learner training	Guides used	Experience with a VC
<b>ITERATION ONE</b>							
<b>1</b>	90% FT 10% PT	100% 18-25	70% M 30% F	11	75% NT 25% B	100% NA	100% NE
<b>2</b>	80% FT 20% PT	20% 22-25 40% 26-45 40% 46-54	80% F 20% M	9	100% NT	100% NA	80% NE 20% VW
<b>3</b>	100% FT	62.5% 19-21 25% 22-25 12.5% 26-45	87.5% F 12.5% M	8	*	*	*
<b>4</b>	*	*	*	0	*	*	*
<b>5</b>	*	*	*	0	*	*	*
<b>6</b>	*	*	*	0	*	*	*
<b>ITERATION TWO</b>							
<b>7</b>	100% FT	50% <18 25% 26-50 25% 50+	75% F 25% M	10	100% I	50% NA 50% NUG	100% NE
<b>8</b>	100% FT	55% <21 27% 26-45 9% 22-25 9% 46-54	73% M 27% F	16	62.5% I 37.5% NT	50% NA 50% NUG	91% NE 9% VW
<b>9</b>	100% FT	60% <18 13% 19-21 27% 22-25	73% F 27% M	15	50% I 50% NT	50% NA 50% NUG	86% NT 7% PW 7% VW
<b>10</b>	*	*	*	6	*	*	*
<b>11</b>	*	*	*	0	*	*	*
<b>12</b>	*	*	*	0	*	*	*

FT = full-time, PT = part-time, F = female, M = male, NE = no experience, NT = no training, B = basic walkthrough of tools, I = intro session by researcher, NA = knew of the guides, NUG = knew about guides and had used them, VW = viewed recording of a Wimba session, PW = participant in Wimba sessions, \* = no data available

**Table 4.3: A summary of the sessions.**

Case Study No.	Faculty of study	Level of study	No. of sessions	Data collected
<b>ITERATION ONE</b>				
1	SCF	D	3	ALL
2	BUS	IV	3	ALL
3	SCF	AD	0	PART
4	BUS	III	0	INT/FEED
5	ICT	IV	0	PART
6	SCF	D	0	PART
<b>ITERATION TWO</b>				
7	BUS	IV	2	ALL
8	BUS	IV	3	ALL
9	SCF	AD	1	PART
10	ICT	IV	3	PART
11	ICT	IV	0	PART
12	BUS	IV	0	PART

SCF = Centre for Science, Forensics and Engineering, BUS = Centre for Business, ICT = Centre for Information Communication and Technology, AD = Advance Diploma, D = Diploma, IV = Certificate IV, III – Certificate III, ALL = complete data collected, PART = partial data collected, INT = Interview, FEED – feedback collected only, \* = no data available

## **4.2 ITERATION ONE – SEMESTER 2, 2011**

The first iteration included six case studies, comprising six teachers, six VC sessions and 28 learners.

### **Guides**

The following guides were developed with consultation from the Flex:Ed staff members prior to the commencement of the semester. These guides were available in PDF files from an internal staff site for teachers to print.

- Getting Ready guide for learners
- Getting Ready guide for teachers/presenters
- Troubleshooting guide.

### **4.2.1 CASE STUDY ONE**

#### **Introduction and Background**

##### ***Background of the Teacher***

The teacher, ‘Julie’, was female and about 50 years old. She had worked at the Institute on a part-time basis for over ten years and was an expert in her content field for the Centre for Science, Forensics and Engineering. Her class comprised first year learners studying at a Diploma level. Julie had only limited experience as a participant in a few Wimba sessions and had no experience in teaching in a Wimba

VC. She had completed the Institute's "Facilitating Learning Online" course, which included detailed training on how to use a VC and had delivered a few sessions through another platform called VET Virtual. She had not referred to any of the current "how to" guides. Julie was very positive and excited about preparing and using the VC with her learners.

### ***Background of the Learners***

Ten of the eleven learners (seven females and three males) responded to the entry survey. Nine were full-time learners and one was part-time. All were aged between 18 and 25 years. Six believed they task switched sometimes, while four stated that they always task switched. None of the learners had ever seen or participated in a VC session before.

### ***Session Details***

Julie delivered three sessions. The first session was not recorded due to the teacher forgetting to start the recording. The second session lasted 43 minutes and attracted eleven learners. PowerPoint slides and audio (teacher's voice) were used to deliver the content of the session. The third session was 20 minutes in duration and attracted only six learners with the content delivery method the same as the second session.

## **Data Analysis**

### **Structure**

Moore (1993) defined structure as "the elements in the course design" (Moore, 1993, p. 26) and stated the importance of "designing appropriately structured presentations and interactions" (Moore, 1993, p. 28) to minimise transactional distance and foster increased engagement by the learners. The data in Table 4.4 were collected to analyse the effectiveness of the teacher's class management, content organisation and presentation in a VC context.



**Table 4.4: Classroom management, content organisation and presentation.**

<b>Classroom Management</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Began on time and in an orderly organised fashion	NA	y	y
Set ground rules for behaviour	NA	n	n
Did not digress from main topic	NA	y	y
Appeared well prepared for class, clearly organised and explained activities	NA	y	y
Provided opportunities for dialogue about the activity with learners and/or self	NA	y	y
Provided sufficient wait time	NA	y	y
Allowed opportunity for individual expression	NA	y	y
Was able to admit error/insufficient knowledge and respected constructive criticism	NA	y	y
Responded to distractions well	NA	y	y
Gave prompt attention to individual problems	NA	y	y
Completed session in required time frame	NA	y	y
<b>Content Organisation</b>	<b>1</b>	<b>2</b>	<b>3</b>
Good lesson plan with clear goal of lesson, introduction, body and conclusion	NA	y	y
Use of lecture	NA	y	y
Use of questioning	NA	y	y
Engaging PowerPoints	NA	y	y
Teacher method appropriate for content	NA	y	y
Made course relevant to real world experience	NA	y	y
Explained difficult terms in more than one way	NA	y	y
Learners collaborated as a group e.g. brainstorming	NA	y	y
Any problem solving activities	NA	y	n
<b>Presentation</b>	<b>1</b>	<b>2</b>	<b>3</b>
Spoke confidently with good voice quality	NA	y	y
Communicated a sense of confidence, enthusiasm and excitement towards content	NA	y	y

n = no, y = yes, NA = not applicable

The classes were very well structured and Julie was very well prepared and organised. It was obvious that Julie was confident in her knowledge of the material presented in the class and this was apparent in her enthusiasm and excitement about the topic.

She did not set ground rules for behaviour and the learners played around with some of the drawing tools. This was reported as a negative by both teacher and learners and could have been overcome by setting ground rules before the session.

Julie incorporated a variety of instructional strategies including question and answer, lecturing and group activities. Julie's PowerPoint slides were designed well in all sessions and encouraged engagement. She introduced real world experience in each session including a graphic slide of a cut finger and broken arm and combined both a learner's experience of having an injury and her own experience in the discussion. Julie also used problem solving group activities where the learners were

asked to brainstorm on the whiteboard and create a diagram of cell production. The learners responded very well to this sort of group work.

Julie improved in each session with her confidence in using the VC and tools. Julie did comment on how organised you need to be to run these sessions: “I did realise that you had to be very, very, very organised. I spent many hours preparing my PowerPoint to find that it still was not that interactive except writing in the blank pages that I inserted.”

## Dialogue

Moore (1993, p.24) stated that “the term dialogue is used to describe an interaction or series of interactions having positive qualities”. Moore argued that as dialogue (positive interaction) is increased the transactional distance decreases. The following tables record observations of the interactions between the teacher, learner and content.

### *Teacher – Learner Dialogue*

Table 4.5 records observations of the interactions between the teacher and learners.

Table 4.5: Teacher – learner dialogue.	Session 1	Session 2	Session 3
Teacher was positive and confident about the topic	NA	y	y
Teacher checked learner comprehension	NA	y	y
Teacher knew and used learner names	NA	y	y
Teacher responded to learners as individuals	NA	y	y
Teacher praised learners for contributions	NA	y	y
Teacher encouraged questions, involvement, debate or feedback	NA	y	y
Teacher encouraged learners to answer questions by providing cues or encouragement	NA	y	y
Teacher feedback was informative and constructive	NA	y	y
Teacher listened carefully to comments and questions	NA	y	y
Teacher answered questions clearly/directly	NA	y	y
Teacher recognised when learners did not understand	NA	y	y
Teacher had good rapport with learners	NA	y	y
Teacher treated members of class equitably and did not criticise learners	NA	y	y
Learners asked questions of the teacher	NA	y	y
Learners volunteered information	NA	y	y
Learners presented information	NA	y	y
Learner feedback was on topic	NA	y	y

n = no, y = yes, NA = not applicable

Julie was familiar with the class and used the learners’ names. She praised learners when they made positive contributions and encouraged those who needed it. When there was a pause in any learners answering questions she was quick to give hints to encourage the correct answer.

In session two the learners conversed with Julie using audio, chat or whiteboard tools to answer questions; however, the learners participated only when prompted. In session three the learners were much more confident and, although they did not have access to the whiteboard tools or the audio, the chat was very active. Two learners asked questions and volunteered information without being prompted.

### ***Learner – Learner Dialogue***

The data in Table 4.6 records how learners interacted with each other in the VC.

<b>Table 4.6: Learner – learner dialogue.</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
On task academic discussions with each other	NA	y	y
Off task academic discussions	NA	n	n
Social discussions	NA	n	n
Learners encouraged each other	NA	n	n
Learners used each other's names	NA	n	y
Did not criticise each other	NA	n	y
Learners maintained good rapport/mutual respect and treated each other equitably	NA	y	y

n = no, y = yes, NA = not applicable

There was minimal discussion among the learners. In session two, one learner did answer another learner's question when the teacher did not know the answer. They were more productive and interactive with each other in session three.

### ***Learner – Content Dialogue***

Table 4.7 records observations of the interaction between the learners and the content.

<b>Table 4.7: Learner – content dialogue.</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Reading	NA	y	y
Listening	NA	y	y
Writing e.g. on whiteboard or chat	NA	y	y
Presentation – verbal, graphical	NA	y	n
Discussions about the topic	NA	y	y
Responded to questions	NA	y	y
Participated in polls	NA	NA	NA

n = no, y = yes, NA = not applicable

In session two the learners engaged with the lesson by reading the whiteboard questions, listening to Julie, writing on the whiteboard, writing in chat, assisting in creating the diagram, answering questions posed on the slides and by communicating verbally. In session three the learners participated as per session two with the exception of verbal and graphical representation.

## Interface (Technology and Tools)

Moore (1993) argued that “by manipulating the communications media it is possible to increase the dialogue between learners and their teachers and thus reduce the transactional distance” (Moore, 1993, p. 25). The following data in Tables 4.8 to 4.11 represent the use of the VC as the communication medium and how the teacher and learners interacted with the technology.

### **Teacher – Interface (Technology)**

Table 4.8 displays how the teacher interacted with the technological aspects of the VC.

	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
No trouble connecting to VC	y	y	y
No trouble with microphone	n	y	y
Able to use recording	n	y	y
No other technical issues	n	y	y
Teacher did not voice frustration with interface	n	y	y
Teacher was positive about the use of the	n	y	y
Able to use tools	y	y	n

n = no, y = yes

Julie forgot to record the first session. In session two she had no trouble connecting to or using the microphone. The learners faced difficulties with using the whiteboard tools as they could write over each other’s text, and this in turn disrupted the session for some. Julie did express frustration with this but came up with a solution for session two. This caused some of her enthusiasm about the use of the VC to wane; however, she did not express this to the learners. Julie did not experience any technological issues in session two.

In session three all of the technology worked but Julie did forget how to authorise access to the whiteboard tools for the learners use. The learners were also unable to use their audio.

### **Teacher – Interface (Tools)**

Table 4.9 records observations about the teacher’s use of the tools and slides in the VC session.

**Table 4.9: Teacher – interface (tools).**

	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Average number of PowerPoint slides used	NA	21 slides in 45 minutes	16 slides in 20 minutes
Average length of use of a PowerPoint slide	NA	2.15 minutes per slide	1.25 minute per slide
Tools used	NA	A, c, w, h, e, t	A, c, w, h, e, t

a = audio, c = chat, w = whiteboard tools, e = emoticons, t = tick-yes/cross-no tool, (**capital indicates multiple use of tool**)

### **Tools**

In both of the recorded sessions Julie used the audio tool well by using her voice to command attention. She used the chat tool to monitor conversation and encouraged learner participation. She also asked the learners to use the hands up tool if they had any questions and used the tick-yes/cross-no tool for feedback. Further, she encouraged the learners to use the emoticons. She used the whiteboard tools well in both of the recorded sessions by drawing diagrams and by highlighting important aspects on a slide through the drawing feature. She also used the pointer feature to point at important sections on a slide. There were times when she did not encourage any interaction and could have used the tick/cross tool and emoticons to encourage attention.

In the third session Julie designed slides that the learners could participate with by writing on the whiteboard. Unfortunately, she could not remember how to give the learners access to the whiteboard tools. However, she did keep the lesson flowing by encouraging the learners to write in the chat instead.

In the teacher exit interview Julie listed the whiteboard tool, learner’s use of chat and engaging PowerPoint slides as the tools that engaged the learners the most.

### **Slides**

Julie invested a great deal of time to design engaging and informative PowerPoint slides specifically to encourage learner participation. She ensured the slides were attractive to the learners by incorporating relevant graphics, real life experience and by keeping the text to main headings.

In the first session she did experience difficulties with the slides as she had prepared interactive animated slides that did not convert in Wimba. She had used these animated slides in a previous VC platform but was not aware that they would not work with Wimba. She wrote of her frustration by stating

I tried to make it interactive – animated PPT [*sic*] but then found out it does not work on virtual classes. Therefore I had to insert blank pages that they could write on. This kept delaying me in what I wanted to say. I had to think quite hard as to what I wanted from them. You can't be spontaneous – maybe with experience you can but not right now. Next time I will add screens that is divided with their names and they can write in their little block – can still be difficult with 15 learners – not much room to write.

The timing of the slides seemed to work well to engage the learners. In the second session she used 21 slides within the 45 minutes of the session, with an average of 2.15 minutes for each slide. One slide, an interactive brainstorming slide, was shown for five minutes due to the learners adding drawings to this slide. In the third session 16 slides were used in the 20 minutes of the session, with an average viewing time of 1.25 minutes per slide. Most of these slides were in groups of two and pertained to the same topic, averaging 3 minutes for each topic covered. This worked well with the learners and encouraged focus and attention.

### ***Effective Slides Used in Session Two***

The following slides were used by Julie to encourage attention. Figure 4.2 was a static PowerPoint slide but incorporated relevant graphic images to encourage the attention of the learners.



Figure 4.2: Graphic image.

Figure 4.3 incorporated Julie's use of the whiteboard tools to draw a diagram to further explain the topic and capture attention.

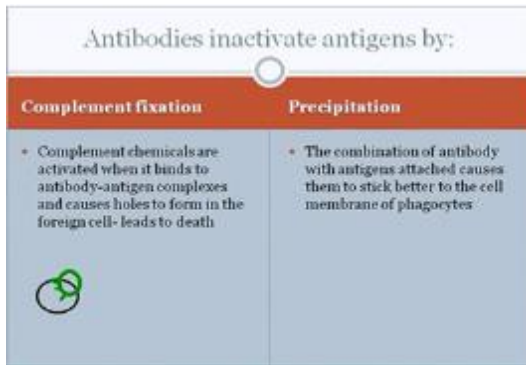


Figure 4.3: Teacher using drawing tools.

Figure 4.4 and 4.5 were inclusive of learner participation through the drawing/writing tools which, in turn, encouraged attention. Slide 4 was designed to encourage all learners to participate by using the whiteboard tools in their own square. Julie commented that she “got them writing on the board and made some slides that were divided into sections with their names. This allowed them to write in their own boxes and not over each other. Worked well.” Figure 4.5 was a question slide that encouraged the learners to participate by the use of the drawing tool to type answers on the slide.



Figure 4.4: Learners using drawing tools in tables.

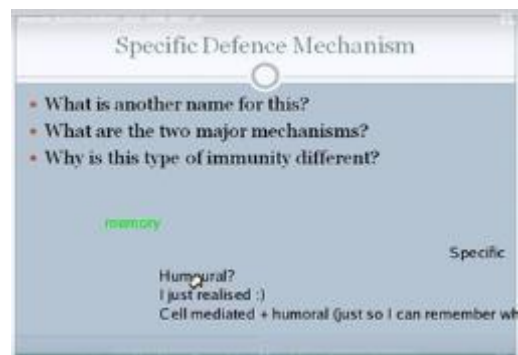


Figure 4.5: Learners using drawing tools to answer question slide.

Figure 4.6 and 4.7 were coupled and designed for complete class participation and problem solving. In Figure 4.7 the learners used whiteboard drawing tools on a blank screen to explain a process and then Julie used Figure 4.6 to show the correct answer. Learners were able to write over the PowerPoint slide by using this function.

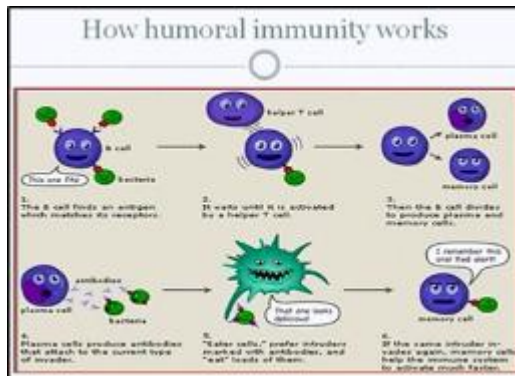


Figure 4.6: Slide showing correct process.

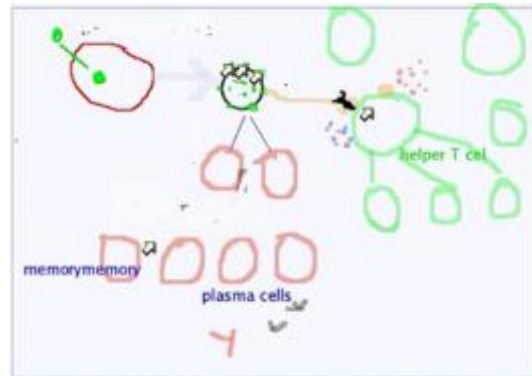


Figure 4.7: Learners using drawing tools to draw a process.

### ***Non-effective Slides Used in Session Two***

Figure 4.8 was a slide in a traditional lecture format. This slide did not have any images and did not encourage any interactivity. This proved to be the least effective slide as it demanded little engagement from the learners. There was a marked decline in the engagement with the tools by the learners while this type of slide was shown.

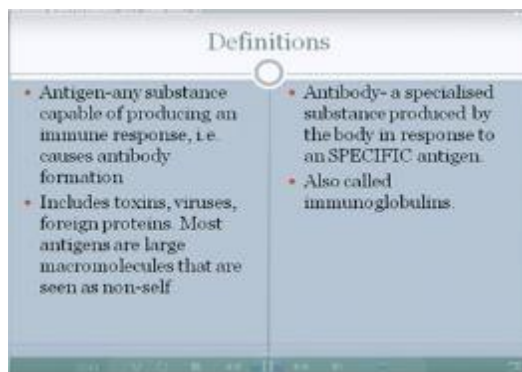


Figure 4.8: Slide in a traditional lecture format.

### ***Effective Slides Used in Session Three***

Figure 4.9 was used as an icebreaker at the start of the class and incorporating humour was found to engage learner attention. Figure 4.10 was an example of Julie using a graphic image on a slide to encourage attention. The learners effectively decoded the information presented to them with the use of the pointing tool by Julie.





Figure 4.9: Icebreaker slide with humour.



Figure 4.10: Use of graphic image and pointer tool.

Figure 4.11 was paired with Figure 4.12 and Figure 4.13 was paired with Figure 4.14. In Figure 4.11 the teacher asked the learners to answer the question using the chat function and then revealed the correct answer in Figure 4.12. Figure 4.13 was an example of the teacher using humorous images in a slide while simultaneously presenting information. In Figure 4.14 the teacher displayed a question slide and the learners engaged by posting their answers in the chat tool (the drawing tool was not available for the learners). Using this technique, the teacher could reveal information before or after active learner participation.

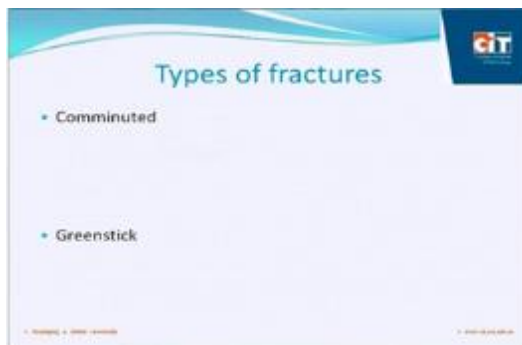


Figure 4.11: Question slide with learners using chat tools.



Figure 4.12: Answer slide.



Figure 4.13: Use of humorous image.



Figure 4.14: Question Slide with learners using the chat tool.

### **Non-effective Slides Used in Session Three**

Figure 4.15 was a straight lecture slide which did not have any images and did not allow any interactivity by the learners. There was a marked decline in participation of the learners.

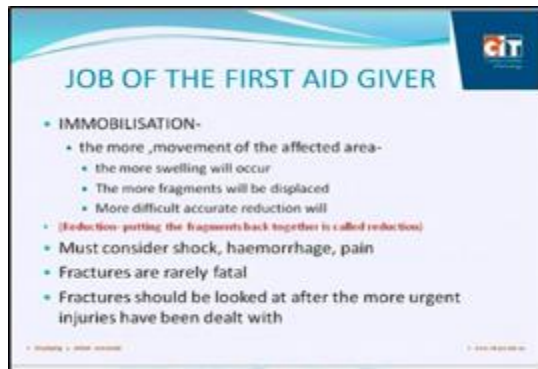


Figure 4.15.: Slide in a traditional lecture format.

### **Learner – Interface (Technology)**

Table 4.10 records observations of how learners interacted with the VC on a technological level.

**Table 4.10: Learner – interface (technology).**

	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
No trouble connecting	n	y	n
No trouble with microphone/audio	y	y	n
No other technical issues	n	y	y
Learners did not voice frustration with interface	n	y	y
Learners were positive about the VC	n	y	n
Able to use tools	n	y	n

n = no, y = yes

In session one the learners had trouble connecting with Wimba initially as a wizard was required to run on every computer before use to ensure all settings worked correctly. Learners were not aware of this requirement and this caused a delay to the start of the session. Julie did voice frustration with this in her blog. The learners were

new to using the whiteboard tools and wrote over each other's text on the screen. Julie commented that "the learners were not that impressed by the class. The learners hated the fact that they wrote over each other."

In session two, one learner was unable to get the audio working and therefore was unable to listen to the lecture. She was extremely frustrated with this. However, she could see the slides, chat and write on the whiteboard. All of the technology worked well for the rest of the learners.

In session three, the learners were unable to get their microphone working and therefore were unable to converse with Julie using this tool. Julie was also unable to release the whiteboard tools for the learners to use. The learners did voice some frustration with this.

### Learner – Interface (Tools)

Table 4.11 records observations of which tools were used and how often each learner used these tools in the VC sessions.

Table 4.11: Learner – interface (tools).

	Session 1	Session 2			Session 3		
Beginning – B Middle – M End – E		B	M	E	B	M	E
Learner 1	NA	C, W, t	a, C, W, t	t	*	*	*
Learner 2	NA	C, W	w	c	C, e, t	C	*
Learner 3	NA	W	*	*	t	C	*
Learner 4	NA	W	*	*	*	*	*
Learner 5	NA	W	*	*	*	*	*
Learner 6	NA	C, w	*	*	*	*	*
Learner 7	NA	C, W, e	w	*	C, t	C	c
Learner 8	NA	W, t	W	W	*	*	*
Learner 9	NA	C, t	*	*	*	*	*
Learner 10	NA	A, C, W, e, t	A, c, W, e	A, c, w, e, t	C, e, t	C	c
Learner 11	NA	C, t	c	*	C, e, t	C	c
What tools were used by most learners?	NA	W, t	*	*	C, t	*	*

a = audio, c = chat, w = whiteboard tools, e = emoticons, t = tick-yes/cross-no, \* = did not participate, NA – not applicable, (**capital indicates multiple use of the tool**)

In session one due to the lack of a VC recording and Wimba analytics there was no access to any data in regard to individual tool use; however, Julie commented in her interview and blog that the learners did experience technical difficulties logging into Wimba, and difficulty with the writing tools.

In session two Julie created slides that required the learners to participate by either a choice of audio, chat or the whiteboard drawing tools. The different modes

of participation encouraged learner attention and autonomy. Only two learners chose to use the audio with Learner 10 dominating the session. All other learners chose to use either chat, the whiteboard tools or both. There was an issue at the commencement of the session when Julie asked the learners to write on the board and she assumed the learners knew how to use these tools. As a result, there was a delay as Julie had to explain how to use the tools. This could have been avoided by explaining the basic tools at the beginning of the first session.

Learner 11 could not get audio working but was still able to see the slides and read and post in the chat. She voiced her frustration during the session by typing “I can see everything you are doing, I just can’t hear you. Dongit [*sic*].”

Julie used the tick-yes/cross-no tool and interactive activities at the start and middle of the session but then lectured with no request for interactivity. There was a noticeable decline in the engagement by the learners. By the end of the session, six of the eleven learners did not use any tools and the five who did showed a decline in the level of interactivity. Julie could have improved engagement by asking for more interaction, for example, through the simple tick-yes/cross-no function or other emoticon tools.

In session three there were a few issues with the use of tools. One of the major issues was Julie’s incapability to allow audio use for the learners, thus eliminating verbal communication by the learners. The other was with the failure to use the whiteboard tool. Julie had prepared engaging interactive slides specifically designed for active participation of learners through the whiteboard drawing tool but she had forgotten how to enable learner access. This hindered the engagement in the session. She did quickly offer the alternative of using chat and thereby enabled the lesson to progress. Due to these two issues the main tools used during this session were the chat, tick-yes/cross-no and emoticons.

Julie began well with the question/answer format and interactive activities in the beginning and middle of the session and then lectured in the third. Once again there was a noticeable decline in the engagement by the learners. At the end of the session, two of the six learners did not participate and among the four who participated there was, once again, a decline in the use of the tools.

It was evident in the last session that the learners were more confident in using the tools and this increased their activity. Julie commented

So the whole class was held with me talking and them writing in the chat area and using icons which actually I think went quite well considering. The learners certainly seemed much more at ease with the VC and how to use it, than they did the first time. I was actually much more relaxed about it as well.

In the learner exit survey the results showed the tools that were most engaging as 50% whiteboard tools, 25% PowerPoint slides and 25% teacher's voice. The results of the end of session polls, as displayed in Figure 4.16, showed a similar response with the learners listing the tools that engaged them the most as audio (teacher's voice), whiteboard tools and the PowerPoint slides.

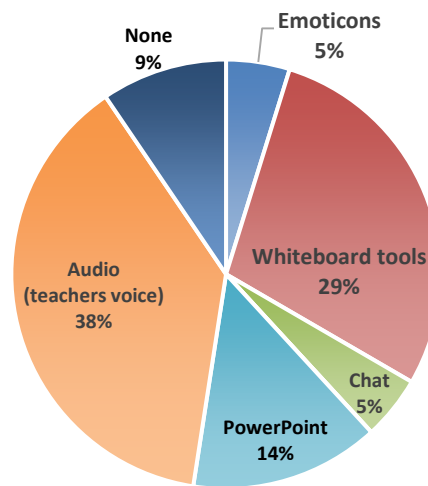


Figure 4.16: Tools which were most engaging for learners.

### **Learner Autonomy**

Moore (1993) described autonomy as the role of the learners in deciding what to learn, how to learn and how much to learn. The following table records observations of learner autonomy in the VC sessions.

**Table 4.12: Learner autonomy.**

	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Teacher has dialogue with learners	NA	y	y
Learners were given options on how they will interact and learn the material	NA	y	n
Participation activities were included e.g. chat	NA	y	y
Learning was not dependent on teacher	NA	y	y
Learners learnt through information discovery rather than teacher supplementation	NA	y	y
Discussion was not dominated by 1 or 2 learners	NA	n	n
Learners asked productive questions	NA	y	n
Learners who struggled with technology bounced back and participated	NA	n	NA
Teacher provided challenges the learners appeared to enjoy	NA	y	y
Learners appeared to have positive attitude	NA	y	y

n = no, y = yes, NA = not applicable

The majority of the sessions were highly interactive and encouraged a great deal of dialogue from the learners. The learners were given the option of three tools to use as they participated in the sessions.

In session two, one learner dominated the session with the audio tool. However, this often encouraged further dialogue by other learners. The learners were required to brainstorm throughout the sessions and were also provided with a group activity to construct a diagram through whiteboard tool use. The majority of the learners were positive about all sessions with the exception of some comments about the overuse and playing of the whiteboard tools in the first session, and one learner in the second session not having access to audio.

### **Task Switching**

Table 4.13 presents the methods employed by Julie to minimise task switching and maximise attention and focus. The following table shows when learners had a delayed response to the session.

**Table 4.13: Task switching – teacher.**

	Session 1	Session 2	Session 3
Introduction captured attention	NA	y	y
Use of icebreaker	NA	y	y
Rate of delivery was appropriate for learners to remain engaged	NA	y	y
Good use of tools by teacher for engagement	NA	y	y
Good use of PowerPoints for engagement	NA	y	y
Timing of PowerPoint slides was appropriate	NA	y	y
Appropriate timing to ask learner to use tools	NA	y	y
Teacher used question/answer	NA	y	y
Teacher incorporated learner responses	NA	y	y
Sufficient variety was used to maintain attention	NA	y	n
Lesson required learner thought and participation	NA	y	y
Maintained learner attention	NA	y	y
Paused to allow learners time for feedback	NA	y	y
Conclusion captured attention	NA	y	y

n = no, y = yes, NA = not applicable

**Table 4.14: Task switching – delay or decrease in learner response.**

	Session 1	Session 2			Session 3		
		B	M	E	B	M	E
Beginning – B							
Middle – M							
End – E							
Learner 1	NA	n	n	y	*	*	*
Learner 2	NA	n	n	y	n	n	y
Learner 3	NA	n	y	y	n	n	y
Learner 4	NA	n	y	y	*	*	*
Learner 5	NA	n	n	y	*	*	*
Learner 6	NA	n	n	y	*	*	*
Learner 7	NA	n	y	y	n	n	y
Learner 8	NA	n	n	n	*	*	*
Learner 9	NA	n	y	y	*	*	*
Learner 10	NA	n	n	n	n	n	y
Learner 11	NA	y	y	y	n	n	y

n = no, y = yes, NA = not applicable, \* = did not participate

There was insufficient data to analyse task switching for session one.

In session two Julie used graphic images in the first slide as an icebreaker and to capture attention. She used a variety of slides and used all available tools including the whiteboard drawing and text tool, chat and emoticons including tick-yes/cross-no and hands up. The slide design was well prepared, planned, engaging and interactive. Julie created a slide where each learner had their own allocated section of the screen to complete. This was a great way to encourage participation as it would have been easy to see who was not paying attention. She also used a variety of delivery with the slides. Some slides were presented in pairs, with the first slide asking for brainstorming and the second with the correct answer. Alternatively, some had the answer first and the brainstorm followed in the next slide. The session was predominantly question/answer based for the start and middle and the end was

lecture based. Julie also incited a great deal of involvement by encouraging the use of the chat and by asking all learners to participate in creating a diagram on a blank slide.

In session three Julie used a cartoon as an icebreaker to gauge attention and introduce the topic of the session. The slides changed on average every 1.25 minutes and this was appropriate for this topic.

To avoid the same mistakes that occurred in session two, the teacher commenced the session by confirming that all learners knew how to use the tools. There was a noticeable increase in the use of chat by all learners and this was most likely due to the whiteboard tool being disengaged. However, even the learners who used only chat in the previous sessions posted more text in the chat this session. It was also evident that the learners were more comfortable with the VC. Like session two, the slides were again well designed and used with a variety of delivery.

Julie stated in the exit survey that she felt the learners were engaged the most at the beginning of the sessions. In both sessions two and three Julie could have improved engagement and attention by asking specific learners to answer questions instead of waiting for a volunteer. This would have put the learners on notice that it could be their turn at any time and would have encouraged greater attention. She did realise this method might have encouraged more attention but commented that “asking them questions did not always work. I do not like to call out individual names as this puts pressure on them – I hate having my name called out to answer things.”

### **Learner Exit Survey and End of Session Poll Results**

Both results indicated learners were most engaged at the beginning and middle of the sessions. The results of the learner exit survey showed that 75% of learners found the beginning most engaging with 25% engaged during the middle. The learners reported in the end of the VC polls (see Figure 4.17) that they were most engaged during the middle (43%) and at the beginning (38%) of a session. This was evident in the level of tool activity at the beginning and middle of the sessions in comparison to the end, where activity decreased, including in session two, when five of the eleven learners did not participate with the class and in session three when none of the learners participated. This may have been caused by the change in delivery of information. The teacher was encouraging of interaction at the beginning and middle of the



sessions. Encouragement and interactivity lowered when a lecture based delivery method was used at the end of the sessions.

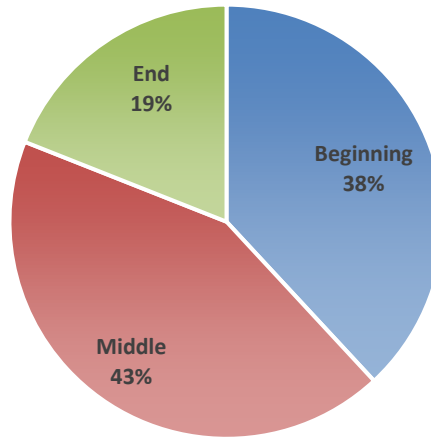


Figure 4.17: Section of the session which engaged the learners the most.

The learners stated in the exit survey that 100% task switched. However, the results of the session VC polls in Figure 4.18 show that 43% of learners task switched. There was no obvious reason for this difference however, there may have been different learners participating in the end of session polls compared to the exit survey.

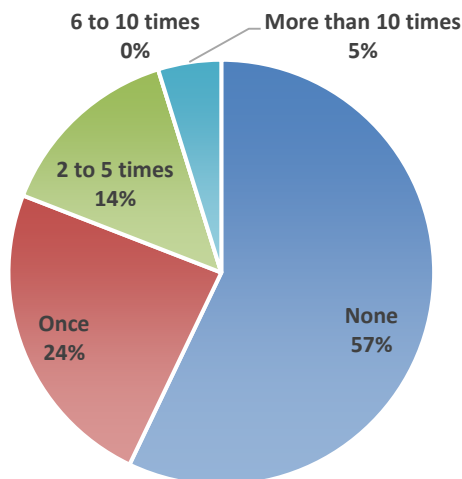


Figure 4.18: Amount of task switching.

In the exit survey 50% of the learner's task switched with text/phone with the other main task being email. Figure 4.19 shows the results of the end of survey poll which

showed similar results of text/phone and internet sites such as Google or YouTube and email.

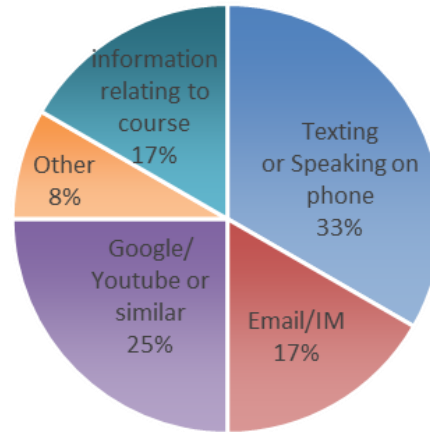


Figure 4.19: Task switching activities.

As to whether or not her learners were task switching during sessions, the teacher commented that

I did have a lot of moments where I asked the learners to give me an answer and I got nothing – just blank. Were they task switching or just did not want to give an answer? I think they mostly were not task switching but I am not sure.

## Case Study One Conclusions

### *Teacher Reflections*

Julie had completed the “Facilitating Learning Online” program at the Institute and believed it covered all the content she needed and did not require any improvement. She believed it provided all necessary knowledge for her to teach using the VC and commented that “it was just a matter of practice.” However, she would be happy to participate in further training. She did experience technical problems but she stated

I still think the learners are focusing on me but who knows. They all seem to be answering the questions and “chatting” to each other. That is why the topic of your VC is so important. It must be engaging. I use disgusting pictures of first aid scenarios – deformed broken limb,

festering wound, etc. This always gets the learners' interest up – morbid curiosity.

### ***Learner Reflections***

Of the eleven learners only five completed the exit survey. Three of the learners were given no prior training with one stating they had been given “basic interface and walk through of buttons (the hands up and tick buttons).” No learners were aware of the current “how to” guides and expressed that they would have liked to have seen them. One learner already had a headset, one did not use one, the other two purchased them from another source and one did not answer this question. Comments about technology included “the need to be supplied headset; internet problems; screen was not full; couldn't access lower parts of VC – solved by adjusting browser zoom.”

### ***Final Comments***

Julie believes she will improve her use of the VC in the future and that she just needs more confidence. She is keen to try new ideas such as playing short videos and then discussing them with the class. Julie stated

I would like to be able to play short videos and then discuss it with them. Picking the right topic is also important to keep them interested. And definitely not too long. Mine were only about ½ hour long which I think is plenty. Gets more fun as you get used to it. I see value in the virtual class in the future to get more learners to CIT that are unable to attend class each week.

Julie also commented “I think this is a great tool but boy you certainly have to be super organised (for me, anyway) in knowing what when and how I will run it – minute by minute.”

## **4.2.2 CASE STUDY TWO**

### **Introduction and Background**

#### ***Background of the Teacher***

The teacher, ‘Rachael’, was 50 year old female. She had worked at the Institute on a casual basis for five years and was an expert in her content field in the Centre for Business. Her learners had already completed a Certificate III and were studying at a

Certificate IV level. Rachael had been a participant in many Wimba sessions and had taught many sessions using Wimba. She had completed training by an external provider. She had not read or used any of the current “how to” guides. She believed that learners did task switch sometimes.

### ***Background of the Learners***

Five of the nine learners (four females and one male) responded to the entry survey. Four were full-time learners and one was part-time. Two were aged between 46 to 54 years old, another two were aged between 26 to 45 years old and the fifth learner was aged between 22 to 25 years old. One stated that they always task switched, two believed they task switched sometimes while two stated they never task switched. None of the learners had ever participated in a VC session before; however, one learner had viewed a recording.

### ***Session Details***

Rachael had previously used only a chat room to hold these classes. The teacher delivered three sessions. The first session ran for one hour and 15 minutes and attracted five learners. The content delivery method included webcam and audio for learners and teacher, as well as extensive use of the whiteboard tools. No PowerPoint slides were used. The second session was 58 minutes in duration and attracted three learners. The content delivery method was similar to the first session with the addition of a video being displayed and the use of three PowerPoint slides. The last session attracted three learners and was recorded for only the final ten minutes due to the teacher forgetting to record. Therefore limited data were available.

## **Data Analysis**

### **Structure**

The data in Table 4.15 were collected to analyse the effectiveness of the teacher’s class management, content organisation and presentation.

**Table 4.15: Classroom management/content organisation/presentation.**

<b>Classroom Management – Session Number</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Began on time in an orderly organised fashion	y	y	NA
Set ground rules for behaviour	n	n	NA
Did not digress from main topic	y	y	NA
Appeared well prepared for class, clearly organised and explained activities	n	y	NA
Provided opportunities for dialogue about the activity with learners and/or self	y	y	NA
Provided sufficient wait time	n	n	
Allowed opportunity for individual expression	y	y	NA
Was able to admit error/insufficient knowledge and respected constructive criticism	NA	NA	NA
Responded to distractions well	y	y	NA
Gave prompt attention to individual problems	y	n	
Completed session in required time frame	y	y	NA
<b>Content Organisation</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Good lesson plan with clear goal of lesson, introduction, body, conclusion.	n	y	NA
Use of lecture	y	y	NA
Use of questioning	y	y	NA
Engaging PowerPoint	n	n	NA
Teacher method appropriate for content	n	n	NA
Made course relevant to real world experience	y	y	NA
Explained difficult terms in more than one way	y	y	NA
Learners collaborated as a group e.g. brainstorming	y	y	NA
Any problem solving activities	y	y	NA
Any other approaches	n	n	NA
<b>Presentation</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Spoke confidently with good voice quality	y	y	NA
Communicated a sense of confidence, enthusiasm and excitement towards content	y	y	NA

n = no, y = yes, NA = not applicable

There was no clear structure to session one with Rachael commencing straight into the content of the session. Rachael was very confident and enthusiastic about her content knowledge and this was evident throughout the session. However, while it was obvious she had planned the content and delivery methodology for the session, she had not taken into account how to best use the technology. Due to this there were issues with the audio and whiteboard tools that in turn affected the flow of the session.

Rachael had a very good rapport with the learners and this helped the flow of the session. Rachael also included a great deal of activity and opportunity for the learners to participate and interact. Rachael engaged the learners by discussing an example of law in the iconic Australian film, *The Castle*.

The structure for session two improved with a clear introduction, body and conclusion. While there were minimal technical difficulties, there continued to be

issues with the size of the font on the whiteboard and this did disrupt the flow of the session.

The delivery structure was varied with a question and answer session, followed by brainstorming, then a lecture with the use of PowerPoint slides. Rachael included a video and followed this with a question and answer session. This session was much more successful with concise structure and a range of delivery methods.

In session three Rachael forgot to record the session until the last ten minutes. Therefore, the researcher was unable to observe the beginning and middle sections of the session.

The teacher commented that “it went much better this time – I could use all the tools better and faster – less time mucking about getting things to work.” The teacher also commented that in the future she would “think of the discussion questions beforehand so I am not making them up on the spot.”

## Dialogue

The following tables record observations of the interactions of the learners with the teacher, other learners, and content.

### *Teacher – Learner Dialogue*

The data in Table 4.16 records the interactions between the teacher and learners.

<b>Table 4.16: Teacher – learner dialogue.</b>			
	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Was teacher positive and confident about the topic?	y	y	NA
Teacher checked learner comprehension	y	y	NA
Teacher knew and used learner names	y	y	NA
Teacher responded to learners as individuals	y	y	NA
Teacher praised learners for contributions	y	y	NA
Teacher encouraged questions, involvement, debate or feedback	y	y	NA
Teacher encouraged learners to answer questions by providing cues or encouragement	y	y	NA
Teacher feedback was informative and constructive	y	y	NA
Teacher listened carefully to comments and questions	y	y	NA
Teacher answered questions clearly/directly	y	y	NA
Teacher recognised when learners did not understand	y	y	NA
Teacher had a good rapport with learners	y	y	NA
Teacher treated members of class equitably and did not criticise learners	y	y	NA
Learners asked questions of the teacher	y	y	NA
Learners volunteered information	y	n	NA
Learners presented information	y	y	NA
Learner feedback was on topic	y	y	NA

n = no, y = yes, NA = not applicable

Rachael was familiar with the class and referred to learners by name. She encouraged learners to participate and interact with each other. It was clear there was a strong rapport between the teacher and the learners.

In the first session the learners conversed with Rachael predominantly by use of audio and the whiteboard drawing tools. The learners volunteered information vocally and answered questions posed by the teacher.

In session two the majority of the learners communicated with the teacher using audio and the whiteboard drawing tools. However, some of the learners could not use audio and therefore resorted to using the chat. The learners in this session conversed with Rachael when prompted but they did not volunteer any information on their own accord.

### ***Learner – Learner Dialogue***

Table 4.17 records how learners interacted with each other in the VC.

<b>Table 4.17: Learner – learner dialogue.</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
On task academic discussions with each other	y	n	NA
Off task academic discussions	y	n	NA
Social discussions	y	n	NA
Learners encouraged each other	y	y	NA
Learners used each other's names	y	n	NA
Did not criticise each other	y	y	NA
Learners maintained good rapport/mutual respect and treated each other equitably	y	y	NA

n = no, y = yes, NA = not applicable

In all sessions Rachael encouraged dialogue and interaction among the learners. In session one there was a great deal of interaction between learners through task discussions and, towards the end, social discussions. The learner social discussion was in relation to studying the topic during social events. The learners were very encouraging of each other. In session two the topic was more detailed and while the learners were still vocal with each other, the dialogue did not diverge from the task.

### ***Learner – Content Dialogue***

Table 4.18 records observations of the interaction between the learners and the content.

**Table 4.18: Learner – content dialogue.**

	Session 1	Session 2	Session 3
Reading	n	y	NA
Listening	y	y	NA
Writing e.g. on whiteboard or chat	y	y	NA
Presentation – verbal, graphical	y	y	NA
Discussions	y	y	NA
Responded to questions	y	y	NA
Participated in polls	NA	NA	NA

n = no, y = yes, NA = not applicable

In session one the learners participated by listening to Rachael, writing their own questions and brainstorming on the whiteboard. They also used the audio frequently to answer questions and viewed Rachael through the webcam. Session two was similar; however, learners read the text on the PowerPoint slides and watched a video. In this session, due to the audio not working for some, learners used chat.

### **Interface (Technology and Tools)**

The following data represent the use of the VC as the communication medium and how the teacher and learners interacted with the technology.

#### ***Teacher – Interface (Technology)***

The data in Table 4.19 represent observations of how the teacher interacted with the technological aspects of the VC.

**Table 4.19: Teacher – interface (technology).**

	Session 1	Session 2	Session 3
No trouble connecting to VC	y	y	NA
No trouble with microphone	y	y	NA
Able to use tools	n	y	NA
Able to use recording	y	y	NA
No other technical issues	n	n	NA
Teacher did not voice frustration with interface	y	y	NA
Teacher positive about the use of the VC	y	y	NA

n = no, y = yes, NA = not applicable

In session one there were issues with the audio with disruptive echoes at the beginning of the first session due to Rachael allowing every learner access to the open microphone. This was resolved by locking the audio and having one learner speaking at a time. During the first session Rachael accidentally deleted five minutes of the learners' brainstorming work and she had to ask them to redo the activity. This was due to a lack of knowledge about tool use in Wimba. Rachael tried to share a webpage within the VC in the first session but was unsuccessful. This meant that the learners had to click out of the VC and between two tabs. Had Rachael practised web-sharing prior to the session, or had she prepared an alternative plan to present



the information from the Learning Management System (such as PowerPoint slides), this issue could have been resolved.

The most prominent issue in this session was the use of the text, the size of the large text font and how learners typed over each other. This could have been overcome by using the chat as an alternative. Rachael also asked the learners to click on the yes button if they agreed with a statement, as this was a tool she had used in another VC platform. However, on the Wimba platform, she should have asked for a tick. As the learners did not know what they were supposed to click on, the session was delayed.

The issues above were due to overconfidence on the teacher's part because she was experienced and familiar with another online platform. Had Rachael read the guides or practised the session prior to holding it, she would have recognised the Wimba platform differed from what she knew and many of these issues could have been avoided.

In session two Rachel was more confident and when technical issues occurred Rachael handled them with confidence. Having learnt from her mistakes in the previous session she explained the tool use at the beginning of session two to avoid delays with content delivery. She also asked the learners to write "lower and to the left" to avoid typing off-screen and text overlap. However, this still did not resolve the issue and there continued to be the problem of larger text font size. She could have created a checker styled slide with allocated spaces for learners to use as Julie had in case study one. Or alternatively she could have instructed the learners to type in chat.

Some learners who did not have audio posted comments and questions in the chat but the teacher did not notice. This observation brings forth an interesting paradox: as a VC teacher you must possess some level of task switching capability to monitor the session but as a learner, and as this thesis proposes, task switching is distracting and opportunities should be explored to lessen the opportunities to task switch.

In session three the teacher forgot to record until the last ten minutes. However, she reported that there were no issues with the technology in this session. She had readjusted her method and instructed learners to respond through chat rather than the whiteboard.

## Teacher – Interface (Tools)

Table 4.20 records observations about the teacher's use of the tools and slides in the VC session.

Table 4.20: Teacher – interface (tools).	Session 1	Session 2	Session 3
PowerPoint slides – how many and how often	None used	3 slides, each approximately 3 minutes long	None used in the last 10 minutes
Tools used	A, c w, WC	A, c, w, WC, v	A (only recorded last 10 minute)
How often were tools used	Frequently	Frequently	Frequently
Tools were used effectively	n	n	n

a = audio, c = chat, w = whiteboard tools, wc = webcam, e = emoticons, t = tick-yes/cross-no tool, v = video, n = no, y = yes, \* = did not participate, (**capital indicates multiple use of tool**)

Figure 4.20 displays a screenshot of the teacher's VC and shows the use of a webcam tool on the top right. To the bottom left is the chatroom being used by learners and in the centre there is a blank whiteboard where learners and teacher can use the drawing tool.

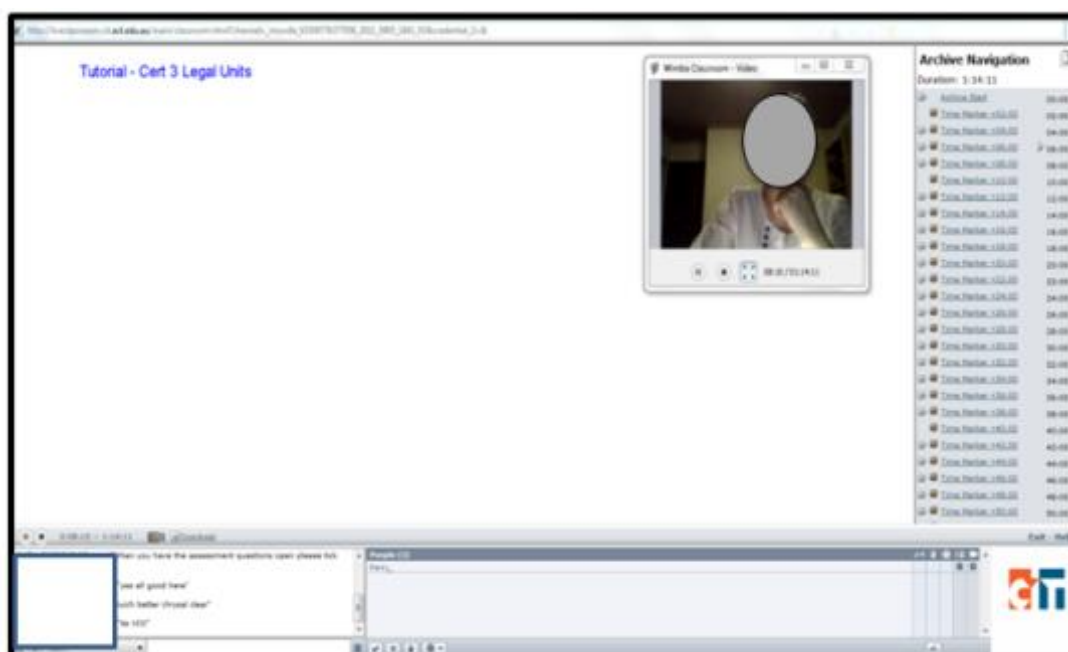


Figure 4.20: A screenshot of the teacher's VC using a webcam.

In session one Rachael's main tools were audio, webcam and the whiteboard (see Figure 4.20). There was an issue with the audio echoing at the beginning of the session but this was resolved quickly. Rachael reflected on the session and commented

It went OK for the first time. I used the whiteboard and got everyone to write up answers to questions – this did not go so well as some answers were on top of each other – then the font became big and I could not make it smaller – little things like that make it difficult.

Rachael relied on the blank whiteboard slide for brainstorming; however, due to large font size some of the text moved off-screen. This was frustrating for the learners and the teacher but Rachael kept her frustration to herself and kept calm throughout the session. Rachael used the chat function at the beginning of the session but its activity decreased as the session progressed.

In session two Rachael relied predominantly on audio and webcam again. Rachael commented that she did not want to use PowerPoint slides in any of the sessions as she felt she was “over PowerPoint” and that she “likes other tools now!” By the second session Rachael had shifted her initial opinion about PowerPoint; she decided that PowerPoint slides would be effective and included three of them into her session. She also used a wider variety of tools including a YouTube video link, chat and the whiteboard tools.

The teacher tried to overcome the problems with the whiteboard text by asking learners to type in different colours and to type at the lower left. While this was comparatively better, it still did not resolve the issue entirely. This could have been overcome by Rachael with alternative options including:

- putting lines up on the whiteboard screen to divide it into individual blocks for the learners to write in
- putting up a PowerPoint slide with a table already created
- asking the learners to reply using the audio or chat.

During one of the brainstorming activities Rachael asked the learners to use the whiteboard but then she accidentally wiped the board. This required her to retype the activity and the learners to retype their answers. This delayed the session for three minutes.

At one point, Rachael’s audio cut off and she had to re-enter the VC and repeat her question. There is no clear or obvious reason as to why she was cut off, but bandwidth usage alongside the webcam could be a reasonable explanation.

There were great lengths of silence in this session as the learners waited for Rachael's instructions. When Rachael was typing her questions for the learners they had time to disengage from the session. Rachael could have encouraged the learners to use the chat to type their questions and answers and this would have saved the session from silence. Also instead of asking "does anyone have any more questions?" and then waiting in silence, Rachael could have used the emoticons and instructed the learners to use a tick if they had a question and a cross if they did not. Had all learners used a tick, she could have then moved on.

In session three the text was once again too large and off-screen. Rachael stated she "started getting each learner to write up a question and then all other learners took turns in answering using the talk button – this worked much better." There were no other data available to analyse for this session.

### ***Slides***

Rachael relied on the webcam and audio in all the sessions as the delivery method for content. This seemed to work well and the data analysis suggested the use of the webcam was crucial in the successful engagement with the learners. Rachael was engaging, confident and knowledgeable. However, had Rachael been a teacher who was hesitant or not confident, the webcam use could have been ineffective for learner engagement without other visual stimulation, for example, images on a whiteboard.

With more knowledge and practice with the VC and all its tools, the sessions could have been delivered more effectively and with less silence. The silence can be interpreted as an opportunity for learners to task switch. Rachael believed the tool that engaged the learners most and created a sense of presence was the use of her voice (audio).

On reflecting about what worked and what did not she commented that "the video link to the movie trailer worked beautifully. The whiteboard is still a hassle – the writing becomes too big and learners cannot get their thoughts on it and I forgot to enable it for one late arriving learner."

### ***Effective Whiteboard Screens used in Session One***

Figure 4.21 shows the introductory whiteboard slide that was used at the start of session one. This entry slide, combined with the webcam, worked well as the learners could focus on the webcam image.

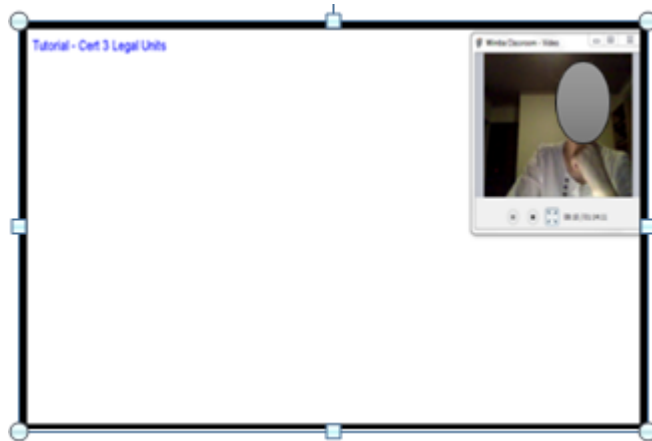


Figure 4.21: Introduction whiteboard slide with webcam.

Figure 4.22 was a brainstorming slide used towards the end of the session. This was the best of the brainstorming slides as the text could still be understood.

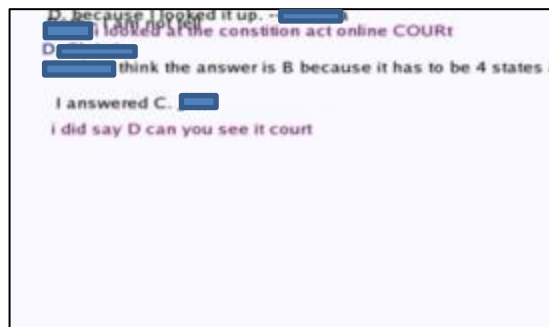


Figure 4.22: Brainstorming whiteboard slide.

### ***Non-effective Whiteboard Screens used in Session One***

Figure 4.23 was a whiteboard slide that Rachael used to post up her questions. The text went off the screen due to the text defaulting to a large size. While Rachael was typing there was a three minute lapse where nothing happened and learners were forced to wait. Figure 4.24 shows the learners' replies to the question in 4.23, where all of the learner text was typed over, making their responses incomprehensible. Figure 4.25 presents another attempt by the learners to type a response and this was much better than the previous slide. However, the text was once again too large and went off the screen and was impossible to read.

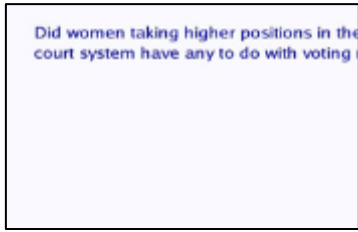


Figure 4.23: Teacher text off-screen.

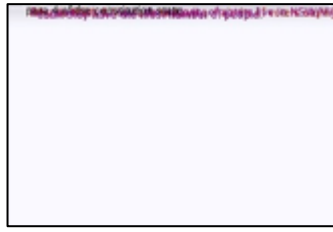


Figure 4.24: Text overlapping slide.

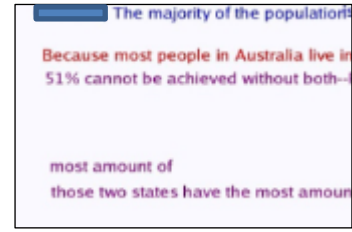


Figure 4.25: Learners' text off-screen.

### ***Effective Slides and Whiteboard Screens used in Session Two***

Figure 4.26, 4.27 and 4.28 were the three PowerPoint slides used in this session.

Figure 4.26 was shown on the screen while the teacher was introducing the content verbally. Figure 4.27 was a straight lecture slide; however, Rachael used colour to engage the learners. Figure 4.28 was the slide that Rachael used to introduce the YouTube video.

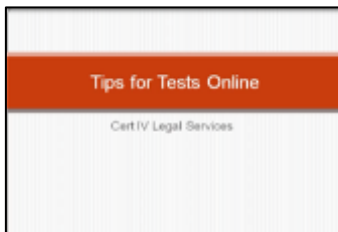


Figure 4.26: Introduction slide.

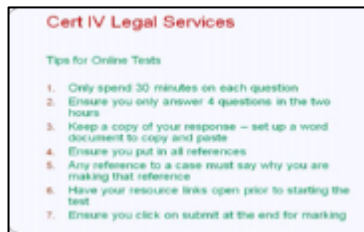


Figure 4.27: Lecture slide.

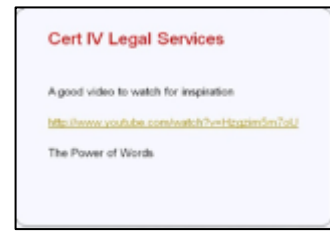


Figure 4.28: Video Link.

Figure 4.29 was a screen where Rachael posted her question and allowed the learners to brainstorm their answers. There was still the issue of the large text moving off-screen; however, it was not as bad as the text in the first session.



Figure 4.29: Question slide with learners' answers.

### ***Non-effective Whiteboard Screen Used in Session Two***

Figure 4.30 was a whiteboard brainstorming slide where the text was off-screen and could not be understood by either the teacher or the learners.

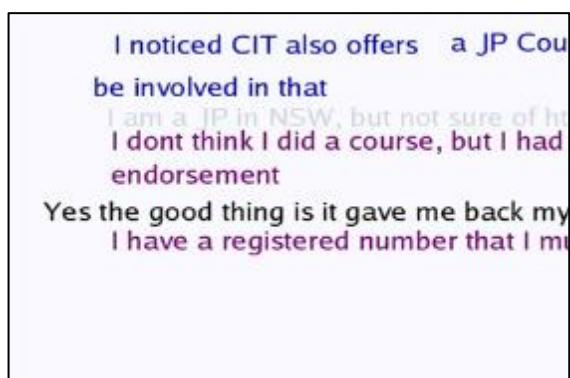


Figure 4.30: Brainstorming slide with text off-screen.

### ***Learner – Interface (Technology)***

Table 4.21 displays observations of how learners interacted with the VC on a technological level.

**Table 4.21: Learner – interface (technology).**

	Session 1	Session 2	Session 3
No trouble connecting	n	n	NA
No trouble with microphone/audio	y	n	NA
Able to use tools	n	n	NA
No other technical issues	y	y	NA
Learners did not voice frustration with interface	n	y	NA
Learners were positive about the VC	y	y	NA

n = no, y = yes, NA = not applicable

In session one there were issues with echo and audio but the teacher was prompt to rectify this. Learners had difficulty navigating the whiteboard tools due to not having an adequate explanation of how to use them by the teacher. This caused a delay in the content delivery. When one learner took five minutes to type a question on the whiteboard the rest of the class was forced to wait in silence. Rachael could have prompted the learners to use the chat feature or the microphone (if they had access to this feature) to save time.

In session two, Learner 6 experienced issues with being logged out and had to log back in again. Learners 6 and 7 did not have access to a microphone and could communicate only via the chat tool. However, this did not deter them from participating fully in the session and they remained positive about the use of the VC.

In the last ten minutes of session three, one of the learners broke her connection to the VC twice and had to log in each time and try to catch up on what she had missed. This learner did voice frustration with this.

## Learner – Interface (Tools)

Table 4.22 records observations of which tools and how often each learner used these tools in the VC sessions.

Table 4.22: Learner – interface (tools)

	Session 1			Session 2			Session 3		
Beginning – B Middle – M End – E	B	M	E	B	M	E	B	M	E
<b>Learner 1</b>	A, c, w	a, w, e	a, c, w	*	*	*	*	*	a, c, w
<b>Learner 2</b>	a w	a, w	a, w	*	*	*	*	*	*
<b>Learner 3</b>	a, w, e	w	a, w	*	*	*	*	*	a, c, w
<b>Learner 4</b>	a, e	w, e	a, w	*	*	*	*	*	*
<b>Learner 5</b>	*	a, w	a, c, w	*	*	*	*	*	*
<b>Learner 6</b>	*	*	*	a, c, w	a, c	c	*	*	*
<b>Learner 7</b>	*	*	*	w	c	e	*	*	*
<b>Learner 8</b>	*	*	*	a, w	a, c, w	C, w	*	*	*
<b>Learner 9</b>	*	*	*	*	*	*	*	*	a, c
<b>What tools were used by all learners?</b>	A	w	a, w	w	c		NA	NA	A
<b>How often were the tools used?</b>	Frequent use of whiteboard and audio			Frequent use of whiteboard and audio			Frequent use of audio		
<b>Were tools used effectively by the learners?</b>	n			n			n		

a = audio, c = chat, w = whiteboard tools, e = emoticons, t = tick-yes/cross-no, \* = did not participate, NA = not applicable, n = no, y = yes, (**capital indicates multiple use**)

In session one the learners predominantly used the audio and whiteboard tool. The learners did experience difficulty with the whiteboard tools. In session two, Learners 6 and 7 could not get their audio working and therefore relied on the whiteboard tool and chat to absorb the content. There were occasions where the learners typed questions in the text and Rachael did not respond. In this session learners took their whiteboard use a step further by picking different colours for their text, upon instructions by Rachael. This did help distinguish the learners although the text continued to run off-screen.

In session three, with the limited data obtained, it was shown that Rachael encouraged the learners to use the chat rather than the drawing tools to save time in the room and this worked well. Learners 1 and 3 also seemed to be very confident in participating using multiple tools.



In the exit survey for the learners the tools listed as most engaging were 50% audio (teacher’s voice), 25% webcam and 25% emoticons. The results collected at the end of the session polls as shown in Figure 4.31, have similar listings of 50% audio, 30% whiteboard tools and 20% webcam.

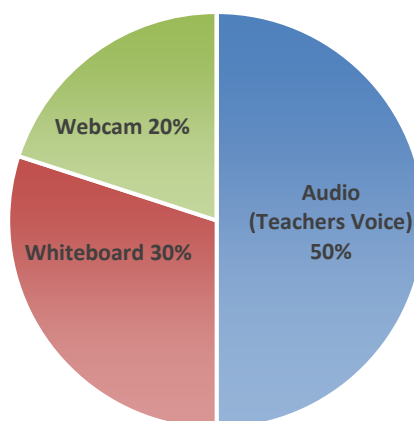


Figure 4.31: Tools which were most engaging for learners.

### Learner Autonomy

As in case study one, it was important that learners feel a degree of autonomy to effectively learn during sessions.

Table 4.23 represents aspects of the learners’ autonomy in the sessions.

	Session 1	Session 2	Session 3
Teacher has dialogue with learners	y	y	NA
Learners were given options on how they will interact and learn the material	n	n	NA
Participation activities were included e.g. chat	y	y	NA
Learning was not dependent on teacher	y	n	NA
Learners discovered information discovery rather than teacher supplementation	y	n	NA
Discussion was not dominated 1 or 2 learners	y	y	NA
Learners asked productive questions	y	y	NA
Learners who struggled with technology bounced back and participated	y	n	NA
Teacher provided challenges the learners appeared to enjoy the session	y	y	NA
Learners appeared to have positive attitude	y	y	NA

n = no, y = yes, NA = not applicable

Rachael encouraged a great deal of learner autonomy across her sessions. All the sessions were highly interactive and encouraged dialogue from the learners. Rachael

commented that “the tutorial was a good chance for the learners to talk to each other in more depth – rather than their usual text chat room.”

While there was an ideal level of interactivity, the learners were not given options for how they interacted. They were directed to the whiteboard to post their questions and this disrupted the flow of information.

### Task Switching

Table 4.24 presents the methods employed by Rachael to minimise task switching and maximise attention and focus. The following Table 4.25 shows when learners had a delayed response to the session.

**Table 4.24: Task switching – teacher.**

	Session 1	Session 2	Session 3
Introduction captured attention	n	n	NA
Use of icebreaker	n	n	NA
Rate of delivery was appropriate for learners to remain engaged	n	n	NA
Good use of tools by teacher for engagement	n	n	NA
Good use of PowerPoint for engagement	n	n	NA
Timing of PowerPoint slides was appropriate	NA	n	NA
Timing of asking learners to use tools was appropriate	n	n	NA
Teacher used question/answer	y	y	NA
Teacher incorporated learner responses	y	y	NA
Sufficient variety was used to maintain attention	n	n	NA
Lesson required learner thought and participation	y	y	NA
Maintained learner attention	y	y	NA
Paused to allow learners time for feedback	y	y	NA
Conclusion captured attention	n	n	NA

n = no, y = yes, NA = not applicable

**Table 4.25: Task switching – delay or decrease in learner response.**

	Session 1			Session 2			Session 3
	B	M	E	B	M	E	E
<b>Beginning – B</b>							
<b>Middle – M</b>							
<b>End – E</b>							
<b>Learner 1</b>	n	n	n	*	*	*	NA
<b>Learner 2</b>	n	n	y	*	*	*	*
<b>Learner 3</b>	n	y	n	*	*	*	NA
<b>Learner 4</b>	n	y	n	*	*	*	*
<b>Learner 5</b>	*	n	n	*	*	*	*
<b>Learner 6</b>	*	*	*	n	y	y	*
<b>Learner 7</b>	*	*	*	n	y	y	*
<b>Learner 8</b>	*	*	*	n	n	y	*
<b>Learner 9</b>	*	*	*	*	*	*	NA

n = no, y = yes, NA = not applicable, \* = did not participate

In session one the teacher commenced straight into interactive dialogue using question and answer format. Rachael did not use PowerPoint slides or graphics and instead relied on the whiteboard screen. While there were technical issues with the

screen the concept worked well to ensure adequate participation by the learners. Rachael also encouraged voluntary learner input and response. Constant visual stimulation via the webcam captured the attention of the learners. There were delays in the session when a learner was typing a question on the whiteboard and during this time the other learners could have diverted their attention out of the VC. There were also pauses when Learners 2 and 4 were asked to post their questions on the whiteboard slides.

Rachael could have avoided these delays by encouraging the learners to use the chat tool as a quicker option or asking one specific learner to answer or setting a time when to progress with the session. Rachael stated “lots of quiet time which can lose the learners’ [attention] – so should have set time limits, and issue of typing over should have set PPT, or quickly put in lines, or just used chat.”

In session two Rachael varied the content delivery by incorporating PowerPoint slides and a video. This appeared to work better as there was less delay in responses. Rachael asked specific learners to reply to questions and this worked well. Rachael also encouraged the learners to use chat when the whiteboard was not working.

### **Learner Exit Survey and End of Session Poll Results**

In the learner exit survey, 50% of the learners felt they were engaged the most in the middle, with 25% of learners who felt engaged during the beginning, and 25% at the end of the sessions. The learners reported similar responses in the end of VC polls (see Figure 4.32) reporting that they were most engaged in the middle and towards the end of each session (40% each). The learners had poor engagement with the beginning of the sessions and this could be addressed with the use of an icebreaker or other interactive activity.

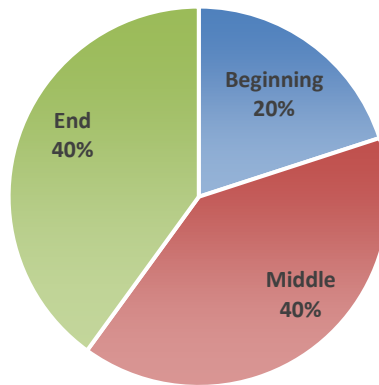


Figure 4.32: Section of the session which engaged learners the most.

In the learner exit survey, 75% of the learners stated they task switched. The results of the learner end of VC polls in Figure 4.33 found that 40% of the learners task switched during the sessions.

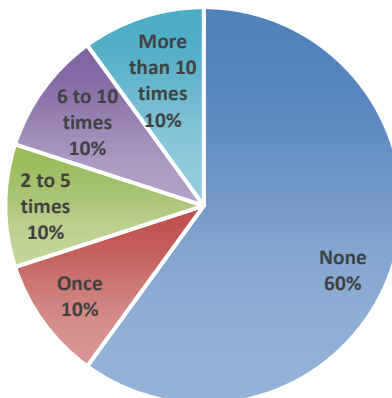


Figure 4.33: Amount of task switching.

Figure 4.34 displays the results from the end of survey poll of what tasks learners were doing when they task switched. 60% were using other websites (Yahoo/Google), 20% child care, and 20% having dinner. In the exit survey the learners listed looking at email as the most popular task at 50%, with phone/texting next at 25%.

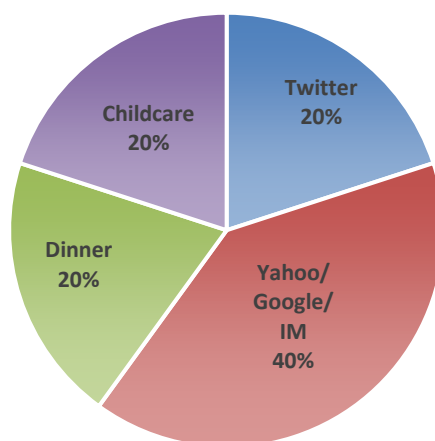


Figure 4.34: Task Switching Activities.

## Case Study Two Conclusions

### *Teacher Reflections*

Rachael had no training prior to any of her sessions. She believed the Institute should include more training on using more interactive activities, such as games and that she would participate in this training if it were on offer. Rachael suggested the guides could be improved with more pictures. She would also like more information about how to write on the whiteboard. She listed the major technological issue as the large text on the whiteboard. She believed learner’s task switched once during her sessions and that they task switched with emails. She believed the learners were engaged the most in the middle and this corresponded with the learner survey.

### *Learner Reflections*

Of the nine learners, four completed the exit survey. No learners were given any prior training or were aware of the “how to” guides. Two learners already had headsets and the other two used the speakers on their computers. Comments about technology included:

- having all participants with a webcam would be better
- frustrations with delays in dialogue and difficulty hearing others
- advance notice of how much bandwidth the VC sessions would take up
- difficulty entering the virtual room – it said “one moment please” but nothing happened, could have been waiting all night

- could not hear teacher and other learners talking
- constant dropping out
- unwieldy program
- huge lag
- required consistent recalibration
- wiped out internet for next month.

Other comments included:

- it would be nice to somehow see when others are talking so there is no confusion and overlap when everyone is talking at once
- Skype would have been better and more stable.

#### **4.2.3 CASE STUDY THREE, FOUR, FIVE AND SIX**

Limited data was collected for these three case studies. This included:

Case Study Three: Teacher Interview, Teacher Feedback

Case Study Four: Teacher Entry Survey, Teachers Feedback, Student Entry Survey

Case Study Five: Teacher Entry Survey, Teacher Feedback

Case Study Six: Teacher Entry Survey, Teacher Feedback

#### **4.2.4 FEEDBACK FROM THE FLEX:ED SUPPORT STAFF**

At the conclusion of the semester all Flex:Ed staff members were asked to participate in an interview or provide feedback in relation to the use of Wimba over the previous semester. Feedback was collected from five staff members. Questions and responses are listed below.

##### ***Teacher Training and Support***

Staff were asked their thoughts about the training they were currently giving to the teachers, and also if there were any ideas for improving the training.

Many found that the “Facilitating Learning Online” training and resources were sufficient but most felt that the training could be improved by a variety of methods including:

- videos
- presence and support of Flex:Ed staff during first VC session

- feedback and brainstorming with teachers
- greater day to day involvement in teacher spaces.

### ***Learner Training and Support***

The researcher asked the staff for their suggestions on how to help or train the learners for the VC. The researcher was also curious as to whether the library provided any training.

Respondents claimed the library offered some training and support, and that other supporting resources that should be available for learners were guides and teacher support. There was also the suggestion of putting these resources onto the Institute's network site.

### ***Guides***

On the topic of guides, the researcher asked if there were any additions, deletions or mistakes that staff could see or any additional guides that were needed. They were asked for any suggestions on improvement.

One commented that guides could include tips and tricks for using Wimba as a platform for learning activities. This would be like using Wimba as an active game rather than watching a passive movie.

Another complemented this notion by adding that teachers were always discovering new techniques to teach on Wimba, and that their tricks could be added to the guides.

One respondent stated that they felt the guides were comprehensive enough.

### ***Help Desk Staff Feedback***

The researcher inquired about the major calls for help from the teachers about the VC.

The problems listed were that there were difficulties entering the classroom and this was mainly due to the teacher's computer or outdated Java software. Staff were also asked to help with use of features in VCs.

When asked what the major calls for help were from the learners about the VC, the issues were very similar to that of a teacher. In addition, there were issues with connectivity and sound problems. These problems could be rectified by updating Java or by the use of USB headsets. One respondent commented that they received fewer calls for help with the VC from learners than teachers.

## ***Final Comments***

The researcher asked for final comments and feedback from the Flex:Ed staff. Respondents all felt that Wimba was emerging software, had great potential but needed improvements. Improvements listed related to the purchasing and managing of technological equipment especially headsets and heightening the trust and morale related to the software by promoting tips and tricks into mainstream areas of the Institute.

### **4.2.5 SUGGESTED IMPROVEMENTS FOR ITERATION TWO**

As a result of the analysis and interpretation of the data collected in the first iteration (case studies one to six) the following improvements were incorporated for the second iteration.

#### **Response to Research Question One**

##### ***Design of the Virtual Classroom Session including Content and Activities***

Introduction slides were created to show how to use basic tools such as emoticons, chat and the whiteboard tools (See Figure 4.35). Teachers will be encouraged to present these slides at the commencement of sessions to ensure all learners know how to use all the tools prior to the teacher discussing the content. Both Julie from case study one and Rachael from case study two had delays in their session while trying to explain how to use the tools and this caused the delivery of the content to be interrupted. Teachers in iteration two were to be instructed to use these introduction PowerPoint slides at the beginning of each VC session.

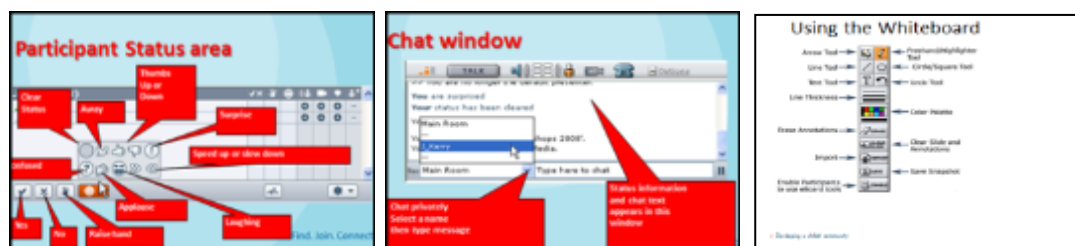


Figure 4.35: Introduction PowerPoint slides explaining basic VC tools. (Kerry Trabinger © Canberra Institute of Technology 2011).

Unfortunately, the issue of the large text/overlapping with the drawing tools could not be resolved using the Wimba VC platform. However, after feedback from the teachers the Institute decided to consider looking to move to a different VC platform in the future.



The teachers in case studies one and two struggled with the tool use during the sessions. For iteration two Flex:Ed staff were to encourage all VC teachers to practise in a VC room prior to conducting their first session with the learners. Flex:Ed staff would also encourage teachers to attend the VC how to sessions or watch the recordings of these sessions. These videos would include tool use and also tips for creating slides with tables to assist with the whiteboard drawing tool issues.

### ***Encouraging Interaction, Engagement and Attention***

For iteration two the researcher and Flex:Ed staff were to encourage all teachers to read the tips and tricks section in the guides and in particular the section which lists that there should be no more than four slides without interaction e.g. tick or cross, emoticons etc., and to not have a slide displayed for longer than four minutes.

### ***Technical Issues***

Unfortunately, the Wimba VC had technical issues with bandwidth and audio. In the future, teachers would be encouraged to provide all learners with the troubleshooting guide to set up their VC rooms prior to the first session.

## **Response to Research Question Two**

### ***Training***

At the commencement of iteration one the researcher had conducted a live one hour “how to” session on using the VC. However, due to time restraints the VC teachers from iteration one did not attend this session. For iteration two the researcher planned to present multiple sessions over the semester including:

- Using the Basic Tools in the VC for Beginners
- Using the Advanced Tools in the VC for Teachers/Presenters.

The teacher in case study two stated that she would have liked “how to” instructional videos prior to delivering her VC session. The researcher planned to record the above sessions for the teachers to view at any time.

### ***Guides***

It was concerning to the researcher and the Flex:Ed staff that the teachers in the first iteration did not use or promote the “how to” guides for their learners. In the future the guides will be printed for the teachers by the Flex:Ed staff members to encourage them to utilise these resources. Julie from case study one commented that she was

provided with the 80 page Wimba guide after she had delivered some sessions but would have liked this much earlier. These guides were to be printed and provided to all new VC teachers.

A new guide was also created for the teachers called the Teacher/Presenter Advanced guide which included further information about administrating the Wimba VC and a section on recording.

### **Support**

**Recording:** Teachers in case studies one and two both forgot to record a full VC session or a significant portion of a session. The researcher created an introductory PowerPoint slide (see Figure 4.36) for the teachers to include at the beginning of each VC session. The slide was a reminder for the teacher to record and was presented while the learners logged in.



Figure 4.36: Recording reminder PowerPoint slide (Kerry Trabinger © Canberra Institute of Technology 2011).

**Headsets:** Teachers and learners in case studies one, two and four commented that a barrier to using the VC was the cost required for the learners to purchase headsets. A discussion was held with Institute management about the availability of the headsets. However, due to budget issues it was decided that all teachers and learners were required to purchase their own headsets and microphones. To assist the learners, the Institute bookshop ordered cost-efficient headsets with microphones for ease of purchase.

**Time:** Teachers in case studies one, two, four and six agreed that preparing and delivering a VC session required a great deal of time especially when compared with face to face sessions. This issue was discussed with the Institute's management but due to budget issues the decision went to their respective departments and most departments would not allow additional time for VC development.

**Assistance for First session:** For iteration two all teachers were to be encouraged to invite a Flex:Ed staff member for their first VC session to assist with technical issues and tool use.

**Institute Flexible Learning Network:** The researcher added a section to the Institute's Flexible Learning Network (which is a network for all online teachers at the Institute) dedicated to the eLearn VC (see Figure 4.37). This section included a link to all the guides available. It also included a discussion forum where teachers could post their issues, ideas and experiences.

### eLearn Virtual Classroom 'How to' Handouts and Videos









-  [eLearn Virtual Classroom Getting Ready Guide for Teachers](#)
-  [eLearn Virtual Classroom Teachers Guide to Administration and Recordings](#)
-  [eLearn Virtual Classroom Troubleshooting Guide](#)
-  [eLearn Virtual Classroom Getting Ready Guide for Students](#)
-  [VIDEO – Recording on Using the Basic Tools in the eLearn Virtual Classrooms for Beginners – 30 minutes](#)
-  [VIDEO – Recording on Using the Virtual Classroom as a Presenter/Teacher – 30 minutes](#)
-  [FULL Instruction book from Wimba – 80 pages](#)
-  [Discussion – here is a place to post your thoughts/ideas/discussion about the eLearn Virtual Classroom](#)

Figure 4.37: List of resources available on the Institutes Flexible Learning Network (Kerry Trabinger © Canberra Institute of Technology 2011).

## 4.3 ITERATION TWO – SEMESTER 1, 2012

The second iteration occurred during semester 1, 2012 and included six case studies, comprising six teachers, nine VC sessions and 47 learners.

### Guides used for Iteration Two

The following guides were improved and/or developed in response to the feedback and analysis in iteration one:

- Getting Ready guide for learners
- Getting Ready guide for teachers/presenters
- Troubleshooting guide
- Advanced Teacher/Presenter guide
- Wimba Classroom (Version 6.0) Presentation guide

### **4.3.1 CASE STUDY SEVEN**

#### **Introduction and Background**

##### ***Background of the Teacher***

The teacher, ‘Sarah’, was female and more than 55 years old. She had worked at the Institute on a part-time basis for 2 to 5 years and was an expert in her content field in the Centre for Business. Her learners were studying a Certificate IV. Sarah had participated in and presented a few sessions using Wimba and had also participated in a few sessions in another platform. She had completed the one hour “How to Use the VC for Beginners” virtual session. She had used all of the guides for both herself and her learners. In the entry survey, she stated she believed that learners sometimes task switch.

##### ***Background of the Learners***

Four (three female and one male) of the ten learners responded to the entry survey and all were full-time learners. Two learners were aged under 18 years, one was aged between 26 to 50 years and one was aged over 50 years. All learners stated that they always task switched. None of the learners had ever seen or participated in a VC session before.

##### ***Session Details***

Sarah delivered two sessions. All sessions were recorded. The first session was 38 minutes in duration and attracted nine learners. Session two lasted 35 minutes and attracted ten learners. PowerPoint slides and audio (voice) were used to deliver the content for both sessions, with the addition of a YouTube video in the second session.

#### **Data Analysis**

##### **Structure**

The data in Table 4.26 were collected to analyse the effectiveness of the teacher’s class management, content organisation and presentation.

**Table 4.26: Classroom management/content organisation/presentation.**

<b>Classroom Management</b>	<b>Session 1</b>	<b>Session 2</b>
Began on time in an orderly organised fashion	y	y
Set ground rules for behaviour	n	n
Did not digress from main topic	y	y
Appeared well prepared for class, clearly organised and explained activities	y	y
Provided opportunities for dialogue about the activity with learners and/or self	y	y
Provided sufficient wait time	y	y
Allowed opportunity for individual expression	n	y
Was able to admit error/insufficient knowledge and respected constructive criticism	n	NA
Responded to distractions well	n	y
Gave prompt attention to individual problems	n	y
Completed session in required time frame	y	y
<b>Content Organisation</b>	<b>Session 1</b>	<b>Session 2</b>
Good lesson plan with clear goal of lesson, introduction, body, conclusion.	y	y
Use of lecture	y	y
Use of questioning	y	y
Engaging PowerPoint slides	n	y
Teacher method appropriate for content	y	y
Made course relevant to real world experience	y	y
Explained difficult terms in more than one way	y	y
Learners collaborated as a group e.g. brainstorming	y	y
Any problem solving activities	y	y
Any other approaches	n	y
<b>Presentation</b>	<b>Session 1</b>	<b>Session 2</b>
Spoke confidently with good voice quality	n	n
Communicated a sense of confidence, enthusiasm and excitement towards content	y	y

n = no, y = yes, NA = not applicable

In both sessions, Sarah’s audio did not work correctly and the sound levels varied. This did not affect the session as she could still be heard but this did cause some learners to voice annoyance. In both sessions there was a small delay in moving from one slide to the next. In the final few slides of the last session Sarah mastered this and they moved more fluently. Sarah included a real world experience of her father’s health issues to encourage conversation.

In session one Sarah was very confident in her content and was well prepared for the session. Sarah did experience some minor technical difficulties but this did not affect the flow of the session. Sarah did not set ground rules for behaviour and one of the learners played around with the drawing tools while she was lecturing which was very distracting. Sarah chose to ignore this behaviour and therefore this continued over many of the PowerPoint slides.

In session two, Sarah started with a great icebreaker slide about the use of the Wimba tools. This ensured tool use during the session went smoothly. Once again

Sarah did not set any ground rules and there was an issue with learners playing with the tools. Sarah also incorporated real life experiences in this session which engaged the learners. She included showing a video; however, not all learners were able to view this video. She quickly came up with an alternative by posting up the link for the learners to watch later. She also had fewer slides for this session and the slides were interactive. This captured attention. There was a drop in participation in the middle section during the video.

## Dialogue

The following data were collected to analyse the interaction between the teacher, learner, content and interface.

### *Teacher – Learner Dialogue*

The data in Table 4.27 represent observations of the interactions between the teacher and learners.

Table 4.27: Teacher – learner dialogue.	Session 1	Session 2
Teacher was positive and confident about the topic	y	y
Teacher checked learner comprehension	y	y
Teacher knew and used learner names	n	n
Teacher responded to learners as individuals	n	n
Teacher praised learners for contributions	y	y
Teacher encouraged questions, involvement, debate or feedback	y	y
Teacher encouraged learners to answer questions by providing cues or encouragement	y	y
Teacher feedback was informative and constructive	y	y
Teacher listened carefully to comments and questions	y	y
Teacher answered questions clearly/directly	y	y
Teacher recognised when learners did not understand	y	y
Teacher had a good rapport with learners	y	y
Treated members of class equitably and did not criticise learners	y	y
Learners asked questions of the teacher	n	n
Learners volunteered information	n	y
Learners presented information	y	y
Learner feedback was on topic	y	y

n = no, y = yes, NA = not applicable

The teacher did not use learners' names at all and there did not seem to be a rapport between the teacher and learners. The first session was predominantly lecture based with some interactive slides. The learners did not volunteer any information and also did not ask any questions.

The second session was much more interactive with each slide requiring a great deal of interactivity by the learners. The learners did volunteer information on the whiteboard and also asked questions in the chat and audio.

### ***Learner – Learner Dialogue***

Table 4.28 displays observations of the interactions between learners.

<b>Table 4.28: Learner – learner dialogue.</b>	<b>Session 1</b>	<b>Session 2</b>
On task academic discussions with each other	n	n
Off task academic discussions	n	n
Social discussions	n	n
Learners encouraged each other	n	n
Learners used each other's names	n	n
Did not criticise each other	y	y
Learners maintained good rapport/mutual respect and treated each other equitably	y	y

n = no, y = yes

There was no learner – learner dialogue during these sessions but the learners participated in group brainstorming.

### ***Learner – Content Dialogue***

Table 4.29 records observations of the interaction between the learners and the content.

<b>Table 4.29: Learner – content dialogue.</b>	<b>Session 1</b>	<b>Session 2</b>
Reading	y	y
Listening	y	y
Writing e.g. on whiteboard or chat	y	y
Presentation – verbal, graphical	y	y
Discussions	y	y
Responded to questions	y	y
Participated in polls	NA	NA

n = no, y = yes, NA = not applicable

In both sessions the learners participated by reading the lecture slides and whiteboard questions, listening to the teacher, writing on the whiteboard and three participated using audio. In session two the learners viewed a video and participated in a group drawing activity by completing a table.

## Interface (Technology and Tools)

### *Teacher – Interface (Technology)*

Table 4.30 displays how the teacher interacted with the technological aspects of the VC.

Table 4.30: Teacher – interface (technology).	Session 1	Session 2
No trouble connecting	y	y
No trouble with microphone	n	n
Able to use tools	y	y
Able to use recording	y	y
No other technical issues	n	n
Teacher did not voice frustration with interface	y	y
Teacher was positive about the use of the VC	y	y

n = no, y = yes

Sarah had asked the researcher to conduct a 15 minute “how to” session with her learners a week before the first session by requesting

If you could do a session from your PC and be the instructor, I would be the learner and the whole class could watch. I was thinking of a session that went for about 15 minutes and the learners could see how to type comments, draw on the screen, put their hand up, etc.

This worked well as no learners experienced any issues with using the tools and were very confident. This was shown in participation levels of the whiteboard brainstorming. It also assisted with the brainstorming as the learners were able to choose different colours. This made for better clarity of reading the text. They also realised they had to type from the top left to avoid any text running off-screen. There continued to be minor issues with this but not to the severity experienced in iteration one.

Sarah did experience technical issues in both sessions with her audio and, while her voice could be heard for the majority of the sessions, it did vary in sound level. Some learners found this to be annoying.

Another issue Sarah experienced was with changing slides. In the middle of the first session she lost access to all slides and this caused a delay of 60 seconds for delivering content.

In session two Sarah shared a video; however, a few learners could not view this and the teacher was unaware of this until it had been running for four to five minutes. Sarah did say she would provide the learners with a link to the video to view later.



However, a few slides later she tried again to show another video and it also did not work. This time she quickly stopped the video and moved on with the content.

In both sessions Sarah began to record prematurely, prior to the actual content delivery or session commencement. When learners log in to view these recordings there would be silence for the first few minutes and it could tempt them to stop watching the session. As there was no way to edit these recordings this could discourage learners from viewing the recordings at a future date.

### **Teacher – Interface (Tools)**

Table 4.31 records observations about the teacher’s use of the tools and slides in the VC session.

<b>Table 4.31: Teacher – interface (tools).</b>	<b>Session 1</b>	<b>Session 2</b>
PowerPoint – how many and how often?	23 slides – average 1.6 minutes per slide	9 slides plus video – average 3.1 minutes per slide
Tools used	A, c, W	A, c, W
How often were tools used?	A and W frequently, chat few times	A and W frequently, chat few times
Tools were used effectively	n	y

n = no, y = yes, a = audio, c = chat, w = whiteboard tools, (**capital indicates multiple use**)

### **Tools**

The learners participated in a short “how to use the VC tools” session and this worked well as the learners were comfortable with all the tools afterwards.

Sarah began the first session by requesting the learners use the emoticons and encouraged the learners to use the emoticons during the session; however, she could have used the emoticons more frequently. She also used the chat tool to monitor conversation and encourage learner participation. Sarah made use of the whiteboard tools and in particular the pointing tool. She used the pointing tool to highlight and draw attention to important sections on a slide and this worked well to engage the learners. She also encouraged the learners to use the whiteboard tools in both sessions for brainstorming and in the second session for completing a table. There were times when she did not encourage any interaction, though she could have used the tick-yes/cross-no to reengage the attention of the learners. She could also have used the pointing tool more frequently or used more variety by including lines or circles with the drawing tools.

Sarah lost the slides at the middle of the session and it took her four to five minutes to get them working again. During this time there was no interactivity and there would have been the opportunity for learners to task switch.

In the teacher's exit interview she listed the whiteboard tool as the tool that engaged the learners the most.

### **Slides**

Sarah was slow in moving from one slide to the next. In the final section of the last session Sarah mastered moving the slides seamlessly.

In the first session the teacher used many lecture slides that lacked interactivity (text heavy). During the delivery of these text heavy slides there was a decline in engagement by the learners. Had she used slides with dot points and a relevant graphic this could have encouraged more attention. An example of a detailed text heavy slide is displayed in Figure 4.40. Using the pointing tool would have highlighted what section she was referring to on the slide. Sarah commented "I need to rethink how I deliver my lessons and what I currently do face to face doesn't translate to an online environment."

In the second session Sarah designed interactive slides specifically for the VC and this showed in the increase of the whiteboard tool use by the learners.

In this session the teacher used 23 slides in the 38 minutes, with an average of 1.6 minutes per slide. The teacher could have reduced the number of slides and spent more time on the one topic. She did add some interactive slides in the session but could have added more. In session two, nine slides were used in the 35 minutes (videos were shown in the middle of the session for a total duration of 7 minutes) so the average time a slide was displayed was 3.1 minutes. The slides were very interactive and required all learners to actively participate to complete tables. This worked well with the learners and encouraged focus and attention.

### **Effective Slides used in Session One**

Figure 4.38 was a question slide leading the learners to answer by using the text tool. Figure 4.39 was a question slide leading the learners to answer by using the chat tool. These two slides were good examples of variety within the session.



Figure 4.38: Question slide with learners typing answer with drawing tool.



Figure 4.39: Question slide with learners using chat tool.

### ***Non-effective Slides used in Session One***

Figure 4.40 was a traditional lecture slide heavy in text. This did not allow any interactivity from the learners. The teacher did start using the pointer tool but only for the first dot point. There was a marked decline in participation by the learners.

Figure 4.41 was another slide in traditional lecture format. Learners grew bored and one commenced writing on the slides.

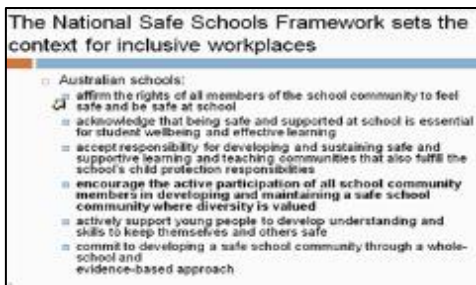


Figure 4.40: Text heavy lecture slide.



Figure 4.41: Lecture slide with learners drawing inappropriately.

### ***Effective Slides used in Session Two***

Figure 4.42 was an introduction slide used as learners were entering the VC room to ensure learners could use the tools and that they all worked correctly. Figure 4.43 was a slide in a traditional lecture format. However, there was limited text and the teacher used the pointing tools and this worked well to maintain attention.

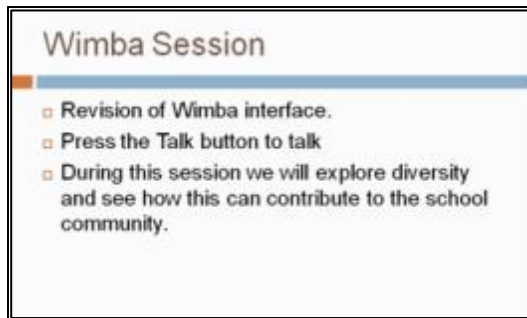


Figure 4.42: Introduction slide on the use of the VC tools.

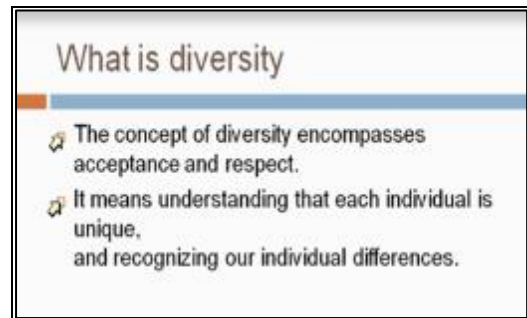


Figure 4.43: Traditional lecture slide with dot points and the pointer tool.

Figure 4.44 was a slide showing the learners participating with the whiteboard tools with a space specifically allocated to them. Figure 4.45 was a lecture slide that allowed learners to use the drawing tool to type answers.

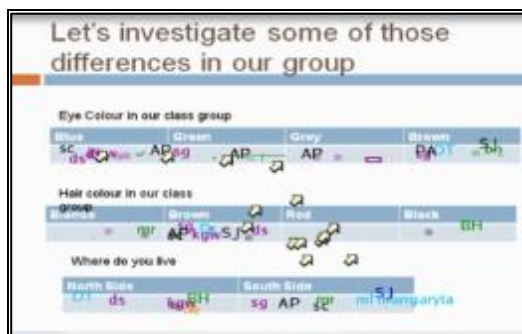


Figure 4.44: Interactive slide with learners using drawing tool.

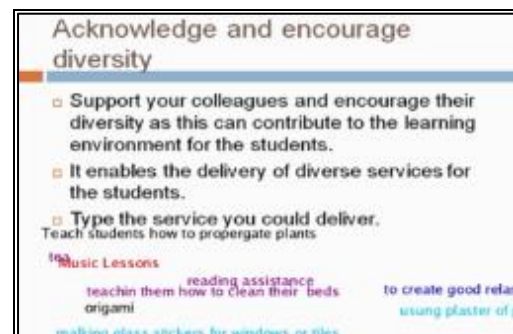


Figure 4.45: Interactive slide with learners using whiteboard tool.

Figure 4.46 was used as a question slide that encouraged learners to use the drawing tool to type answers. This slide became a brainstorming session.

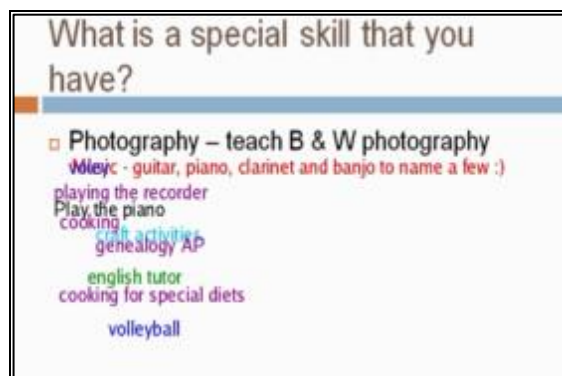


Figure 4.46: Brainstorming slide with learners using the drawing tool.

### ***Learner – Interface (Technology)***

Table 4.32 records observations of how learners interacted with the VC on a technological level.

**Table 4.32: Learner – interface (technology).**

	Session 1	Session 2
No trouble connecting	y	n
No trouble with microphone/audio	n	y
Able to use tools	y	y
No other technical issues	y	y
Learners did not voice frustration with interface	n	n
Learners were positive about the VC	n	n

n = no, y = yes

Due to the learners participating in the “how to use the Wimba tools” session prior to the first session, the learners were all confident in using the tools. Also due to this practice session the learners used the whiteboard tools well by choosing different colours and also by typing to the left and towards the bottom of the screen.

Some of the learners expressed annoyance in the first session at the variance in sound level and this continued throughout both sessions; however, Sarah’s voice was still audible at all times.

To use audio, Wimba requires the speaker to hold down a button while talking and release it once finished. In session one, some of the learners tried to use audio but had forgotten they had to hold down the microphone button to speak. Sarah did correct this for the second session by reminding them at the beginning to hold down the microphone button.

Learner 8 had trouble getting into session two but then participated in the first section. However, because she could not see slides she left the session.

Sarah lost the slides towards the end of the middle session and it took her four minutes to get them back up. During this time there was no interactivity and this would have given the learners the opportunity to task switch. She did voice some frustration with this during the session; however, she remained calm and moved forward.

### ***Learner – Interface (Tools)***

Table 4.33 records observations of which tools and how often each learner used these tools in the VC sessions.

**Table 4.33: Learner – interface (tools).**

Learner Number Beginning – B, Middle – M End – E	Session 1			Session 2		
	B	M	E	B	M	E
Learner 1	a, W	w	w	c, W, e	C, e	c, w
Learner 2	c, W	w	w	c, w, e, t	w, e	w
Learner 3	C, W, e, t	W, e	W	w, e, t	W, e	a, c, W, t
Learner 4	a, w	*	*	a, W, e	a, w, e	a, w, c
Learner 5	w, e		w	W, e, t	w, e	w
Learner 6	*	*	*	w, e	w, e	w
Learner 7	W, e, t		w, c, e	w, e, t	NA	w
Learner 8	C, e		c	w, e, t	*	*
Learner 9	a, w, e		c	w, e, t	a, e	w
Learner 10	*	*	*	w, e, t	c, e	C, w
What tools were used by most learners	w and c			w		
Were tools used effectively by the learners?	y			y		

n = no, y = yes, NA = not applicable a = audio, c = chat, w = whiteboard tools, wc = webcam, h = hand raising, e = emoticons, t = tick-yes/cross-no, \* = did not participate, (**capital indicates multiple use**)

In session one the teacher encouraged the learners to participate with all available tools including audio, chat, emoticons, tick-yes/cross-no, or the whiteboard drawing tools. The different modes of participation encouraged learner attention and autonomy. Some of the learners experienced issues with using the microphone and therefore only three learners chose to use the audio. All other learners chose to use either chat or the whiteboard tools or both.

The teacher had a few interactive activities in between lecture slides. However, in the middle of the session Sarah lectured with no request for interactivity. There was a noticeable decline in the engagement by the learners. The teacher could have improved engagement by asking for more interaction, for example, through the simple tick-yes/cross-no function or other emoticon tools.

Once again in session two the teacher encouraged the learners to participate with any of the tools and commenced the session with a revision of how to use the tools. This ensured immediate attention and encouragement of the learners. She had a few lecture slides but she used the pointing tool well and the slides were dot points. This session was very interactive with a great deal of input required by the learners. There were more uses of the tools by all learners across all sections in this session.

The teacher did show videos in the middle of the session which some learners could not access. This could have allowed the learners to task switch while waiting

for the video to finish. A solution could have been for the teacher to post the URL link to the video in the chat to enable the other learners to view the video. Sarah could have set a time frame for the learners to return to the room because allowing learners to go to another tab allowed the opportunity to task switch or not come back to the room in a timely fashion. There was a marked decline in participation in tool use at the middle section due to the learners watching the video

It is interesting to note that Learner 9 (an international learner) was the learner who participated the least in the sessions.

The learner exit survey results listed the tools which were most engaging as the whiteboard tools at 75% and voice at 25%. The results of the end of VC learner poll (see Figure 4.47) also showed 33.3% of learners listed the teacher's voice as most engaging, with the other 66.7% listing the emoticons.

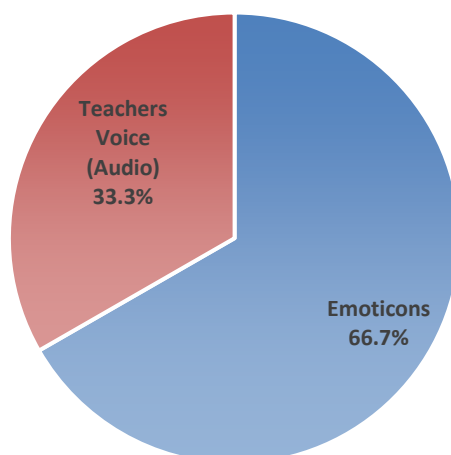


Figure 4.47: Tools which were most engaging for learners.

### **Learner Autonomy**

Table 4.34 represents aspects of the learner autonomy in the sessions.

**Table 4.34: Learner autonomy.**

	Session 1	Session 2
Teacher used dialogue with learners	y	y
Learners were given options on how they will interact and learn the material	y	y
Participation activities were included e.g. chat	y	y
Learning was not dependent on teacher	n	n
Learners discovered information that they needed for the session rather than being provided all of it	n	n
Discussion was not dominated 1 or 2 learners	y	y
Learners asked a lot of productive questions	n	y
Learners who struggled with technology bounced back and participated	NA	NA
Teacher provided challenges the learners seemed to enjoy the session	y	y
Learners seemed to have positive attitude	y	y

n = no, y = yes, NA = not applicable

The sessions were teacher led but the learners were given the opportunity to use different tools to participate in the sessions. The learners did not volunteer any information or ask questions in session one but in session two they posted questions both in chat and via audio and also volunteered information on the whiteboard brainstorming.

During the sessions the learners did not make any negative comments with the exception of one learner who voiced frustration with the sound levels. In both the entry and exit surveys the learners commented that they preferred face-to-face classrooms.

### **Task Switching**

Table 4.35 presents the methods employed by the teacher to minimise task switching and maximise attention and focus. The following Table 4.36 shows when learners had a delayed response to the session.



**Table 4.35: Task switching – teacher.**

	Session 1	Session 2
Introduction captured attention	n	y
Use of icebreaker	n	y
Rate of delivery was appropriate for learners to remain engaged	y	y
Good use of tools by teacher for engagement	y	y
Good use of PowerPoint for engagement	y	y
Timing of PowerPoint slides was appropriate		
Timing of asking learners to use tools was appropriate	y	y
Teacher used question/response	y	y
Teacher incorporated learner responses	y	y
Sufficient variety was used to maintain attention	n	n
Lesson required learner thought and participation	y	y
Maintained learner attention	y	y
Paused to allow learners time for feedback	y	y
Conclusion captured attention	n	n

n = no, y = yes

**Table 4.36: Task switching – delay or decrease in learner response.**

Learner Number	Session 1			Session 2		
	B	M	E	B	M	E
Beginning – B, Middle – M, End – E						
Learner 1	n	n	y	n	n	n
Learner 2	n	y	y	n	n	n
Learner 3	n	n	n	n	n	n
Learner 4	n	y	*	n	y	n
Learner 5	n	n	n	n	n	n
Learner 6	*	*	*	n	n	n
Learner 7	n	y	n	n	y	n
Learner 8	n	y	n	n	*	*
Learner 9	n	y	n	n	y	n
Learner 10	*	*	*	n	y	n

n = no, y = yes, \* = did not participate

In session one the teacher did not use an icebreaker, but she did ask all learners to give a tick or cross so she knew when the learners were ready for the session. This ensured all learners were attentive.

Sarah had many slides which averaged 1.6 minutes per slide and many of these incorporated a great deal of text. She included some interactive slides particularly towards the end of the first section and in the middle section and this engaged the learners. However, there was a section where she delivered six slides in a row that were straight lecture slides and she did not encourage interaction. She did not use any whiteboard tools or pointing tools on these slides. At the end of these slides the teacher asked the learners to give her a tick and there was a delay in the learners giving the tick. This may have been as a result of the learner's task switching during the delivery of the lecture slides.

Learner 4 was bored during the period of the lecture slide delivery, and kept writing on the slides and making smart comments on the board such as “needed full stop”. He continued to do this a number of times during the session and also used the speed up symbol during this time so it was obvious he was bored.

When there was the period of four minutes of silence, Learner 4 logged out and said he had to leave. Did he leave because he was bored? After this there was once again a delay with two learners using the emoticons when asked. This could indicate they were task switching.

In session two the teacher used a great introduction slide that reviewed how to use the audio. Sarah also reduced the number of slides to only nine with the majority of these slides including interactivity. There was a marked increase in participation and tool use across all learners in this session. The only decrease in any tool use was during the video delivery and this was due to the focus being 100% on the video. However, as some of the learners could not view the video due to technical issues it is possible they could have task switched during this time. When the teacher started speaking again and asked for emoticons three learners were delayed in responding.

### **Learner Exit Survey and End of Session Poll Results**

The results of the learner exit survey showed that 75% of learners found the middle most engaging with 25% engaged the most during the beginning. The learners in the end of the VC poll (see Figure 4.48) reported that all were engaged during the middle. Unfortunately, in this case study there was some confusion about what the learners thought was the middle of the session. The tracking statistics show there was a marked decrease in participation in the middle but this was towards the end of the middle section so the learners may have meant the end of the session.

For the analysis the researcher divided the sessions into three sections based on the length of time of the sessions. In hindsight this should have been clearly stated to the learners to ensure more accurate statistics. At the end of the middle section and beginning of the end section of session one there was a marked decrease in participation when the straight lecture slides with no interactivity were recorded in the Wimba Tracking logs. This also occurred in session two when the videos were shown. The teacher stated she felt the learners were most engaged at the beginning and least at the end.

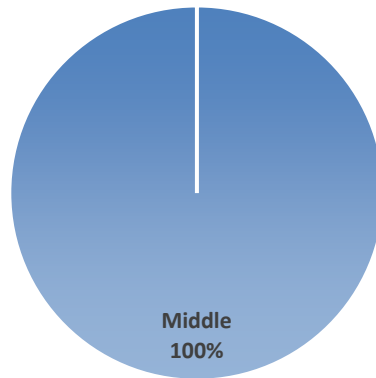


Figure 4.48: Section of the session which engaged learners the most.

In the learner exit survey 25% task switched two to five times, with 25% task switching one time which totalled to 50% of learners task switching. The results of the learner end of VC poll in Figure 4.49 reported that 100% of the learner's task switched.

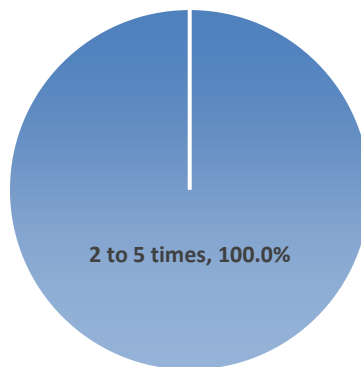


Figure 4.49: Amount of task switching by learners in the sessions.

In the exit survey the learners listed 50% text/phone and 50% email as their method of task switching. Figure 4.50 displays the results of the end of session poll with 100% of learners using Facebook and text/phone.

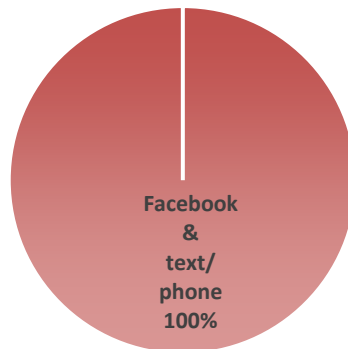


Figure 4.50: Task switching activities.

## Case Study Seven Conclusions

### *Teacher Reflections*

Sarah had participated in a one hour “How to Use the VC for Beginners session” and also attended a one on one training session with the researcher. She did not feel any improvements in training or the guides were required. She stated “I found it useful to have Kerry [the researcher] give my learners the first session on how to use the tools.” She did experience technical problems with audio issues. In the exit survey she stated she believed her learners did not task switch.

### *Learner Reflections*

Of the ten learners only four (all female and aged between 26 to 45 years) completed the exit survey. Three were full-time learners and one part-time. All learners were given a “how to use the tools” session by the researcher and teacher prior to their first session. All learners stated that they did not need any additional training with one learner commenting “it was very simple.” Only 50% of the learners were aware of the guides. Two learners did not use a headset; one purchased theirs from the Institute bookshop and one from an external shop. Comments about technology included “teacher dropping in and out, volume control, kept dropping out and was very hard to hear at times.” On being asked what could have been done to make the session more engaging one learner commented

It seemed to go very slow, but I understand that it was mostly due to technical difficulties such as other learners not hearing, microphones

not working, etc. I think we could have gotten through a lot more stuff during the sessions otherwise.

Three learners stated they did not believe there were any improvements necessary with one stating “it was simple and clear cut.”

### ***Final Comments***

Sarah had a final comment about the VC, stating

Even though I feel there are a few obstacles that make it an effort to use the online environment I feel it will get better especially with the introduction of National Broadband Network. I believe that the more practice you have with something the quicker it will become to use.

## **4.3.2 CASE STUDY EIGHT**

### **Introduction and Background**

#### ***Background of the Teacher***

The teacher, ‘Natalie’, was female and about 50 years old. She had worked at the Institute on a full-time basis for approximately ten years and was an expert in her content field for the Centre for Business. Her learners were studying a Certificate IV. Natalie had not taught in any VC before but had been a participant in many VC sessions in other platforms. Natalie did participate in a one hour “How to Use the VC for Beginners” virtual session run by the researcher prior to commencing her sessions. She was aware of the Getting Ready Guide for Teachers and Learners. She believed that learners were always task switching. Natalie was positive about using the VC with learners and was looking forward to preparing the sessions.

#### ***Background of the Learners***

Eleven of the sixteen learners (eight males and three females) responded to the entry survey. All learners were full-time learners. Over half of the learners (six) were aged under 21, three were aged 26 to 45 years, with one aged 22 to 25 years and one aged 46 to 54 years. Six believed they task switched sometimes while five stated that they always task switched. Ten of the learners had never seen or participated in a VC session before, with one stating they had viewed a recording.

## Session Details

Natalie delivered three sessions. The first session was 50 minutes in duration and attracted fourteen learners. The second session was 63 minutes in duration and the third 45 minutes, with both sessions attracting eight learners. All sessions used PowerPoint slides and audio (voice) to deliver the content of the session with the addition of a video in the second session.

## Data Analysis

### Structure

Table 4.37: Classroom management, content organisation and presentation.

Classroom Management	Session 1	Session 2	Session 3
Began on time in an orderly organised fashion	y	n	n
Set ground rules for behaviour	n	n	n
Did not digress from main topic	y	y	y
Appeared well prepared for class, clearly organised and explained activities	y	y	y
Provided opportunities for dialogue about the activity with learners and/or self	y	y	y
Provided sufficient wait time	y	y	y
Allowed opportunity for individual expression	y	y	y
Was able to admit error/insufficient knowledge and respected constructive criticism	y	y	y
Responded to distractions well	y	y	y
Gave prompt attention to individual problems	y	y	y
Completed session in required time frame	y	n	y
Content Organisation	Session 1	Session 2	Session 3
Good lesson plan with clear goal of lesson, introduction, body, conclusion.	y	y	y
Use of lecture	y	y	y
Use of questioning	y	y	y
Engaging PowerPoint slides	y	y	y
Teacher method appropriate for content	y	y	y
Made course relevant to real world experience	y	y	y
Explained difficult terms in more than one way	y	y	y
Learners collaborated as a group e.g. brainstorming	y	y	y
Any problem solving activities	y	y	y
Any other approaches	y	y	y
Presentation	Session 1	Session 2	Session 3
Spoke confidently with good voice quality	y	y	y
Communicated a sense of confidence, enthusiasm and excitement towards content	y	y	y

n = no, y = yes

The sessions were well structured with revision of previous sessions and a clear introduction, body and conclusion. Natalie was very well prepared and organised for

her sessions. It was evident she was confident in her content knowledge and was enthusiastic about the topic.

All sessions were delivered using predominantly lecture based slides. However, Natalie did incorporate a variety of instructional strategies including lecturing, question and answer, group brainstorming activities and videos in session two. Natalie’s PowerPoint slides were designed well and most encouraged a high level of engagement. Natalie improved in each session with her confidence in using the tools.

Unfortunately, due to technical issues both sessions two and three were delayed in commencing the delivery of the content. However, once these technical issues were resolved the sessions flowed well.

In sessions two and three, learners started playing around with the tools. Natalie did try to address it but it kept occurring. This could have been avoided by Natalie setting rules about the use of the drawing tools and also by using blocking tools.

In all sessions Natalie incorporated real life examples to engage the learners, for example, using a Bundaberg Rum and Coke advertisement.

## Dialogue

The data in this section were collected to analyse the interactions between the teacher, learner, content and interface.

### ***Teacher – Learner Dialogue***

Table 4.38 records observations of the interactions between the teacher and learners.

<b>Table 4.38: Teacher – learner dialogue.</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Teacher was positive and confident about the topic	y	y	y
Teacher checked learner comprehension	y	y	y
Teacher knew and used learner names	y	y	y
Teacher responded to learners as individuals	y	y	y
Teacher praised learners for contributions	y	y	y
Teacher encouraged questions, involvement, debate or feedback	y	y	y
Teacher encouraged learners to answer questions by providing cues or encouragement	y	y	y
Teacher feedback was informative and constructive	y	y	y
Teacher listened carefully to comments and questions	y	y	y
Teacher answered questions clearly/directly	y	y	y
Teacher recognised when learners did not understand	y	y	y
Teacher had a good rapport with learners	y	y	y
Treated members of class equitably and did not criticise learners	y	y	y
Learners asked questions of the teacher	y	y	y
Learners volunteered information	n	y	y
Learners presented information	y	y	y
Learner feedback was on topic	y	y	y

n = no, y = yes

The teacher was very familiar with the class and she used learner names frequently. She praised learners when they made positive contributions and encouraged those who needed it. She encouraged participation by using a question and answer format and when no one responded she addressed learners by name. When there was a pause in any learners answering questions she was quick to encourage participation by all learners and she offered extra encouragement to the international learners who were very hesitant at times during the session. She encouraged them by praising them when they provided input.

She encouraged whole group participation. One example was putting up a slide with a question and instructing “everyone post in chat – I want a post from each of you.” She also allowed flexibility for anyone who was not confident in participating by stating “if you do not want to put a question for all to see just send it to me privately and we will then discuss it.”

Some of the learners were quite cheeky and she handled them well. One example was when she was discussing a website and had a disruptive learner. She encouraged him to cut and paste the URL into the chat and hence kept him occupied and on task. After the session she commented that she felt it was important that they had had some face to face sessions prior to using the VC so she could establish a rapport with the learners and learn about their behavioural patterns.

The learners dialogued with the teacher using audio, chat, emoticons and whiteboard drawing tools. The teacher encouraged participation through her use of the drawing tools. The learners did not volunteer information unless prompted by the teacher but when they were prompted they were very forthcoming.

### ***Learner – Learner Dialogue***

The data in Table 4.39 record how learners interacted with each other in the VC.

<b>Table 4.39: Learner – learner dialogue.</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
On task academic discussions with each other	y	y	y
Off task academic discussions	n	n	n
Social discussions	n	n	n
Learners encouraged each other	n	n	n
Learners used each other’s names	n	y	y
Did not criticise each other	y	y	y
Learners maintained good rapport/mutual respect and treated each other equitably	y	y	y

n = no, y = yes



There was minimal discussion among the learners in sessions one and two. However, in session three each learner had a turn at presenting information and during this section there was a great deal of dialogue.

### ***Learner – Content Dialogue***

Table 4.40 records observations of the interaction between the learners and the content.

<b>Table 4.40: Learner – content dialogue.</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Reading	y	y	y
Listening	y	y	y
Writing e.g. on whiteboard or chat	y	y	y
Presentation – verbal, graphical	y	y	y
Discussions	y	y	y
Responded to questions	y	y	y
Participated in polls	NA	NA	NA

n = no, y = yes, NA = not applicable

The learners interacted with the content by listening to the teacher, reading the slide questions, writing on the whiteboard or in chat, assisting to create a diagram and answering questions posed on the slides or verbally. They also watched a video.

### **Interface (Technology and Tools)**

The following data represent the use of the VC as the communication medium and how the teacher and learners interacted with the technology.

### ***Teacher – Interface (Technology)***

Table 4.41 displays how the teacher interacted with the technical aspects of the VC.

<b>Table 4.41: Teacher – interface (technology).</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
No trouble connecting	y	n	n
No trouble with microphone	y	n	n
Able to use tools	y	y	y
Able to use recording	y	y	y
No other technical issues	y	y	y
Teacher did not voice frustration with interface	y	n	n
Teacher was positive about the use of the VC	y	n	y

n = no, y = yes

All technology worked well in session one. However, at the beginning of both sessions two and three the audio was not working for the teacher or learners.

In session two there were major technical issues where the audio was not working for either teacher or learners and this caused a delay of five minutes. Once the audio was working, Natalie asked the learners for a tick-yes/cross-no; however, as no one put a tick she said “oh what now?” and did not realise the learners could hear that.

She was clearly frustrated with the technical issues. Once all issues were resolved she once again asked for tick-yes/cross-no and waited until the last person had ticked. This ensured she had complete attention at the commencement of the session. She then asked them all to add a comment in the chat. One learner put in a smile and she commented “lovely smile.” She also reminded the learners how to use the microphone button and remained positive for the rest of the session.

In session two Natalie tried to show a YouTube video but was unaware that the learners could not see it for a few minutes. This did cause a delay where there was silence and it could have been an opportunity for the learners to task switch. However, she rectified the issue quickly. This could have been overcome by practising showing a video prior to the commencement of the session. Towards the end of session two there were also echoing issues but this was resolved quickly.

At the beginning of session three the same technical issues occurred and this caused a delay of seven minutes. However, as the learners were confident with the tools they drew on the board with the drawing tools while waiting for the session to commence. A question could be posed as to whether this was positive or negative. While they were playing with the tools they were still focusing on the VC rather than task switching.

Unfortunately, in both sessions two and three the recordings were silent at the beginning. Natalie needed to start the recording once all tools were working and the content delivery commenced. But due to being nervous she would forget and she would start the recording as soon as she entered the room. A solution for learners viewing the videos in the future would be to instruct the learners to fast forward the number of minutes to reach commencement of the content.

### ***Teacher – Interface (Tools)***

Table 4.42 records observations about the teacher’s use of the tools and slides in the VC session.

<b>Table 4.42: Teacher – interface (tools).</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
PowerPoint – how many and how often?	25 slides – average of 2 minutes per slide	15 slides – average of 2.1 minutes per slide	18 slides – average of 1.1 minutes per slide with last slide lasting 20 minutes
Tools used	A, c, W, h, e, t	A, c, W, h, e, t, v	A, c, W, h, e, t
Tools were used effectively	y	y	y

N = no, y = yes, a = audio, c = chat, w = whiteboard tools, h = hand raising, e = emoticons, t = tick/yes-cross/no, v = video, (**capital indicates multiple use**)

## **Tools**

As a member of the Flex:Ed team the researcher was in the room for the first session and the teacher commented that she “felt relaxed as the researcher was in to sort out technical issues.”

Natalie had great use of all tools in all sessions and incorporated a variety of tools including audio, chat, emoticons, hands up, tick-yes/cross-no, pointer tool and the drawing tools. She showed a video in session two. She also gave options to participate so learners had a choice of responding with chat, audio or drawing tools. At one stage she posed a question and said to the learners “talk, chat, draw, speak do anything you want.” This was a great example of offering the learners options to encourage participation and engagement. She also became more confident in the use of the drawing tools over the sessions. She initially was using the basic drawing tool and in a later session this evolved to the underline tool.

She used the emoticons well throughout the sessions. When she sensed, after doing a few straight lecture slides, that they were getting bored she told the learners “if you are getting bored give me a tick,” and then she proceeded to tell them “only four slides to go.” This was an excellent method to ensure the learners stayed attentive.

In the first session Natalie did have a few issues with using the drawing tools. One example was trying to draw red circles but when it did not work she quickly changed back to the pointing tool. In session two she also started using the free pen but this did not work so she quickly changed to the underline tool.

In session two at the beginning of the session, Natalie asked all learners to write a comment in the chat to make sure they knew how to use the chat and that they were all engaged in the session. She also asked each learner to check their microphone one by one.

Natalie was very pleased with the third session and commented that “both students and myself felt more comfortable and therefore more student interaction.” At the end of this final session Natalie asked the learners to use the clapping emoticon and this was a direct result of her being more familiar and confident in the use of a variety of tools that were available.

### **Slides**

In sessions one and two the teacher averaged two minutes per slide. In session three she averaged just over a minute a slide and seemed to rush through these.

Natalie’s slides were clear and most included great interaction. The graphics on the slides were engaging, topical and encouraged interaction. She used a lot of slides that were in pairs having one showing content and the other with interaction. She also used slides that had blank tables that required the learners to complete them.

She stated she felt she could improve the design of the slides to increase engagement with her learners by using “more pictures and learn application sharing” and also “better timing, commenting on the students’ contributions when they are contributing, inclusion of websites and to try polling, my slides could be less boring.” In a post session interview, Natalie said she felt she did have enough control in placement of the learners’ work.

In the third session, the teacher commented that “the reduced number of PowerPoints made it easier to manage.”

### **Effective Slides used in Session One**

Natalie used a variety of whiteboard tools to maintain learner attention. Figure 4.51 was an example of the use of the pointing tool, Figure 4.52 was an example of the use of the pen tool and Figure 4.53 was an example of the use of the underline tool and drawing tool.

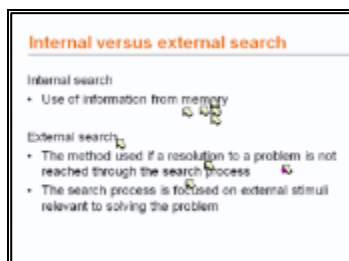


Figure 4.51: Example of pointing tool.

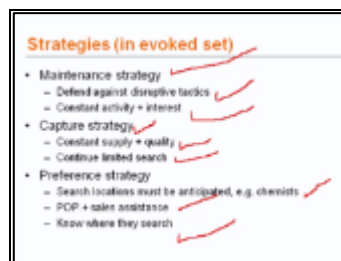


Figure 4.52: Example of pen tool.

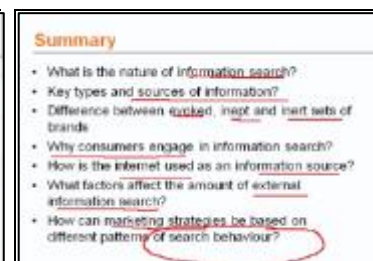


Figure 4.53: Example of underline and drawing tools.

The teacher varied the delivery from the above figures to include diagram slides and she also varied her use of drawing tools. In Figure 4.54 she used the pen and highlighter tool and in Figure 4.55 she used the pointer tool.

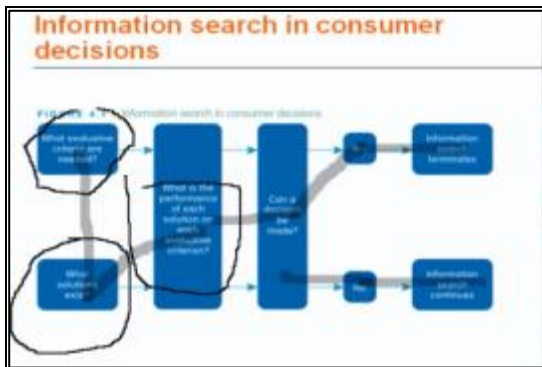


Figure 4.54: Example of pen and highlighter tool.



Figure 4.55: Example of pointer tool.

Natalie also included slides with relevant, on topic, engaging images such as the one in Figure 4.56. In Figure 4.57 she used table slides and a variety of whiteboard tools including the pointing tool and drawing tools in different colours.



Figure 4.56: A topical and engaging image.

	Target market decision making pattern		
	Habitual decision making (no search)	Limited decision making (limited search)	Habitual decision making (extensive search)
Brand position	Maintenance strategy	Capture strategy	Preference strategy
Brand in evoked set	Disrupt strategy	Intercept strategy	Acceptance strategy
Brand in not evoked set			

The table is annotated with hand-drawn circles and checkmarks. The 'Brand in evoked set' row has checkmarks under 'Maintenance strategy', 'Capture strategy', and 'Preference strategy'. The 'Brand in not evoked set' row has checkmarks under 'Disrupt strategy', 'Intercept strategy', and 'Acceptance strategy'. There are also arrows pointing to various cells.

Figure 4.57: Pointing and drawing tool in colours.

Natalie included group brainstorming and participation by asking all learners to complete the tables below in Figure 4.58 with the text tool and in Figure 4.59 with the pointing tool and drawing tool.

The image shows a worksheet titled 'Your problem: "I want to get fit - and I want to do it at a gym."' with a 'Reassessment' section. Below this is a table for 'Task 1' with columns for 'Brand position and Evoked set', 'Evoked set', 'Brand position', and 'Evoked set'. The table contains handwritten entries for 'Club Lime', 'Anytime fitness first', and 'anytime club lime'. There are also handwritten notes and arrows.

Figure 4.58: Learners using the text tool in group activity.

The image shows a worksheet titled 'Your problem: "I want to get fit - and I want to do it at a gym."' with a 'Task 2' section. Below this is a table for 'Task 2' with columns for 'Evoked set', 'Evoked set', 'Evoked set', and 'Evoked set'. The table contains handwritten entries for 'Club Lime', 'Anytime fitness first', and 'anytime club lime'. There are also handwritten notes, arrows, and a legend: 'Legend - ? 1 - poor 10=excellent'.

Figure 4.59: Learners using pointing and drawing tools.

## Non-effective Slides used in Session One

Figure 4.60 (a), (b) and (c) were unengaging lecture slides where the learners grew bored and drew on the slide while the teacher was lecturing.



Figure 4.60(a), 4.60(b), 4.60(c): Uninvited use of the tools.

## Effective Slides used in Session Two

Natalie once again used a variety of slide layouts and a variety of whiteboard tools. In Figure 4.61 she used the pointing tool and in Figure 4.62 the pointing tool and the pen tool. In Figure 4.63 she used relevant images, the pointing tool and the pen tool. Natalie once again included engaging humorous images on her slides. One example is in Figure 4.64. There were no non-effective slides in session two.

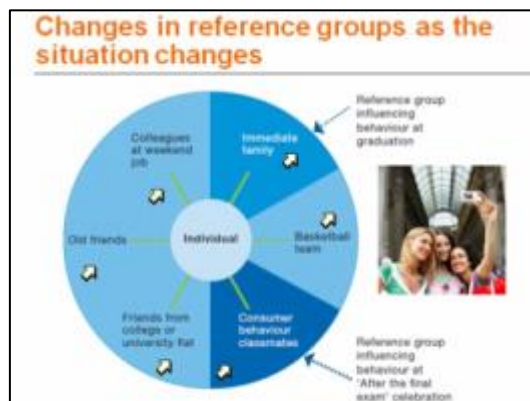


Figure 4.61: Pointing tool.

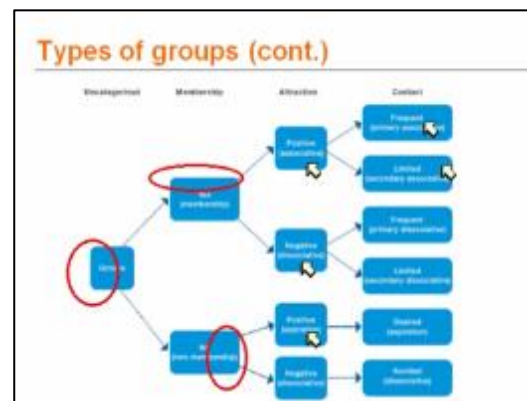


Figure 4.62: Pointing and drawing.

The slide lists two main points: 'Conformity' and 'Norms'. 'Conformity' includes: 'Makes groups influential', 'Is the tendency to want to be like "relevant and significant others"', and 'Generally makes life more pleasant'. 'Norms' includes: 'Are general expectations about behaviours that are deemed appropriate for all persons in a social context, regardless of the position they hold' and 'Are often communicated non-verbally'. There are two images: one of a group of people and one of a person in a social setting.

Figure 4.63: Images, pointing and pen tool.



Figure 4.64: Use of humorous image.

### Effective Slides used in Session Three

Natalie once again used a variety of slides. In Figure 4.65 she used the pointing tool and in Figure 4.66 she used relevant images.



Figure 4.65: Pointing tool.



Figure 4.66: Relevant image.

### Non-effective PowerPoint Slides used in Session Three

Toward the end of the session a learner lost interest in the straight lecture slides and began writing on the slides. On Figure 4.67(a) a learner wrote “CAN” and in Figure 4.67(b) a learner drew flowers.

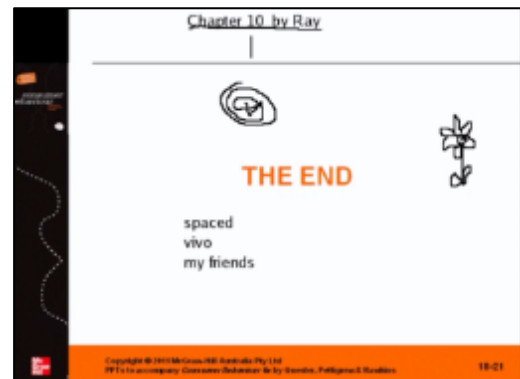
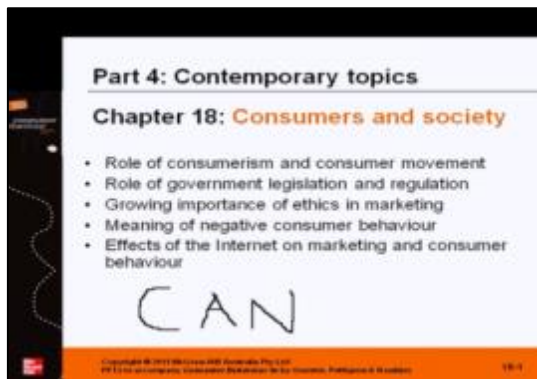


Figure 4.67 (a) and 4.67(b): Uninvited use of tools.

### Learner – Interface (Technology)

Table 4.43 records observations of how learners interacted with the VC on a technical level.

**Table 4.43: Learner – interface (technology).**

	Session 1	Session 2	Session 3
No trouble connecting	y	y	y
No trouble with microphone/audio	y	n	n
Able to use tools	n	y	y
No other technical issues	y	y	y
Learners did not voice frustration with interface	y	y	y
Learners were positive about the VC	y	y	y

n = no, y = yes

In sessions two and three the teacher and learners had problems with the audio and this caused long delays in both sessions. However, once this was resolved the sessions went well.

In the middle of session one, a learner tried to speak but could not due to the learner forgetting to hold the talk button. Once the teacher pointed this out it was rectified. Learner 5 experienced audio issues in the second section and then left the session. In session three a learner could not get their audio to work. In all sessions no learners expressed frustration with the technology.

### ***Learner – Interface (Tools)***

Table 4.44 records observations about how the learners used tools and slides in the VC session.



**Table 4.44: Learner – interface (tools).**

Learner No.	Session 1			Session 2			Session 3		
	B	M	E	B	M	E	B	M	E
Beginning – B, Middle – M, End – E									
Learner 1	c, E, t	A, c, w, E, t	C, w, E, t	*	*	*	*	*	*
Learner 2	A, C, e	a, c, e	A, C, w, e, t	C, e, t	A, C, e, t	A, C	*	*	*
Learner 3	c, t	c, w, e, t	c, w, e	*	*	*	*	*	*
Learner 4	c, e, t	c, w, t	c, e, t	*	*	*	*	*	*
Learner 5	C, w, e, t	*	*	*	*	*	*	*	*
Learner 6	*	a, w	C, W, e, t	*	*	*	*	*	*
Learner 7	c, e, t	A, c, W, e, t	a, C, e	c, e, t	c, t	C, e, t	c, W, e, t	a, e, t	c, e, t
Learner 8	c, e, t	c, w, t	c, e, t	C, t	c, t	c, e, t	c, e, t	a, c, e	c, e, t
Learner 9	a, C, e, t	A, C, w, t	a, e, t	*	*	*	c, e, t	C, e	C, e, t
Learner 10	c, e, t	a, c, w, e, t	c, t	a, c, t	c, e, t	a, C, e, t	*	*	*
Learner 11	w, e, t	a, c, w, t	E, t	*	*	*	*	*	*
Learner 12 (International)	c	c, w, e, t	c, e, t	c, t	t	c, e, t	w, e, t	c, e, t	a, c, W, e, t
Learner 13	c, e, t	c, w, t	c, e, t	c, t	y	c, e, t	w, e, t	c, e, t	a, c, W, e, t
Learner 14	c, e, t	c, w, E, t	c, e	*	*	*	a, c, e, t	c, e	a, w, e
Learner 15 (International)	*	*	*	c, t	a, c, t	e, t	*	*	*
Learner 16 (International)	*	*	*	*	*	*	e, t	c, e	a, C, e, T
What tools were used by all learners?	c, w, t			c, w, t			c, e, t		

a = audio, c = chat, w = whiteboard tools, h = hand raising, e = emoticons, t = tick/yes-cross/no, v = video, (**capital indicates multiple use**)

In session one Natalie requested the researcher to run a “how to” session for the learners prior to her delivery of the first session. This ensured that learners were familiar with the tools prior to commencing the session.

The main tools used by all the learners in this session were chat, tick-yes/cross-no and whiteboard tool with many learners also using the emoticons and the audio. Natalie encouraged the learners to use multiple tools for participation and this helped with engagement as learners could use a tool they felt most comfortable with. Natalie also encouraged group participation by putting up a detailed table and asking the learners to complete this table. This worked well until one of the learners deleted all the work. This could have been overcome by the teacher setting ground rules about the use of the tools. She did comment that “I would have liked it to work better.”

There was one international learner in the session and it was obvious he was hesitant to use the tools; however, Natalie encouraged him throughout the session and by the end he was participating using multiple tools when prompted.

In session two there were delays at the beginning due to the audio tool not working. However, once Natalie commenced the session she asked all the learners for a tick-yes/cross-no to make sure all learners were engaged and knew how to use the emoticons. The main tools used in this session were the chat, tick-yes/cross-no and whiteboard tools with many learners also using emoticons. Only two learners used the audio. Natalie once again allowed the learners a choice of tools to participate in the session.

During this session one of the learners drew a circle on a slide while the teacher was lecturing and rather than ignoring it the teacher addressed this by saying “lovely circle, good on you.” Then a learner drew on the board again and this time the teacher quickly said “stop drawing whoever you are,” and moved on with the lesson. This could have been avoided had she set up some ground rules for using the whiteboard tools.

During the session if any learners did not respond when she posed a question to the group she then called on the learners who did not respond individually by their name. This ensured the learners were attentive through the session.

Session three was also delayed due to the audio issues again. This time while waiting, the learners used the whiteboard tools to draw on the first slide of the session. Once Natalie was ready to commence the session she asked all learners to write in the chat to ensure they were comfortable with the tool and to ensure they were all attentive. She also asked each learner to check their microphone individually.

The tools used by all learners in this session were the chat-yes/cross-no and emoticons and audio (except Learner 9 who did not have a microphone) with some learners using the whiteboard drawing tools.

It was evident by this third session that the teacher was very confident with the tool use and was encouraging the learners to use a wide range of tools. For example, halfway through this session she asked the learners to use a smiley face emoticon for the first time as previously she just used the tick-yes/cross-no. In the second half of session three the teacher asked each learner to contribute information with the rest of the class and to communicate with each other. The teacher commented that “the third session was the best, as learners needed to take control in the second half and discuss journal entries.”

In the learners’ exit survey (learners were able to choose multiple answers) the results listed the emoticons as the most engaging with 62.50%. This was followed by PowerPoint and the teacher’s voice (audio) both scoring 50% and the use of chat (37.5%). Finally, the whiteboard tools scored 3%.

In the end of session poll (see Figure 4.68) the learners listed the tools which engaged them the most as being 46% teacher’s voice (audio), 27% use of chat and then the whiteboard tools at 13%. The use of webcam scored 7%, although the teacher did not use webcam.

In the teacher exit survey Natalie stated the tools she thought engaged the learners were use of chat, PowerPoint and audio. She stated she believed the tools that created a sense of presence were use of chat and audio. The common tool listed in these results by both learners and teachers was the audio (teacher’s voice) and chat.

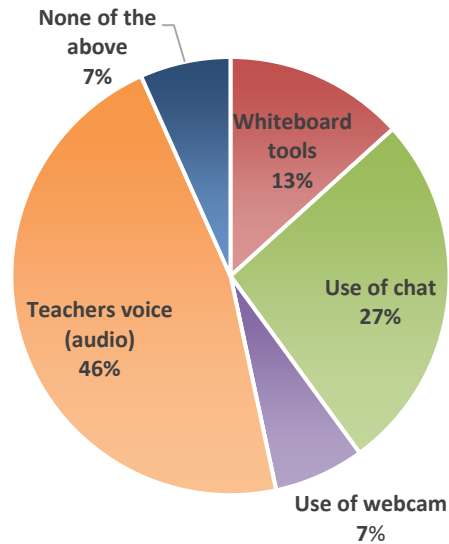


Figure 4.68: Tools which were most engaging for learners

## Learner Autonomy

Table 4.45 represents aspects of the learner autonomy in the sessions.

	Session 1	Session 2	Session 3
Teacher used dialogue with learners	y	y	y
Learners were given options on how they will interact and learn the material	y	y	y
Participation activities were included e.g. chat	y	y	y
Learning was not dependent on teacher	n	n	n
Learners discovered information that they needed for the session rather than being provided all of it	n	n	n
Discussion was not dominated 1 or 2 learners	n	y	n
Learners asked a lot of productive questions	n	y	y
Learners who struggled with technology bounced back and participated	y	y	y
Teacher provided challenges the learners seemed to enjoy the session	y	y	y
Learners seemed to have positive attitude	y	y	y

n = no, y = yes

The sessions were predominantly lecture based; however, the teacher did include regular slides that were interactive and encouraged a great deal of dialogue from the learners. The learners were given the option of multiple tools (audio, chat, whiteboard or emoticons) to participate in most instances.

In session two, one difficult learner tried to disrupt and dominate the session with the audio tool. Natalie used this to engage productive participation from the learner by encouraging the learner to post content related information. The learners were required to brainstorm throughout the sessions and were also provided with a group activity to construct a table using the whiteboard tools.

In all three sessions the international learners were reluctant to participate, particularly in the first section of each session. However, the teacher encouraged these learners and prompted them to participate by calling them by name. All the learners were positive about all sessions.

### Task Switching

Table 4.46 presents the methods employed by the teacher to minimise task switching and maximise attention and focus. Table 4.47 shows when learners had a delayed response to the session.

<b>Table 4.46: Task switching – teacher.</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Introduction captured attention	y	y	y
Use of icebreaker	y	y	y
Rate of delivery was appropriate for learners to remain engaged	y	y	y
Good use of tools by teacher for engagement	y	y	y
Good use of PowerPoint for engagement	y	y	y
Timing of PowerPoint slides was appropriate	y	y	y
Timing of asking learners to use tools was appropriate	y	y	y
Teacher used question/response	y	y	y
Teacher incorporated learner responses	y	y	y
Sufficient variety was used to maintain attention	y	y	y
Lesson required learner thought and participation	y	y	y
Maintained learner attention	y	y	y
Paused to allow learners time for feedback	y	y	y
Conclusion captured attention	y	y	y

n = no, y = yes

**Table 4.47: Task switching – delay or decrease in learner response.**

Learner No.	Session 1			Session 2			Session 3		
	B	M	E	B	M	E	B	M	E
Beginning – B Middle – M End – E									
Learner 1	n	n	y	*	*	*	*	*	*
Learner 2	n	n	n	n	n	y	*	*	*
Learner 3	n	n	n	*	*	*	*	*	*
Learner 4	n	n	n	*	*	*	*	*	*
Learner 5	n	y	*	*	*	*	*	*	*
Learner 6	*	n	n	*	*	*	*	*	*
Learner 7	n	n	y	n	y	n	n	n	n
Learner 8	n	n	n	n	n	n	n	n	n
Learner 9	n	n	y	*	*	*	n	y	y
Learner 10	n	y	y	n	n	n	*	*	*
Learner 11	n	n	y	*	*	*	*	*	*
Learner 12 (International)	y	n	n	n	y	n	n	n	n
Learner 13	n	n	n	n	y	n	n	n	N
Learner 14	n	n	y	*	*	*	n	y	N
Learner 15 (International)	*	*	*	y	n	y	*	*	*
Learner 16 (International)	*	*	*	*	*	*	n	y	n

n = no, y = yes, NA = not applicable, \* = did not participate

At the commencement of session one the teacher used revision questions from the previous face to face class to engage the learners. She used a variety of slides that lasted approximately two minutes per slide and this worked well.

Natalie also allowed for any learner who was hesitant to participate by stating “if you do not want to put a question for all to see just send it to me privately and we will then discuss it.” This ensured those learners who were not confident were still engaged. The teacher used an interactive slide where the learners were encouraged to use the drawing tools and/or put examples in the chat. In this session the international learner (Learner 12) was hesitant to participate at the beginning but the teacher encouraged him throughout the session and as a result he became more engaged.

In the middle of this first session the teacher showed a few bullet point lecture slides in a row and there was a reduction in participation, with two of the fourteen learners showing less engagement. Throughout the session when the teacher had not had participation of any kind from a learner she would call them by name and this worked well to ensure the learners were attentive.

Towards the end of session one, after the delivery of a few straight lecture slides the teacher sensed the learners were growing bored and implemented some humour by stating “if you are getting bored give me a tick.” She hurried these slides through

and this was reflected in the data as fourteen learners displayed less interaction than in the beginning and middle of the session.

In session two the teacher commenced the session by posting revision questions then asked if “anyone [is] game to talk?” When no one responded, she called for learners by name and asked for individual answers. This was great engagement for the beginning of the session.

An international learner who had not participated in the previous session did not interact at the beginning, but once again the teacher encouraged him to participate and he became more engaged towards the middle and end of the session.

Throughout the session Natalie kept asking questions and wanted to see all learners using the tick-yes/cross-no tool. If they did not use this tool she called them by name. At one stage she asked “are you with me? You haven’t run away or texting or going on YouTube. More participation if possible.”

Natalie had a difficult learner and when she was discussing a website she asked the disruptive learner to cut and paste the URL into the chat. When he did not do it straight away she said “he is on his phone which is why he is not doing it.” The learner posted in chat “how does she know what I am doing LOL.” This rapport with the learners assisted her to engage the learners.

The teacher used the pointer tool on diagrams to direct the learners’ attention. She used questions throughout the session to engage the learners. The teacher stated she had a story to share and rather than just telling the story, she asked the learners to tick if they wanted to hear it. The difficult learner did not give her a tick so she commented “be a sport – answers aren’t that crash hot at the moment will have to rev you all up.” This constant encouragement inspired the learners to engage with the session.

At one stage when she invited the learners to use the audio, one learner typed in the chat that his audio was not working. Natalie did not see this in the chat and if she had she could have quickly told him to communicate via chat. This highlights once again the requirement of teachers needing task switching skills when teaching via a VC.

Towards the end of this session Natalie became very direct with her directions. When she posted a question slide she instructed “everyone post in chat – I want a post from each of you.”

In the middle of this second session she showed a few bullet point lecture slides in succession and three out of seven of the learners displayed reduction in engagement.

In session three the teacher regularly asked the learners to use the tick-yes/cross-no tool to make sure they were all engaged. However, about two thirds of the way through the session she asked for a smiley face to show they were there. This use of variety helped maintain learner focus.

In this session the three international learners all engaged right at the commencement of the session and were very engaged towards the end. This was evident in the variety of tools used. By the end they had become confident with participating in the VC.

The teacher used the question and answer format regularly throughout the session and again, asked for a great deal of interactivity with almost every slide by encouraging them to type in chat. In this session she used engaging relevant graphics and then asked for responses. This encouraged a great deal of response.

Natalie ran this session using a different format. The first two thirds of the session adopted the same format as the previous two sessions. However, the last 20 minutes of this session was a sharing session where the teacher asked the learners to consecutively post their favourite chapter either on the whiteboard, chat or by audio. Most of the learners chose to use chat with one choosing to use audio. They were also invited to decide which order to present in by putting their hand up. She waited until everyone had put their hands up and one of the international learners did not put up his hand so she called upon his name. This ensured the international learner's attention but this may have made him uncomfortable. The analytics did show a decline in participation by the learners during this sharing session but that would be expected as the learners were taking turns using the tools.

### **Learner Exit Survey and End of Session Poll Results**

In the learner exit survey 50% stated they were engaged the most in the beginning, 25% in the middle and 25% towards the end. In the end of session poll (see Figure 4.69) 60% of learners listed the middle as being the most engaging, 26.7% stated the beginning and 13.3% towards the end. It appears that engagement dropped in the last section of the sessions. The teacher stated she believed they were most engaged in the beginning of the sessions and least engaged at the middle of the sessions.



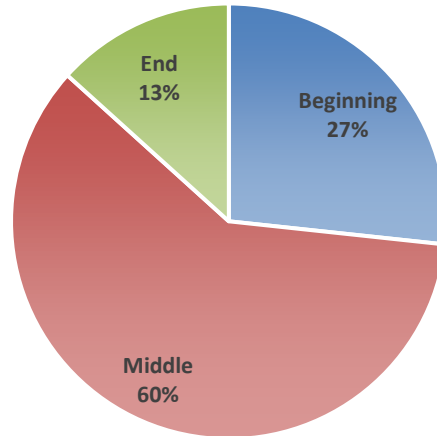


Figure 4.69: Section of the session which engaged learners the most.

In the learner exit survey 75% stated they task switched two to five times, 12.5% task switched five to ten times and 12.5% once which meant all learners task switched. In the end of session poll (Figure 4.70) 53% of the learners reported they task switched two to five times, 20% once, 13.3% none, 7% six to ten times and 7% more than ten times. This would correlate to mean 87% of the learner's task switched.

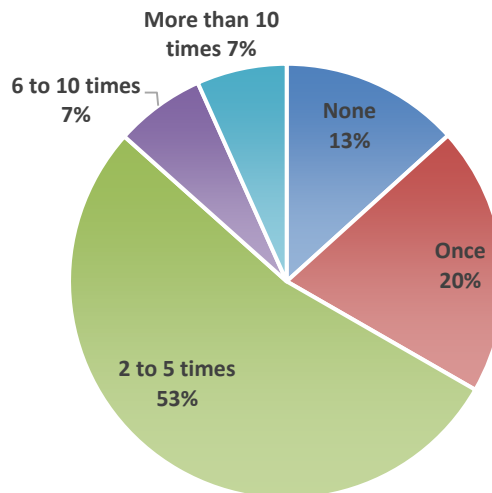


Figure 4.70: Amount of task switching.

In the exit survey, learners listed the tasks they switched with as being 25% text, 25% email, 25% Facebook and text/phone, 25% stated they did two activities (out of Facebook/text/email), 12.5% stated they emailed and Facebooked and 12.5% stated they emailed, Facebooked, text/phone and other tasks.

In the end of session poll (as shown in Figure 4.71) 60% stated they texted/phone, 26% used Facebook, YouTube or similar, 7% watched television and 7% did other activities. The teacher stated she believed that they texted and used Facebook.

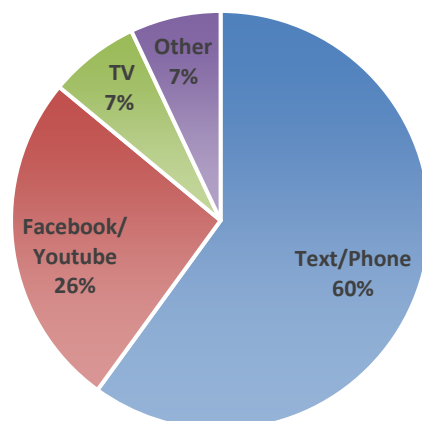


Figure 4.71: Task switching activities.

On being asked if she felt the learners were task switching during her sessions she commented that she felt at some point in the lessons “all learners became involved.” On being asked what could have been improved to encourage attention she stated: “more interaction required, perhaps polling will help and encourage more talking not just chat and icons.”

## **Case Study Eight Conclusions**

### ***Teacher Reflections***

Natalie had participated in a one hour “How to Use the VC for Beginners” session and one on one training session with the researcher. She suggested more Wimba training should be provided during the fortnightly professional development sessions. She would like further training on refining the use of tools. She stated “now that I have completed a few Wimba classes I now know what I need to ‘brush’ up on and where I can improve so just getting on and doing it is the best training of all.” She stated she was aware of all the guides available to her but only used the Wimba Classroom Version 6.0 Presenter guide. She did not list any improvement for the guides.

Other information she would have liked before commencing the sessions were “I still seem to get the recording part mixed up and I really need some practice and

assistance to place the recorded session into the appropriate session.” She did experience technical problems with microphone issues. Tools she used to encourage interaction and focus were “using the chatroom, microphone, learner drawing and YouTube; actually instructing learners beforehand what they need to present when asked to speak.”

### ***Learner Reflections***

Of the 16 learners eight completed the exit survey of which four were female and four male. There was a wide age range with four learners aged 19 to 21, two aged 22 to 25 and two aged 26 to 45. All were full-time learners. Five learners were given headsets by the teacher, two did not use headsets and one purchased it from a shop external from the Institute. Five learners stated that they had been given training prior to commencing a session and stated the training they received was “training on how to use the speakers and connect to Wimba; headpiece set up.” Some learners commented that they would have liked more training. 50% of the learners were aware of the guides. Other information they felt would have helped included “bringing own headphones, the need to have flash player, would have liked a YouTube how to watch video, more on audio in the beginning.” Comments about technology were minimal with only one learner listing that audio was an issue at the beginning.

Other comments listed included:

- well done, I like the idea of virtual for distance education
- people may skip more classes if they know it is recorded and may not get to the lesson
- a reasonable experience
- it doesn't flow yet
- the teacher's thoughts were communicated more
- I loved it; it was more fun than Facebook :).

On listing any improvements, they stated:

- no changes needed
- more interesting slides
- great class, asked us to do more

- found that I was interested in listening to the teacher
- none I found it very engaging
- if we could do more drawing on board
- do not just read out PowerPoint
- have some moving parts or YouTube to increase attention.

### ***Final Comments***

The teacher commented that while the VC took a great deal of effort and time to prepare “perseverance and persistence could be worth it in the long run.” Natalie also stated she was excited about using the VC in the future for “recording assessment information classes.”

## **4.3.3 CASE STUDY NINE**

### **Introduction and Background**

#### ***Background of the Teacher***

The teacher, ‘Belinda’, was female and aged over 55 years. She had worked at the Institute on a full-time basis for 2 to 5 years and was an expert in her content field in the Centre for Science, Forensic and Engineering. Her learners were studying an Advanced Diploma but were first year learners. Belinda had been a participant in some Wimba sessions and also in another platform. She had also taught a few sessions using VET Virtual. She had completed the “Facilitating Learning Online” course. She was aware of the guides and had used them previously. The teacher had wanted to try using the VC last semester but as there was an issue with the learners accessing headsets, this was delayed until this semester. She believed learners task switched sometimes.

#### ***Background of the Learners***

Fifteen learners (eleven females and four males) responded to the entry survey and all were full-time learners. The cohort members were predominantly young with nine aged under 18, two aged 19 to 21 years old and four aged 22 to 25 years old. Eight believed that they always task switched, seven stated that they sometimes task switched and one stated that they never task switched. Twelve learners had never participated in a VC session, one learner previously participated in one or two sessions and one learner had seen a recording of a session.

## Session Details

Belinda recorded only one session. This session was 52 minutes in duration and attracted ten learners. The content delivery method involved the teacher using lecture slides with audio. The teacher also used a USB microscope in the webcam.

## Data Analysis

### Structure

The data in Table 4.48 were collected to analyse the effectiveness of the teacher's class management, content organisation and presentation in a VC context.

**Table 4.48: Classroom management/content organisation/presentation.**

<b>Classroom Management</b>	<b>Session 1</b>
Began on time in an orderly organised fashion	n
Set ground rules for behaviour	y
Did not digress from main topic	y
Appeared well prepared for class, clearly organised and explained activities	y
Provided opportunities for dialogue about the activity with learners and/or self	y
Provided sufficient wait time	y
Allowed opportunity for individual expression	n
Was able to admit error/insufficient knowledge and respected constructive criticism	y
Responded to distractions well	y
Gave prompt attention to individual problems	y
Completed session in required time frame	n
<b>Content Organisation</b>	<b>Session 1</b>
Good lesson plan with clear goal of lesson, introduction, body, conclusion.	y
Use of lecture	y
Use of questioning	y
Engaging PowerPoint slides	y
Teacher method appropriate for content	y
Made course relevant to real world experience	y
Explained difficult terms in more than one way	y
Learners collaborated as a group e.g. brainstorming	y
Any problem solving activities	n
Any other approaches	y
<b>Presentation</b>	<b>Session 1</b>
Spoke confidently with good voice quality	y
Communicated a sense of confidence, enthusiasm and excitement towards content	y

n = no, y = yes

Unfortunately, there was the technical issue of audio not working correctly at the beginning of the session. This was due to the Wimba wizard needing to be run. The teacher's old computer was also extremely slow. This delayed the session from commencing for 20 minutes. The session had a clear introduction, body and conclusion. The teacher started the session with VC ground rules and a brief summary of how to use the tools. She stated she did this because "I do not want them scribbling all over the place so I wanted to run through the VC etiquette at the start of the lesson."

Belinda was very confident about her content knowledge and this was evident throughout the session. The first half of the session was lecture slides with no participation from the learners. However, she then encouraged participation by asking one of the learners to draw a maggot using the whiteboard tools. There was an issue where she had not released this tool to the learner but this was resolved. When the learner was finally able to use the text drawing tool, text ran off-screen. The teacher overcame this by drawing it herself but this caused a delay in the content delivery. In the last section she used a USB microscope to show a maggot and a fly and she invited the learners to participate by using chat to comment on these microscope pictures.

While it was obvious she had planned the content and delivery methodology for the session, unfortunately, there were a few issues with the flow of the session. This included the delay in her computer displaying slides, due to the age of the computer, and knocking over the USB microscope just prior to the session. She also was not familiar with the Wimba tool location and this delayed the session at times.

## Dialogue

The data in this section were collected to analyse the interactions between the teacher, learner, content and interface.

### *Teacher – Learner Dialogue*

The following Table 4.49 records observations of the interactions between the teacher, learner and content.

	Session 1
Teacher was positive and confident about the topic	y
Teacher checked learner comprehension	y
Teacher knew and used learner names	y
Teacher responded to learners as individuals	y
Teacher praised learners for contributions	y
Teacher encouraged questions, involvement, debate or feedback	y
Teacher encouraged learners to answer questions by providing cues or encouragement	y
Teacher feedback was informative and constructive	y
Teacher listened carefully to comments and questions	y
Teacher answered questions clearly/directly	y
Teacher recognised when learners did not understand	y
Teacher had a good rapport with learners	y
Treated members of class equitably and did not criticise learners	y
Learners asked questions of the teacher	y
Learners volunteered information	n
Learners presented information	y
Learner feedback was on topic	y

n = no, y = yes

Belinda was familiar with the class and had a good rapport with the learners. She knew and used the names of the learners. The session was predominantly teacher led. In the first half of the session there was no participation by the learners but by the second half she encouraged participation. The learners dialogued with the teacher predominantly using audio and the chat tool. The learners volunteered information only when prompted by the teacher.

### ***Learner – Learner Dialogue***

The data in Table 4.50 record how learners interacted with each other in the VC.

	Session 1
On task academic discussions with each other	n
Off task academic discussions	n
Social discussions	n
Learners encouraged each other	y
Learners used each other's names	y
Did not criticise each other	y
Learners maintained good rapport/mutual respect and treated each other equitably	y

n = no, y = yes

There was no dialogue amongst the learners in the first half of the session. In the second half of the session, there was dialogue and encouragement including using the whiteboard tools and using the chat to complete the drawing. They also discussed the webcam USB microscope images.

### ***Learner – Content Dialogue***

Table 4.51 records observations of the interaction between the learners and the content.

	Session 1
Reading	y
Listening	y
Writing e.g. on whiteboard or chat	y
Presentation – verbal, graphical	y
Discussions	y
Responded to questions	y
Participated in polls	NA

n = no, y = yes, NA = not applicable

In the session the learners participated by listening to the teacher, reading the slides, using the whiteboard to draw a maggot and by using the chat to comment on the USB microscope slides. They also used audio to answer questions.

### **Interface (Technology and Tools)**

The following data represent the use of the VC as the communication medium and how the teacher and learners interacted with the technology

### **Teacher – Interface (Technology)**

Table 4.52 displays how the teacher interacted with the technological aspects of the VC.

	Session 1
No trouble connecting	n
No trouble with microphone	n
Able to use tools	n
Able to use recording	y
No other technical issues	n
Teacher did not voice frustration with interface	y
Teacher was positive about the use of the VC	y

n = no, y = yes, NA = not applicable

The teacher had technical issues which caused many delays in delivering the session. However, this was the first time the teacher had used the VC with a USB microscope (in fact, this might have been a world first). Due to this the teacher was very nervous.

A major technical issue of audio and microphones not working correctly was a common theme in iteration two and affected both the teacher and the learners. This was due to compatibility issues at the Institute as Wimba and the Wimba wizard need to run on the computers prior to commencing the sessions. This could have been overcome by ensuring the learners had completed this the day prior. Regarding the teacher's computer not working, the Flex:Ed staff member who was in the room assisting with the session commented that she suspected it had to do with Windows 7 and also that "the computer she's running on now must be the slowest one in the whole of the Institute".

The teacher also had issues releasing the drawing tools and showing the USB microscope webcam to the learners. Due to all these issues the teacher expressed slight frustration during the session and also in the exit interview. Having the Flex:Ed teacher in the room for assistance ensured the session continued flowing. Despite these multiple technical issues, the teacher did very well to remain calm and focused to complete the session.

### **Teacher – Interface (Tools)**

Table 4.53 records observations about the teacher's use of the tools and slides in the VC session.



Table 4.53: Teacher – interface (tools).	Session 1
PowerPoint – how many and how often?	11 slides in 11 minutes, 1 minute per slide and 2
Tools used	USB microscope slides WC, A, c, W,
How often were tools used?	Audio regularly
Tools were used effectively	n

n = no, y = yes, NA = not applicable, a = audio, c = chat, w = whiteboard tools, wc = webcam, h = hand raising, e = emoticons, t – tick/yes- cross/no, v = video, o = other, \* did not participate, (**capital indicates multiple use**)

## Tools

Belinda had to be reminded to start the recording after being prompted by a learner. At the beginning of the session Belinda used the audio and PowerPoint slides with limited input from the learners. In the middle section she created a blank slide and wanted the learners to do some drawing. However, she had not released the drawing tools to the learners nor did she know how to. She expressed some frustration by stating “well this is challenging. No, not going to work, sorry.” The Flex:Ed staff member stepped in and gave the learners access. This caused a delay of many minutes. This could have been overcome by the teacher practising using the tools. She had used a previous VC platform but had not practised with this tool in Wimba. The learner then tried to draw and unfortunately it went to the right hand side of the screen, so it could not be seen. The teacher then drew the picture herself.

At the end of the session Belinda used the USB microscope in the webcam tool to show a maggot and a fly. Unfortunately, while she had set it prior to the session, just before the session commenced she knocked it over. This caused delays as she had to set it up again for the learners to view. The Flex:Ed staff member observed

While Belinda was starting to show the video from the microscope, lots of the learners were scribbling on the whiteboard and adding images, so I ended up disabling them all when it got out of hand. I do not think Belinda had any idea as I gather she was watching the video image on full screen.

This delay offered the learners the opportunity to task switch from the session, so in some ways the ability to draw on the board was still engaging them in the VC. Belinda also did not know how to allow the learners to view the webcam initially and this caused delay. Once they could see the images, it was in full screen and very pixelated and difficult to see. The Flex:Ed staff member informed Belinda and she

quickly switched back to the small screen overlay on the Wimba page. This worked well as the learners were able to see the images and use the chat to post answers to the teacher's questions.

These issues occurred because it was the first time the microscope was used in a VC. In the future Belinda will be aware of these issues and know how to give the learners access to watch the images but also to keep it small screen for less pixelation.

### **Slides**

Belinda used PowerPoint slides at the beginning of the session. She showed 11 slides each averaging a minute. She did not use the pointing tool or any whiteboard tools and this would have made the lecture slides more engaging. However, she did use graphic images on the slides and these captured the learners' attention.

### **Effective Slides used in Session One**

Figure 4.72 was an example of the teacher using a graphic image to engage the learners and Figure 4.73 was an example of the teacher using multiple images on the one slide to engage the learners.



Figure 4.72: A graphic image.



Figure 4.73: Example of multiple image use.

### **Non-Effective Slides used in Session One**

Figure 4.74 was the entry slide to the room. The teacher did not put up the slides until twenty minutes into the session, after the audio issues were resolved. This did not encourage the learners to remain in the room. Figure 4.75 was a straight lecture slide and the teacher did not use any drawing tools to capture the attention of the learners.



Figure 4.74: Introductory Wimba slide.

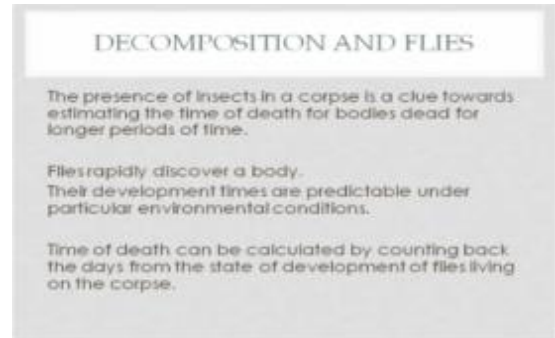


Figure 4.75: A lecture slide.

Figure 4.76 was a blank slide where the teacher asked a learner to draw a picture of a maggot. However, you will see that the image was off the screen to the bottom right. The teacher took over, drew a picture and this did not encourage engagement or participation by the learners. Figure 4.77 was the blank screen that the teacher had displayed while she was trying to set up the USB webcam. This blank slide encouraged the learners to use the drawing tools while waiting.



Figure 4.76: Learners drawing off-screen.

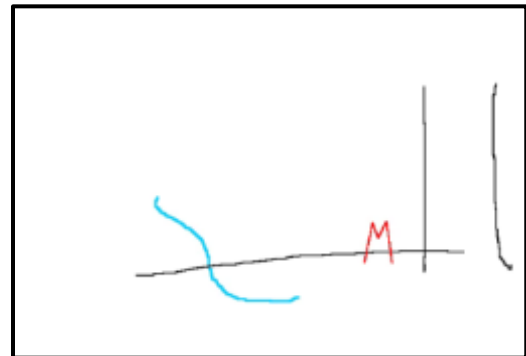


Figure 4.77: learners using the drawing tool uninvited.

### **USB Microscope**

Figure 4.78 was the last slide of the PowerPoint slides. This was used to introduce the use of the USB microscope images. This slide encouraged the learners to engage with the slides.

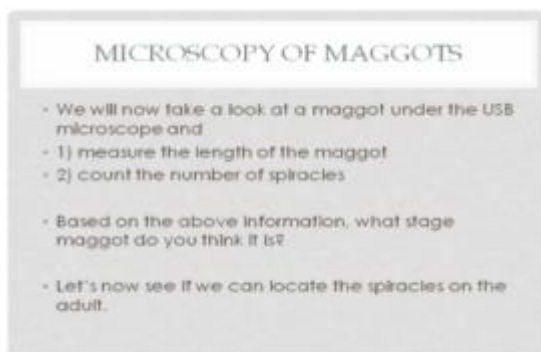


Figure 4.78: Introduction slide to the USB microscope.

Figure 4.79 was the USB webcam image blown to full size and the image was not clear. The teacher commented that “the video looks much better in a small window as the resolution is very poor.”



Figure 4.79: USB microscope image full screen.

Figure 4.80 is the teacher using the USB microscope at the original webcam size with a blank screen in the background. This ensured the attention was just on the microscope image.

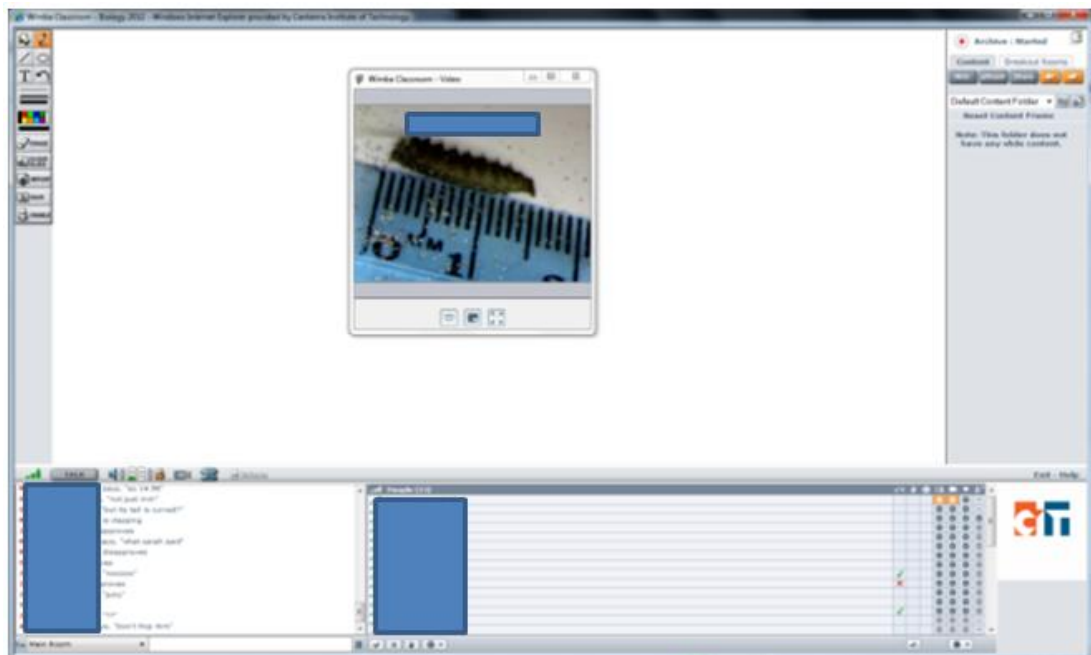


Figure 4.80: Wimba room with blank screen and USB microscope slide.

Figure 4.81 shows the teacher using the USB microscope image with the PowerPoint slide in the background to remind the learners how to check the sizing of the specimen.

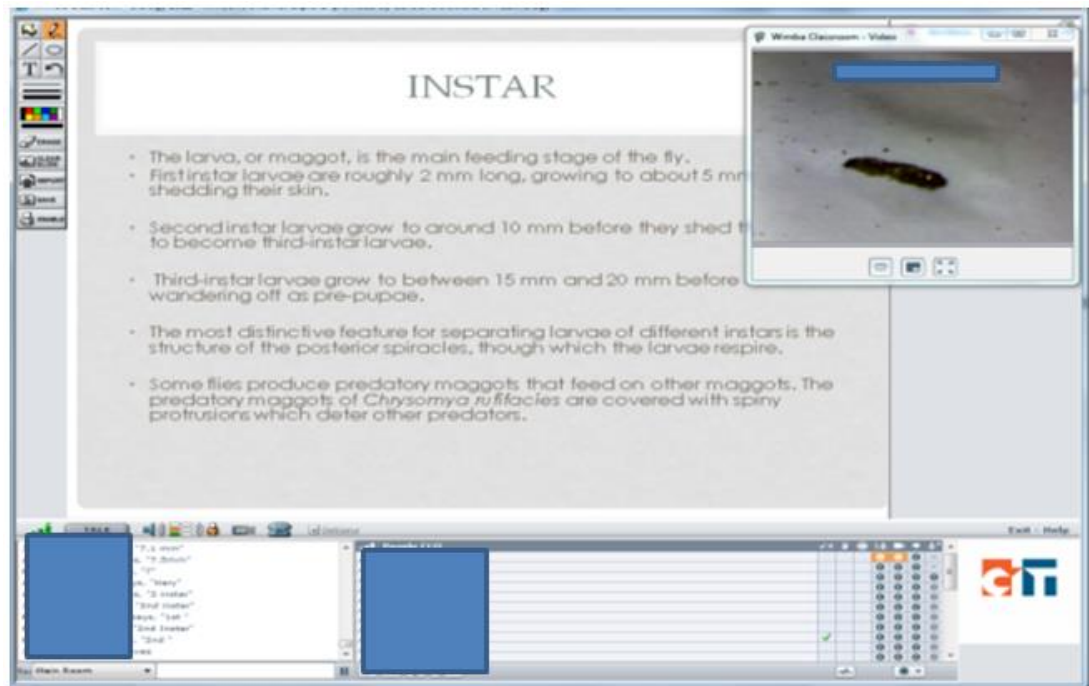


Figure 4.81: USB microscope with PowerPoint slide in the background.

When the teacher was asked if she felt the USB microscope tool was effective in the VC she commented

The USB microscope has great potential. I experienced problems because the focus control was very difficult to change. At first I had the microscope mounted on a stand but when I tried to focus the specimen, the microscope and stand toppled over. I think the learners are more likely to get distracted while they are waiting for me to rectify these problems.

In response to being asked if the USB microscope provided all the features necessary to deliver her session, the teacher replied “in theory yes, but in practice I had trouble focussing and obtaining the optimal magnification.” The teacher also stated the learners were attentive once the images were displayed correctly. She also felt that a huge advantage in having the USB microscope in the VC was that it was a safe environment to demonstrate the morphological features. The teacher suggested that for future sessions it would be great to have the help of a laboratory technician.

## Learner – Interface (Technology and Tools)

### *Learner – Interface (Technology)*

Table 4.54 records observations of how learners interacted with the VC on a technical level.

<b>Table 4.54: Learner – interface (technology).</b>		<b>Session 1</b>
No trouble connecting		n
No trouble with microphone/audio		n
Able to use tools		y
No other technical issues		y
Learners did not voice frustration with interface		y
Learners were positive about the VC		y

n = no, y = yes

Most of the learners had difficulty getting into Wimba for the first 20 minutes of the session due to having to run the Wimba wizard. However, once this was resolved there were no further issues. Some of the learners also could not view the USB microscope pictures clearly but this was due to the teacher having it in a large screen. Once it was reduced to the smaller size it worked much better. The learners were positive throughout the session despite the technical issues as they were aware this was the first VC session that used a USB microscope.

### *Learner – Interface (Tools)*

Table 4.55 records observations of which tools and how often each learner used these tools in the VC sessions.

**Table 4.55: Learner – Interface (Tools)**

<b>Learner No.</b>	<b>Session 1</b>		
	<b>B</b>	<b>M</b>	<b>E</b>
<b>Beginning – B, Middle – M, End – E</b>			
Learner 1	c, h, t	a, c, W	a, C
Learner 2	h, t	a, c, W	C
Learner 3	h, e, t	c, W, e	C
Learner 4	c, E	c, W	C, e
Learner 5	a, h, e, t	a, c, W	NA
Learner 6	a, c, h	a, c, W	a, C, e
Learner 7	a, h, t	a, c, W	a, C, e
Learner 8	c, h, e	a, c, W	C
Learner 9	h, t, e	a, c, W	C
Learner 10	a, c, h, e, t	a, c, W	a, C, e, t
What tools were used by all learners	c, h, t		
How often were the tools used by the learners?	Frequently		

NA = not applicable, a = audio, c = chat, w = whiteboard tools, h = hand raising, e = emoticons, t = tick-yes/cross-no, (**capital indicates multiple use**)

The learners predominantly used the chat feature, the tick-yes/cross-no tool and the whiteboard drawing tool. The learners did not get an opportunity to use many of the tools in the first half of the session except for the initial tick-yes/cross-no and hands up. However, in the second half of the session they all used the whiteboard tools and in the final section they used the chat tool extensively.

In the exit survey the learners listed the tools which engaged them most as the teacher’s voice at 66.7% and emoticons and webcam at 33.3% each. In the end of session polls 50% of the learners listed the tools that engaged them the most as the whiteboard tools at 50%, emoticons at 29%, use of the chat at 14% and the PowerPoint slides at 7% (see Figure 4.82).

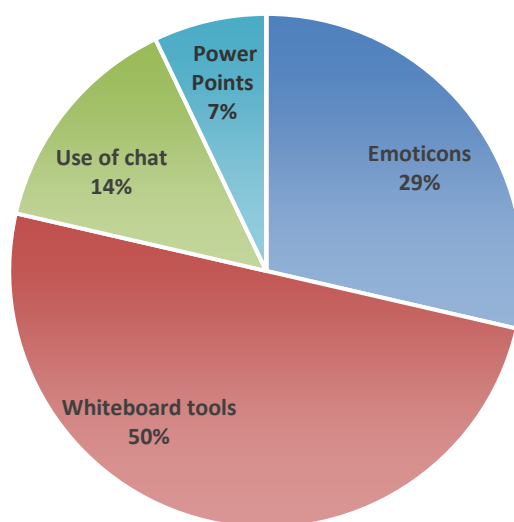


Figure 4.82: Tools which were most engaging for learners.

## Learner Autonomy

Table 4.56 represents aspects of the learner autonomy in the sessions.

	Session 1
Teacher used dialogue with learners	y
Learners were given options on how they will interact and learn the material	n
Participation activities were included e.g. chat	y
Learning was not dependent on teacher	n
Learners discovered information that they needed for the session rather than being provided all of it	n
Discussion was not dominated 1 or 2 learners	n
Learners asked a lot of productive questions	n
Learners who struggled with technology bounced back and participated	NA
Teacher provided challenges the learners seemed to enjoy the session	y
Learners seemed to have positive attitude	y

n = no, y = yes, NA = not applicable

Belinda did not encourage learner autonomy. The session was teacher led. She also did not offer the learners a choice of how to participate. However, the learners did get to participate in drawing a maggot and also by using the chat to respond to the USB microscope pictures.

### Task Switching

Table 4.57 presents the methods employed by the teacher to minimise task switching and maximise attention and focus. The following Table 4.58 shows when learners had a delayed response to the session.

<b>Table 4.57: Task switching – teacher.</b>	Session 1	
Introduction captured attention	y	
Use of icebreaker	n	
Rate of delivery was appropriate for learners to remain engaged	y	
Good use of tools by teacher for engagement	n	
Good use of PowerPoint for engagement	y	
Timing of PowerPoint slides was appropriate	y	
Timing of asking learners to use tools was appropriate	y	
Teacher used question/response	y	
Teacher incorporated learner responses	n	
Sufficient variety was used to maintain attention	y	
Lesson required learner thought and participation	y	
Maintained learner attention	y	
Paused to allow learners time for feedback	y	
Conclusion captured attention	y	

n = no, y = yes

**Table 4.58: Task switching – delay or decrease in learner responses.**

<b>Learner Number</b>	<b>Session 1</b>		
	B	M	E
Beginning – B, Middle – M, End – E			
Learner 1	y	n	n
Learner 2	n	n	y
Learner 3	n	n	y
Learner 4	n	n	n
Learner 5	n	y	y
Learner 6	n	n	n
Learner 7	n	n	n
Learner 8	n	n	y
Learner 9	n	n	y
Learner 10	n	n	n

n = no, y = yes

The teacher commenced the session by asking the learners to engage with the tick-yes/cross-no and hands up tool. She also clearly explained how to use the tools and when she expected them to use tools. Some of the learners had participated in a previous “How to Use Wimba Tools” session so they were confident in the tools.

She did not use an icebreaker but the content was engaging from the first slide. The beginning of the session was teacher led with the use of PowerPoint slides and



the audio (teacher's voice). The learners were not asked to use any tools in this section except for the chat tool. The teacher did change slides regularly and this helped maintain learner attention. However, the teacher could have used the pointer tool or the drawing tool to encourage the learners to focus on the slides. The teacher also used graphic images to capture the learners' attention. The teacher included limited questions and answers and explained that she maintained learner attention by "directing my questions to particular learners. All the learner names are there to see!"

In the middle she did try to encourage learner interaction by putting up a blank screen and asking a learner to draw an image. She was then intending to ask other learners to interact; however, this did have some issues which caused delays.

The first issue was the teacher not knowing how to give the learners access to the drawing tools. The second issue was the learner drawing to the right of the screen (a Wimba issue). The teacher, however, then decided to draw on the board herself. During these delays the learners could have been tempted to task switch. In the middle section one learner displayed a reduction in interaction.

At the end the session, the teacher used a USB microscope plugged into the webcam to show zoomed images of a maggot and a fly. However, due to accidentally knocking it over just before the session commenced she had trouble and commented "I tried to hold the microscope in my hand and focus with the other hand but any slight movements caused it to go out of focus. I think the learners are more likely to get distracted while they are waiting for me to rectify these problems."

At the end of the session, three learners had a reduction in engagement. However, the teacher believed that once the images were displayed correctly they were engaged. She stated "you may see from some of the comments (text) that they thought the maggot was alive."

## Learner Exit Survey and End of Session Poll Results

In the exit survey 50% of the learners listed the middle sections as most engaging with 33.3% the beginning and 16.7% the end (multiple responses were allowed). In the end of session poll the learners listed the end as most engaging at 64% and the middle at 36% (see Figure 4.83). These results showed that the middle and end sections was the most engaging and this was where the learners were drawing a maggot, and also the start of the USB slides being shown.

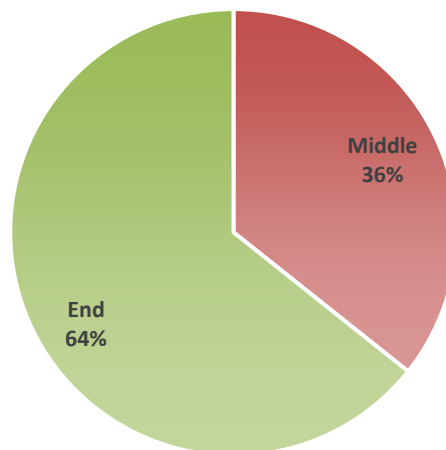


Figure 4.83: Section of the session which engaged the learners the most.

In the learner exit survey, 71.5 % of the learners stated they task switched with 16% stating they task switched more than 5 times. In the end of poll survey (see Figure 4.84) 64% responded that they task switched.

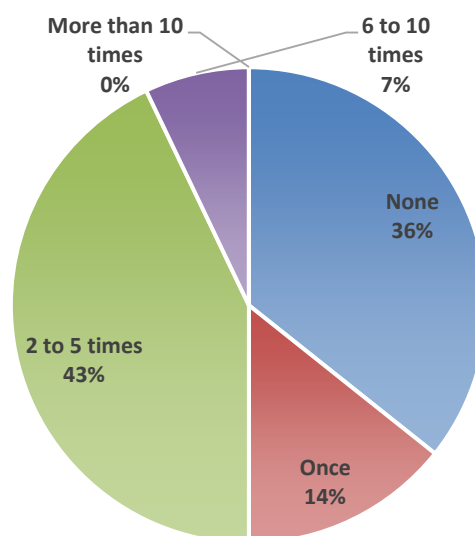


Figure 4.84: Amount of task switching.

In the exit survey 40% of the learners stated that when task switching they used Facebook, 20% email, 20% phone/text and 20% stating they did at least two of these tasks. In the end of session polls (see Figure 4.85) 65% stated they texted, 21% looked at Facebook or similar and 14% did other tasks.

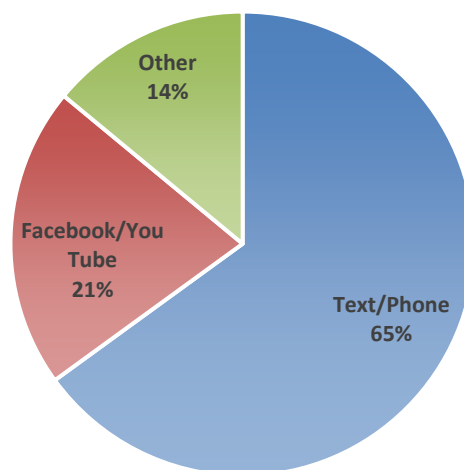


Figure 4.85: Task switching activities.

## **Case Study Nine Conclusions**

### ***Teacher Reflections***

Belinda did not complete an exit survey but did provide comprehensive feedback in an interview.

### ***Learner Reflections***

Of the ten learners who participated six (five female and one male) completed the exit survey. The learners were a young cohort with one aged under 18, four aged 19 to 21, and one aged 22 to 25 years. Five were full-time learners and one was part-time. Two learners purchased their headset from the Institute bookshop, two from an external shop, one already had a set and one was given a headset by the teacher.

Three learners stated they had been given training prior to the session and stated the training they received was “setting up microphones, practice session, an introduction to it online, how to use it basics.” One learner commented they would have liked more time to practise before using it. Half of the learners were aware of the guides. Other information they felt would have helped included “information about the microphone, getting headset.” Comments about technical problems

included “VC was not compatible on whatever player it uses on my Mac, seeing the slide but then it got better, yes audio to work.”

On being asked how the teacher could have improved the session the responses were:

- the online sessions were very good, I can think of no way to improve them
- to get us to do more
- yes, having an observing teacher on hand to control others
- not the teacher but it was distracting when technical problems arise
- better pictures
- no, the teacher was really good.

Other comments listed were “overall not too bad experience not recommended for younger or out of control or people who have trouble concentrating, I found this tool very useful.”

### ***Final comments***

The teacher commented that it was difficult managing the microscope USB while in the VC and stated in the future she would “enlist the help of a laboratory technician.”

## **4.3.4 CASE STUDY TEN**

### **Introduction and Background**

#### ***Background of the Teacher***

The teacher, ‘Greg’, was male, aged between 35 to 44 years. He had worked at the Institute on a full-time basis for two to five years and was an expert in his content field of Mathematics in the Centre for Information, Communication and Technology. His learners were studying a Certificate IV. Greg had been a participant in some Wimba sessions and had also taught a few sessions in another platform. He had completed the Facilitating Learning Online course. He was aware of the guides and had used them previously. He believed learners always task switched.

#### ***Background of the Learners***

No learners completed the entry survey.

## Session Details

Greg delivered three sessions. These sessions were conducted by the teacher for the learners to participate on a voluntary basis for extra assistance. In the previous semester the teacher had conducted these sessions in a face to face classroom using a SMART board. The teacher tried to emulate these face to face sessions by using the audio with the whiteboard as a SMART board. The first session was 46 minutes in duration and attracted four learners, the second session lasted 53 minutes and the third session 36 minutes with both attracting three learners in each session.

## Data Analysis

### Structure

The data in Table 4.59 were collected to analyse the effectiveness of the teacher's class management, content organisation and presentation in a VC context.

**Table 4.59: Classroom management/content organisation/presentation.**

<b>Classroom Management</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Began on time in an orderly organised fashion	y	y	n
Set ground rules for behaviour	n	n	n
Did not digress from main topic	y	y	y
Appeared well prepared for class, clearly organised and explained activities	y	y	y
Provided opportunities for dialogue about the activity with learners and/or self	y	y	y
Provided sufficient wait time	y	y	y
Allowed opportunity for individual expression	y	y	y
Was able to admit error/insufficient knowledge and respected constructive criticism	y	y	y
Responded to distractions well	y	y	y
Gave prompt attention to individual problems	y	y	y
Completed session in required time frame	y	y	y
<b>Content Organisation</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Good lesson plan with clear goal of lesson, introduction, body, conclusion.	y	y	y
Use of lecture	y	y	y
Use of questioning	y	y	y
Engaging PowerPoint slides	n	n	n
Teacher method appropriate for content	y	y	y
Made course relevant to real world experience	y	y	y
Explained difficult terms in more than one way	y	y	y
Learners collaborated as a group e.g. brainstorming	n	n	n
Any problem solving activities	y	y	y
Any other approaches	y	y	y
<b>Presentation</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Spoke confidently with good voice quality	y	y	y
Communicated a sense of confidence, enthusiasm and excitement towards content	y	y	y

n = no, y = yes

The sessions were designed to be teacher led. The teacher was very confident in his knowledge of the topic and this was evident in all sessions. The sessions did not have an introduction, body and conclusion. Instead, the session was divided into sections to address individual mathematical questions.

The teacher did not use a great deal of variety but rather each session was delivered predominantly using the audio (teacher’s voice) with the mathematical equations on the whiteboard. The teacher did use real world examples to explain the equations, for example, a car falling off a cliff.

The teacher commented after his first session that “we had our first session today. It seemed to go quite well, I think. Only four learners online, but hopefully there will be more next week. I’m going to run them weekly, until the end of the semester.”

At each session the teacher improved in his confidence with the tools.

## Dialogue

The data in this section were collected to analyse the interactions between the teacher, learner, content and interface.

### **Teacher – Learner Dialogue**

The data in Table 4.60 record how teacher interacted with the learners in the VC.

Table 4.60: Teacher – learner dialogue.	Session 1	Session 2	Session 3
Teacher was positive and confident about the topic	y	y	y
Teacher checked learner comprehension	y	y	y
Teacher knew and used learner names	y	y	y
Teacher responded to learners as individuals	y	y	y
Teacher praised learners for contributions	y	y	y
Teacher encouraged questions, involvement, debate or feedback	y	y	y
Teacher encouraged learners to answer questions by providing cues or encouragement	y	y	y
Teacher feedback was informative and constructive	y	y	y
Teacher listened carefully to comments and questions	y	y	y
Teacher answered questions clearly/directly	y	y	y
Teacher recognised when learners did not understand	y	y	y
Teacher had a good rapport with learners	y	y	y
Treated members of class equitably and did not criticise learners	y	y	y
Learners asked questions of the teacher	y	y	y
Learners volunteered information	y	y	y
Learners presented information	n	n	n
Learner feedback was on topic	y	y	y

n = no, y = yes

Greg was familiar with the learners and used learner names. He praised learners when they made positive contributions and encouraged those who needed it. When there was a pause in answering questions, he was quick to give hints to encourage the

correct answer and if this was not understood he would explain it in an alternative way.

In the first session the learners interacted only when prompted. However, as their confidence grew in the final sessions they were asking questions and volunteering answers.

### ***Learner – Learner Dialogue***

The data in Table 4.61 record how learners interacted with each other in the VC.

<b>Table 4.61: Learner – learner dialogue.</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
On task academic discussions with each other	n	n	n
Off task academic discussions	n	n	n
Social discussions	n	n	n
Learners encouraged each other	NA	NA	NA
Learners used each other's names	NA	NA	NA
Did not criticise each other	NA	NA	NA
Learners maintained good rapport/mutual respect and treated each other equitably	NA	NA	NA

n = no, y = yes, NA = not applicable

The teacher did not encourage any dialogue or interaction among the learners.

### ***Learner – Content Dialogue***

Table 4.62 records observations of the interaction between the learners and the content.

<b>Table 4.62: Learner – content dialogue.</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Reading	y	y	y
Listening	y	y	y
Writing e.g. on whiteboard or chat	y	y	y
Presentation – verbal, graphical	n	n	n
Discussions	n	n	n
Responded to questions	y	y	y
Participated in polls	NA	NA	NA

n = no, y = yes, NA = not applicable

In all sessions the learners interacted with the content by listening to the teacher's voice, reading the text, viewing drawings on the whiteboard, responding to questions and by communicating verbally. In the second and third sessions the teacher began asking the learners to use the chat, tick-yes/cross-no and emoticons for participation.

### **Interface (Technology and Tools)**

The following data represent the use of the VC as the communication medium and how the teacher and learners interacted with the technology

### **Teacher – Interface (Technology)**

Table 4.63 displays how the teacher interacted with the technological aspects of the VC.

	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
No trouble connecting	y	y	n
No trouble with microphone	y	y	n
Able to use tools	n	y	y
Able to use recording	n	y	y
No other technical issues	n	y	y
Teacher did not voice frustration with interface	n	y	y
Teacher was positive about the use of the VC	y	y	y

n = no, y = yes

Greg had some issues with the recordings. In the first session Greg used the audio before the session was ready to commence and therefore in the recording the first three minutes displayed a blank screen with no audio. In the third session Greg had issues getting his audio working for the first 2.5 minutes and therefore the learners were in the room with no audio. However, this time Greg had already typed information on the whiteboard so this was visible to the learners. The recording was also blank for the first 2.5 minutes but this time there was text on the screen. At the end of the first session he went to save and realised he did not know how to do this so stated to the class “I want to save – does anyone know how to save it on this thing?” He then worked out how to save. This could have been avoided if Greg had participated in a “How to Use the VC” session.

The teacher also had difficulty in the first session with the tools (see detailed information in the next section) and did express some frustration, but he remained positive and commented that he would be better next session.

### **Teacher – Interface (Tools)**

Table 4.64 records observations about the teacher’s use of the tools and slides in the VC session.

	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Whiteboard slides PowerPoint – how many and how often	2 slide with additions to the slides – average 4 min per change	19 slides with additions to the slides -average 2.5 minutes per change	12 slides with additions to the slides -average 3 min per change
Tools used	A, W	A, W	A, c, W
How often were tools used	Frequently	Frequently	Frequently
Tools were used effectively	n	n	n

n = no, y = yes, a = audio, c = chat, w = whiteboard tools, (**capital indicates multiple use**)



In the first session it was evident the teacher was not confident in the VC tools and he did not encourage the learners to use emoticons. Instead he encouraged them to use their audio. He was also not confident in the use of the whiteboard drawing tools and in the first session used only basic black and white text. However, this improved each session as his confidence grew and by the final session he was using different colours for the drawing tools, chat and emoticons. He also encouraged the learners to use the chat and emoticons.

The teacher also had some technical difficulty in the first session with the tools. The first issue occurred half way through the session when the text became larger. The teacher commented in the session “I have no idea why larger print but I do not know how to change it so just going to roll with it.” The print was still a readable size so this did not affect the session.

Towards the end of the first session he had typed the wrong number on the board and commented “whoops, do not know how to delete so I will just put a line through it.” On the same slide he then tried to type a number and accidentally put a highlight box on the screen and commented “just wanted a line, not sure why I got the box.” He then commented that this was the first time he had run a session so was very new to these tools.

The second issue occurred in the middle of the first session, when he was typing towards the bottom of the screen and then towards the end of the session, when he typed text on the right hand side of the screen. While the learners in the session could see this text it did not appear in the recordings. After the first session Greg commented

I’ve just checked the archives and one surprise is that the whiteboard I see live is not the same as what I see in the recording. In particular the far RHS of the board is not appearing. So some of the things I wrote can’t be seen on the recording.

However, in session two and three Greg resolved this by typing only at the top left hand side of the screen and making screen changes more frequently.

There was also a delay while Greg was writing on the whiteboard as the text did not appear until he pressed the enter button. This caused a delay of up to 30 seconds. However, in the second session he started entering one line at a time and this worked

well. He continued this in the third session. Also, before the learners entered the third session, Greg had the first question already typed on the board ready to begin.

The teacher commented “the only tools I used were the whiteboard and voice. The learners used the chat and emoticons. All these tools worked well, although, I need to do more to encourage the learners to interact.” The teacher believed the tools that created a sense of presence were whiteboard tools, chat and voice.

### ***Slides***

Greg stated “I didn’t use PowerPoints. I have used PowerPoints in the past. I’m a big fan of using linked buttons in PowerPoints to increase learner interaction.

Unfortunately, these do not work when the PowerPoint is uploaded to the VC.”

Instead Greg used the blank whiteboard screen and used the drawing tools to write mathematical equations on the screens. He added information to these screens regularly. In the first session he used only plain black and white numbers. However, as he grew in confidence he also wrote words and did drawings. He also started to use colour.

Greg commenced each slide with minimal text and added to this over a period of time. In the first session he used only two slides and added to these regularly with changes made on average every four minutes. In the second session he used many different slides and once again made changes every 2.5 minutes and this seemed to work better to engage the learners. In the final session he used four different slides with changes made every three minutes. He also commented

PowerPoints are the only file types that can be uploaded. For a maths/science/computing teacher it would be great if Excel files could be uploaded too. At the moment, explaining an Excel activity is not feasible in the VC (yes, we could put screenshots into a PowerPoint, but that’s time consuming, and not as effective).

He was not aware that you could screen share and this was discussed with him by the researcher at the end of the semester.

### ***Effective Screens used in Session One***

Please note: the entry screen is showing the view of the full slide; all other slides are cropped to show only the text.

Greg commenced the session with the blank whiteboard slide and then added the first question in text in Figure 4.86. This directed the learners to the question. Figure 4.87 shows the additions to the slide question. This text was added in 3 stages.

Figure 4.86: First slide with question displayed using text.

Figure 4.87: Text and answer added on the first slide.

Figure 4.88 shows the second question posted. This slide was created in 4 stages.

Figure 4.88: Text and answer.

### ***Non-effective Screens used in Session One***

Figure 4.89 and Figure 4.90 show the text not being displayed correctly at the bottom of the screen and to the right of the screen. Figure 4.91 shows Greg accidentally using the highlighter box and not being able to delete, but as an alternative he crossed out the incorrect number.

Figure 4.89: Slide with unreadable text at the bottom.

Figure 4.90: slide with unreadable text to the right.

Figure 4.91: accidental use of the highlighter tool.

## Effective Screens used in Session Two

Please note: the entry screen is showing the view of the full slide; all the other slides are cropped to show only the text space.

For session two Greg commenced the session with a blank whiteboard slide as shown in Figure 4.92. He then typed the mathematical problem on the screen.

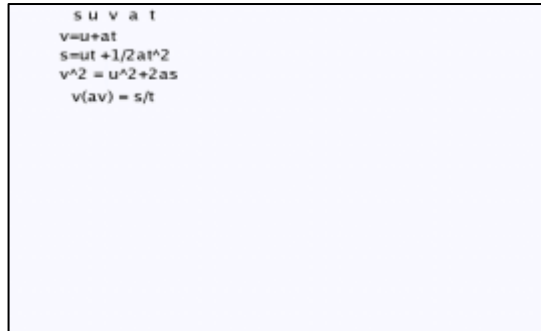


Figure 4.92: First slide with question displayed using text.

Figure 4.93 and Figure 4.94 display the additions to the first question slide. These additions were made on average 2.5 minutes a change. Figure 4.94 shows Greg using a pen drawing tool and also being more confident in typing words on the screen.

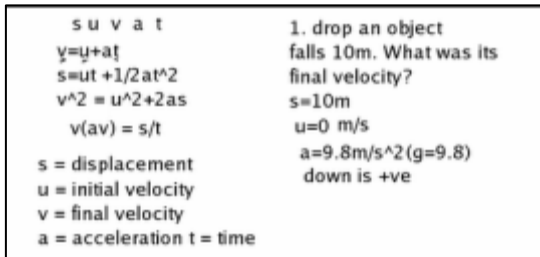


Figure 4.93: First slide with additional text to the right.

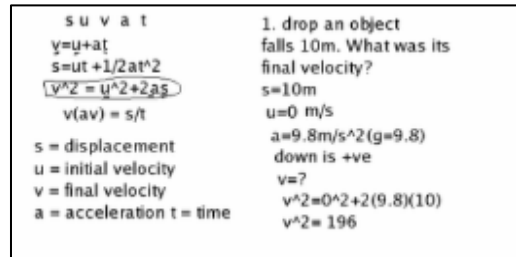


Figure 4.94: first slide with addition of the drawing tool.

Figure 4.95 and Figure 4.96 shows the teacher changing to a new slide for the second part of the problem. Figure 4.96 shows the addition of the drawing tool to draw a diagram.

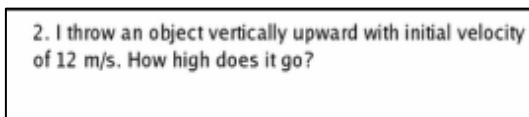


Figure 4.95: Change of slide using plain text.

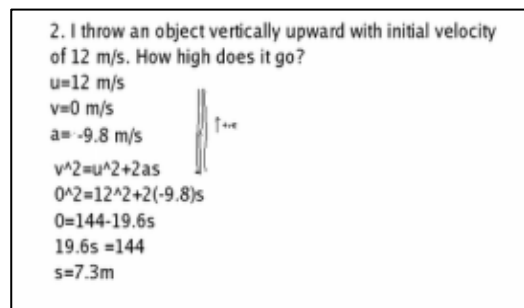


Figure 4.96: Addition of drawing tool to draw a diagram.

Figure 4.97 to Figure 4.98 show the progression and changes to a question slide. It is evident Greg was becoming more confident with the use of the tools as Figure 4.98 shows an advanced diagram and Figure 4.99(a) and (b) show the use of colour.

2.A car travelling at 90 km/h drives off a 25m cliff. How far far does the car land from the base of the cliff?

horizontal	vertical
$s_x = ?$	$s_y = 25\text{m}$
$u_x = 90\text{km/h}/3.6 = 25\text{m/s}$	$u_y = 0\text{ m/s}$
$v_x = 90/3.6 = 25\text{m/s}$	$v_y = ?$
$a_x = 0$	$a_y = 9.8$
$t = ?$	$t = ?$

Figure 4.97: Question slide with use of text/drawing tool.

2.A car travelling at 90 km/h drives off a 25m cliff. How far far does the car land from the base of the cliff?

horizontal	vertical
$s_x = ?$	$s_y = 25\text{m}$
$u_x = 90\text{km/h}/3.6 = 25\text{m/s}$	$u_y = 0\text{ m/s}$
$v_x = 90/3.6 = 25\text{m/s}$	$v_y = ?$
$a_x = 0$	$a_y = 9.8$
$t = ?$	$t = ?$

Figure 4.98: addition to the diagram using drawing tool.

2.A car travelling at 90 km/h drives off a 25m cliff. How far far does the car land from the base of the cliff?

horizontal	vertical
$s_x = ?$	$s_y = 25\text{m}$
$u_x = 90\text{km/h}/3.6 = 25\text{m/s}$	$u_y = 0\text{ m/s}$
$v_x = 90/3.6 = 25\text{m/s}$	$v_y = ?$
$a_x = 0$	$a_y = 9.8$
$t = 2.26\text{s}$	$t = 2.26\text{ s}$

$s = ut + \frac{1}{2}at^2$

$25 = 0 + 0.5(9.8)t^2$

$4.9 = 4.9t^2$

2.A car travelling at 90 km/h drives off a 25m cliff. How far far does the car land from the base of the cliff?

horizontal	vertical
$s_x = ?$	$s_y = 25\text{m}$
$u_x = 90\text{km/h}/3.6 = 25\text{m/s}$	$u_y = 0\text{ m/s}$
$v_x = 90/3.6 = 25\text{m/s}$	$v_y = ?$
$a_x = 0$	$a_y = 9.8$
$t = 2.26\text{s}$	$t = 2.26\text{ s}$

$s = ut + \frac{1}{2}at^2$

$s = 25 \times 2.26 = 56\text{m}$

$25 = 0 + 0.5(9.8)t^2$

$25 = 4.9t^2$

Figure 4.99(a) and (b): Slides with additional use of colour.

There were no non-effective screens used in session two.

### Effective Screens used in Session Three

Please note: the entry screen is showing the view of the full slide; all the other slides are cropped to show only the text space.

This time Greg commenced the session with the text in Figure 4.100 already typed on the screen.

Newton's laws

First law

2 parts

If an object is at rest, it will remain at rest unless acted upon by an external force.

Figure 4.100: First slide with text pre-typed.

Figure 4.101 is an example of the teacher using text words and the pen drawing tool to underline. Figure 4.102 shows Greg using text and diagrams.

'If an object is in motion  
it will continue with the  
same velocity unless  
acted upon by an external force

eg skateboard

second law  $F=ma$   
 $a=F/m$

Figure 4.101: Slide with text and drawing tool.

$a=F/m$   
 $a = F_{net}/m$

The diagram shows a circle representing a wheel. A force vector  $F_f$  points to the left from the center. A force vector  $F_d$  points to the right from the center. A force vector of 40N points to the right from the bottom of the wheel.

Figure 4.102: Slide with text, drawing tool and diagram.

### **Non-Effective Screens used in Session Three**

Figure 4.103 was an answer to a problem previously solved on the whiteboard. This took Greg time to write and during this time there was a blank screen. Greg could have overcome this by using a PowerPoint for this slide.

acceleration only happens  
while the skaters are in  
contact

eg  
a wheel is being dragged with  
constant velocity  
what is the net force on the wheel

Figure 4.103: Slide answer which caused a delay.

### **Learner – Interface (Technology)**

Table 4.65 records observations of how learners interacted with the VC on a technical level.

**Table 4.65: Learner – interface (technology).**

	Session 1	Session 2	Session 3
No trouble connecting	y	y	y
No trouble with microphone/audio	n	y	y
Able to use tools	n	y	y
No other technical issues	n	y	y
Learners did not voice frustration with interface	n	n	n
Learners were positive about the VC	y	y	y

n = no, y = yes

In the first session Learner 3 had trouble getting any tools in the VC to work. He asked another learner to inform the teacher he was using a Mac and could see and hear but could not use the audio, chat or emoticons. However, he did stay logged in the session until the end. Learners 1 and 4 also had trouble with their computers in the middle of the session and were forced to log out and log back in. After this they

both did not experience any further issues and continued participating. There were no issues with any of the technology in sessions two or three.

### **Learner – Interface (Tools)**

Table 4.66 records observations about the learner’s use of the tools and slides in the VC session.

**Table 4.66: Learner – interface (tools).**

Learner No.	Session 1			Session 2			Session 3		
	B	M	E	B	M	E	B	M	E
Beginning – B, Middle – M, End – E									
Learner 1	A	A	c, e	*	A	*	C	c	c
Learner 2	A	*	*	a, c	C	C	*	*	*
Learner 3	A	*	*	*	*	*	*	*	*
Learner 4	A, C	a, c	a, c	a, C	C, e	*	*	*	*
Learner 5	*	*	*	*	*	*	c	c	c
Learner 6	*	*	*	*	*	*	a, t	C	C, e
What tools were used by all learners	a			a			c		
How often were the tools used by the learners?	Infrequently			More frequently			Very frequently		
Were tools used effectively by the learners?	n			y			n		

n = no, y = yes, NA = not applicable, a = audio, c = chat, e = emoticons, t = tick/yes-cross/no, \* did not participate, (capital indicates multiple use)

In session one engagement with the tools was minimal and learners relied on the audio to participate in the session, with Learner 4 using the chat in the final section of the session. In session two the learners once again used the audio, but this time also used the chat and some emoticons. In session three the learners predominantly used chat to participate.

The tool use increased by level of activity and variety as the learners became more confident with the tools.

No data were collected from the learner exit survey. In the end of session polls the learners listed the tools that engaged them the most as the whiteboard tools at 67% and the audio and slides at 11% each (as shown in Figure 4.104). The teacher believed the tools that engaged them the most and created a sense of presence were whiteboard tools, chat and voice.

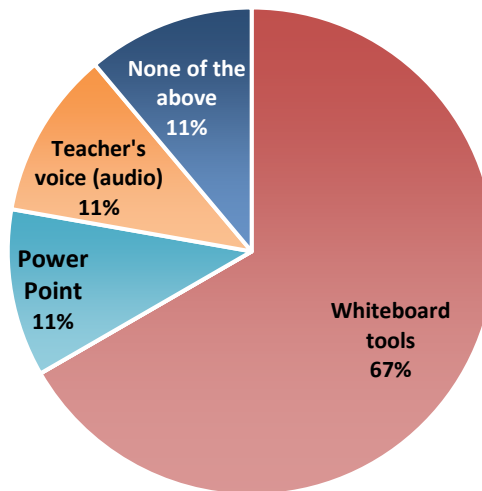


Figure 4.104: Tools which were most engaging for learners.

## Learner Autonomy

Table 4.67: Learner autonomy.

	Session 1	Session 2	Session 3
Teacher used dialogue with learners	y	y	y
Learners were given options on how they will interact and learn the material	y	y	y
Participation activities were included e.g. chat	y	y	y
Learning was not dependent on teacher	n	n	n
Learners discovered information that they needed for the session rather than being provided all of it	n	n	n
Discussion was not dominated 1 or 2 learners	n	y	y
Learners asked a lot of productive questions	n	y	y
Learners who struggled with technology bounced back and participated	y	y	y
Teacher provided challenges the learners seemed to enjoy the session	y	y	y
Learners seemed to have positive attitude	y	y	y

n = no, y = yes, NA = not applicable

The sessions were teacher led and lecture based. The learners were given the limited option of participating through audio and chat. In session one the learners did not volunteer any information unless prompted by the teacher. However, in the following sessions the learners did start posting questions and answers in the chat and/or using the audio. The teacher prompted and encouraged the learners regularly in the sessions.

The majority of the learners were positive about the use of the VC in the sessions as they were aware this was the first time the teacher had used the VC for these sessions.



## Task Switching

Table 4.68 presents the methods employed by the teacher to minimise task switching and maximise attention and focus. The following Table 4.69 shows when learners had a delayed response to the session.

**Table 4.68: Task switching – teacher.**

	Session 1	Session 2	Session 3
Introduction captured attention	n	n	n
Use of icebreaker	n	n	n
Rate of delivery was appropriate for learners to remain engaged	y	y	y
Good use of tools by teacher for engagement	n	n	n
Good use of slides engagement	n	n	n
Timing of slides was appropriate	n	y	y
Timing of asking learners to use tools was appropriate	y	y	y
Teacher used question/response	y	y	y
Teacher incorporated learner responses	y	y	y
Sufficient variety was used to maintain attention	n	n	n
Lesson required learner thought and participation	y	y	y
Maintained learner attention	y	y	y
Paused to allow learners time for feedback	y	y	y
Conclusion captured attention	n	n	n

n = no, y = yes, NA = not applicable

**Table 4.69: Task switching – delay or decrease in learner responses.**

Learner No.	Session 1			Session 2			Session 3		
	B	M	E	B	M	E	B	M	E
Beginning – B, Middle – M, End – E									
Learner 1	n	n	n	y	n	*	n	n	n
Learner 2	NA	*	*	y	n	n	*	*	*
Learner 3	NA	*	*	*	*	*	*	*	*
Learner 4	n	y	n	n	n	*	*	*	*
Learner 5	*	*	*	*	*	*	n	n	n
Learner 6	*	*	*	*	*	*	y	n	n

n = no, y = yes, NA = not applicable, \* = did not participate.

All sessions were teacher led with the teacher using his audio and whiteboard screen with text on it. The teacher did not use an icebreaker but rather commenced straight into the mathematical problem solving. The learners were predominantly engaged by the constant change in the text on the screen. In session one the changes averaged every four minutes compared to session two when changes were at 2.5 minutes and session three at three minutes.

The learners participated predominantly by using audio and chat with minimal use of the emoticons, hands up or tick-yes/cross-no tools. The tool use and variety increased over the sessions and this could have been due to the learners becoming more confident and comfortable in the use of the VC.

The teacher encouraged attention and engagement by asking the learners to answer questions regularly through the session and when no one answered he would call on individual learners.

The teacher also encouraged attention by using real life examples such as the example of ice skaters and a car falling off the cliff. The teacher also encouraged the learners to participate and pay attention by using the “carrot” of stating that a question will be in the test and is worth many marks.

In the middle section of session one, Learner 4 showed a decrease in participation. She was task switching and admitted to this. After being asked by the teacher to answer a question she commented in chat “sorry, I’m on the phone but I am still watching.” At the beginning of session one Learners 1 and 4 showed a decrease in participation and in the last session and Learner 6 showed limited participation at the beginning. This that could have been due to the fact that this was the learners’ first session in a VC and they therefore lacked confidence in using the tool.

### **Learner Exit Survey and End of Session Poll Results**

The learners stated in the end of session polls (Figure 4.105) that 88% task switched, with almost half the learners stating they task switched two to five times. The teacher agreed with this by stating in his exit survey that he believed his learner’s task switched two to five times.

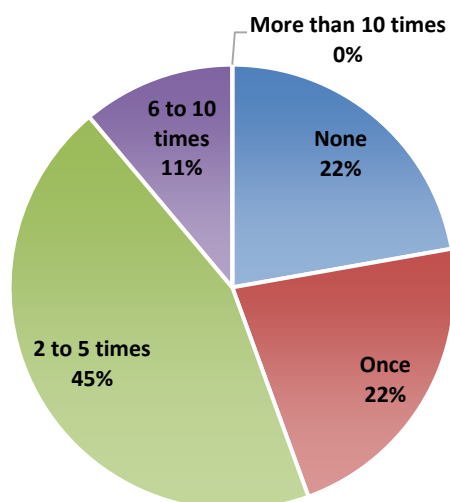


Figure 4.105: Amount of task switching.

The learners reported in the end of VC polls (see Figure 4.106) that 56% were most engaged at the end of the session, with 33% reporting the beginning and only 11% at the middle. In the exit survey the teacher stated he believed the beginning was the most engaging and the end the least. This is an opposite result to other case studies where most of the learners were engaged in the beginning or the middle. This could be because of the different delivery method, and also because in the end of the session the teacher used his “carrot”.

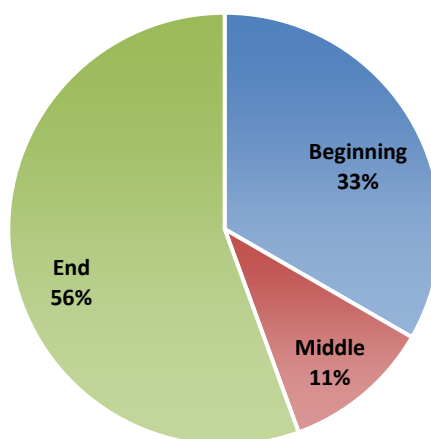


Figure 4.106: Section of the session which engaged the learners the most

Figure 4.107 shows the main tasks performed by the learners as texting or speaking on the phone (50%), 20% were on Facebook or other webpages, 10% were using email, 10% were watching television/music or reading and 10% noted other. The teacher supported this by stating in the exit survey he believed they task switched using text/phone and Facebook.

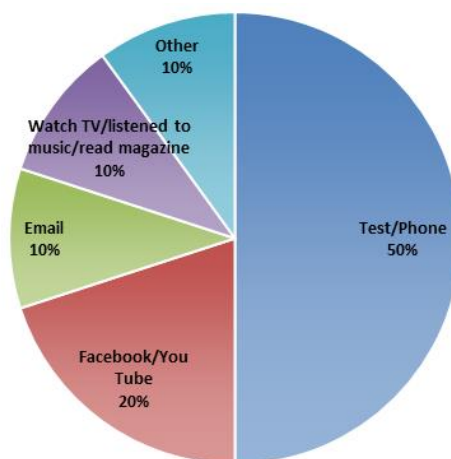


Figure 4.107: Task switching activities

## **Case Study Ten Conclusions**

### ***Teacher Reflections***

Greg had participated previously in the “Facilitating Learning Online” course and also participated in a short one on one training session with a Flex:Ed staff member. He believed that “the best way to learn is to actually run a session with learners,” and “it is important to have a Flex:Ed staff member on hand to assist for the first session.” He stated he did not need any further training as “I find the best help is being able to talk to a Flex:Ed staff member on an ‘as needs’ basis’. He stated he was aware of all the guides and had “read through the ‘Getting Ready’ guide, the ‘Troubleshooting’ guide and ‘Teacher Admin’ guide. They gave a good general overview. But the details do not stick in one’s brain (or, my brain, at least!) until I actually need to use them.” He did not believe the guides needed any improvements and thought they were quite clear. However, he did list a number of tips that could be added to the guides. Other items of information he would have liked before commencing the sessions were:

- how to add links to the VC room for different course and how to obtain links for the recorded sessions
- write in the centre of the whiteboard to allow for different screen sizes
- not all computers in our labs have the appropriate plug-in installed and so can’t be used for VC sessions
- in using the virtual whiteboard there is a time delay before the learners can see what I’ve written.

He listed the following technical issues:

- some computers do not have the appropriate plug-ins installed
- a few sound issues. All due to old style headphones.

The teacher listed other comments as:

- at the moment, I’m using the VC as a supplement to face to face teaching. I think it works well as a supplement. Nevertheless, the interaction is more limited. The learners can’t see my face or my body movements. So I do not

think the teaching ‘sticks’ as well. Learners need to make extra effort to consolidate their learning

- the teacher cannot read the faces of the learners to see if they are understanding. The VC works best with extroverted learners who like to interact. With shy learners it becomes a one-way conversation, which I suspect is not very effective
- weaker learners are reluctant to interact because they do not want to appear stupid in front of other learners – especially when the session is being recorded!
- PowerPoints are the only file types that can be uploaded. For a maths/science/computing teacher it would be great if Excel files could be uploaded too. At the moment, explaining an Excel activity is not feasible in the VC. (Yes, we could put screenshots into a PowerPoint, but that’s time consuming, and not as effective)
- I’ve also recorded face to face lessons using Camtasia and the SMART board. For recording face to face lessons, this has a couple of advantages over the VC: (a) You can upload any type of file; (b) you can save your SMART board notes as PDF; (c) you can edit it.

He also commented

This is my first use of VCs with a class and it has been a very positive experience. I think they add an extra dimension to the teaching and learning experience and are a great supplement to face to face delivery. An essential element in the blended classroom.

### ***Learner Reflections***

The learners did not complete the exit survey.

### ***Final Comments***

The teacher made the following final comments about his experience in using the VC.

Just because you, the teacher, may be excited about the VC, you shouldn’t assume that your learners will automatically be excited about it. Interestingly, in my experience, it is the mature learners who

are more open to new ways of learning through online tools. The younger ones may love their social media, but they are much less enthusiastic about online learning. They want a real live teacher! So the teacher needs to think carefully about how to introduce these new learning tools.

It has been a great experience for me. The only disappointing aspect has been the lack of response from some of the learners. Here I am offering extra help to struggling learners, and yet many would not take it up. Something for me to reflect on.

#### **4.3.5 CASE STUDY ELEVEN AND TWELVE**

Limited data was collected for these two case studies. This included:

Case Study Eleven: Teacher Entry Survey, Teacher Feedback

Case Study Twelve: Teacher Entry Survey, Teacher Feedback

#### **4.3.6 Feedback from the Flex:Ed Staff**

At the conclusion of the semester all Flex:Ed staff members were asked to participate in an interview or provide feedback in relation to the use of Wimba over the previous semester. Seven staff members participated in this feedback. Questions and responses are listed below.

##### ***Task Switching***

On being asked if they had any thoughts on learner task switching, or feedback about this from teachers, or if they felt this could be a potential issue for our remote learners and/or teachers, three respondents commented that they knew the learners all task switched but that “we can’t really stop them.” Another respondent commented that “the teachers need to make it interactive and entertaining enough if they do not want people to ‘multitask’”. Another respondent replied that “it is impossible to control; best we can do is to make sure that the teachers keep asking for learner contributions/activity through the course of a session.” A final respondent suggested teachers make PowerPoint slides engaging with graphics and lots of activities.

### ***Teacher Training and Support***

The staff members were asked what they thought about the training they were currently delivering to the teachers, and if there were any ideas for improvements to the current training.

One staff member commented that they thought the teachers

Need a lot more training before they use it with learners. I think they need to be using it a lot more as participants in lots of different types of sessions – lectures, presentations, interactive, one-to-one and more – to get a good idea of the different features and different (good and bad) facilitation techniques. I'm not quite sure yet what is covered in FLO, but would think that anyone who is going to use it with a class needs to have done the equivalent of FLO training. I have sat in to help out a few teachers using it with learners and think some teachers are going to need a lot more 'in class' support (with or without training) before they are able to comfortably and confidently manage the VC session alone.

Another teacher supported this comment saying "they would like to include more training for the more sophisticated functions and longer session where everyone gets a go at doing these things." Another staff member commented that "it is good but if you do not use it straight away you lose it" and "it would be good to have more shared knowledge sessions to see what other teachers are using the VC."

Suggestions for improvements included "recording example videos of someone running a virtual session well versus someone doing it poorly to highlight good and bad practice." A final comment was it would be good to include in the training "hints on how to get learners to 'buy' into it!"

### ***Learner Training and Support***

The staff members were asked for suggestions on training or support for the learners to use the VC and if the library did, or would in the future, provide any training.

Respondents claimed that they think the area should be running sessions, with staff stating "at the very least we should be doing more extensive first-time sessions with learners or how they are expected to use it for their lessons," and

Most of the time the first time sessions I've seen have been spent on getting the technical aspects set up and only a few minutes on getting comfortable with the environment. Some learners find that enough, but others are left bewildered – not a great first experience. For their sake, we need to be doing more 'in class' support too.

However, one staff member commented that they did not think learners need any more information.

### ***Guides***

On the topic of guides, the researchers asked if there were any additions, deletions, mistakes in the guides or if any new ones were needed. They were also asked for suggestions for improvements.

One commented that the guides this semester were updated and included all additional requests from the previous semester, and were also clearly available on the internal staff site. Another stated they did not believe any more guides were needed and believed they were up to date.

A final comment was that while the guides are very clear and helpful, maybe a new handout would be useful on the more complex functionality such as application sharing and breakout rooms. This was because “the detailed long guide from Wimba includes ways of doing it that do not work so well with our version of the VC.”

### ***Support – Headsets***

The researcher quizzed the staff for any comments from teachers or learners about headsets or any requests to purchase them. The respondents answered that there were lots of requests from Centres to purchase them. One commented that they knew the library had purchased a large set but then did not want to use them due to WHS issues. A final comment was that “making them available in the bookshop seems to be working fairly well.”

### ***Help Desk Staff Feedback***

On being asked about the major calls for help from the teachers concerning the VC, the problems listed included that they had difficulty getting into Wimba and sound or audio issues. When asked what the major calls from the learners were, the issues were very similar to that of a teacher that is, predominantly audio issues.



### 4.3.7 SUGGESTED IMPROVEMENTS AFTER ITERATION TWO

As a result of the analysis and interpretation of the data collected in the second iteration (case studies seven to twelve) the following improvements were incorporated in the future use of the VC at the Institute.

#### Response to Research Question One

##### ***Design of the Virtual Classroom Session including Content and Activities***

In many of the case studies the teachers did not use all available tools or use them frequently. The teachers used a wider variety of tools and encouraged the learners to use them more so in the final sessions, and this was due to the teachers being more confident. Teachers in the future will be encouraged to attend the VC “how to” sessions and also to run a practice session prior to taking their first VC session with the learners. There was a recurring theme from the learners in this iteration that they would like the teachers to “get us to do more.” The basic two page guide for teachers will be updated to include a section advising them to encourage the learners to use these tools regularly (see Figure 4.108). The detailed guides will retain the section on encouraging the learners to use the tools regularly.

### Hints for presenting

- Close all other applications. Running other applications on your computer can slow your connection to the eLearn Virtual Classroom
- Encourage your students to use the emoticons/signals to keep them focused during the session. You may also like to use the poll feature.
- If you find the room is freezing or the webcam has a long lag, **Pause** your web cam so it only shows a still shot (instructions on this can be found in the **Managing your Room** guide).

Figure 4.108: Additional information to be included in the two page teacher guide (© Canberra Institute of Technology 2012).

The teachers will also have access to and be encouraged to use the PowerPoint slides below at the commencement of all VC sessions.



Figure 4.109(a), 4.109(b), 4.109(c): Introduction to tools PowerPoint slides. (Kerry Trabinger © Canberra Institute of Technology 2012).

The teacher from case study nine commented she was worried about giving control of the whiteboard to the learners so next semester will include a section in the guides about blocking tools for teachers.

### ***Encouraging Interaction, Engagement and Attention***

In the future the researcher and Flex:Ed staff will continue to encourage all teachers to read the tips and tricks section in the guides and in particular the section which lists that there should be no more than four slides without interaction e.g. tick-yes/cross-no, emoticons. In addition, they will be advised to not have the one slide displayed for longer than four minutes.

### ***Technical Issues***

This iteration still had many technical issues with the audio setup and once again this was often due to the learners and teachers not running the Wimba wizard prior to the session start time. There are also often quick easy fixes and the teachers will be encouraged to provide all learners with the Troubleshooting guide that explains how to run the set up wizard and how to fix basic audio issues.

## **Response to Research Question Two**

### ***Training***

Two of the teachers had attended the “Facilitating Learning Online” course which included in-depth training and practice in a VC; however, this was in a different platform called VET Virtual. Unfortunately, the confidence the teachers had from participating in these sessions was detrimental as they did not prepare or practise in the Wimba VC and therefore had difficulty using the tools in their first sessions. This was particularly evident in case studies nine and ten. In case study ten, in the first session the teacher realised he did not know how to delete text on the whiteboard or how to save the recording.

From these observations the teachers in the future will be encouraged to do a practice run in the VC room prior to delivering a session to the learners.

The teachers in case study seven and eight had attended a one hour “How to Use the VC Room” basic session but commented that they would like more advanced sessions. During iteration two, “How to Beginner” sessions were held and one “Advanced Session” at the beginning of the semester. In future semesters these will

be run at the commencement of the semester and also midway, with multiple advanced sessions also being held. Feedback from the teachers suggested the advanced training should include tools such as recording, polling, application sharing and blocking tools, and these will be included in this training. Many of the teachers in this iteration commented that the best way to train is to practise using the tools and the live sessions will include practice time for the teachers to use the tools. These sessions will also be recorded.

### ***Guides***

It was once again concerning to the researcher and the Flex:Ed staff that the teachers in this iteration still did not use all the guides or promote the “how to” guides for their learners. In this iteration 50% of all learners were not aware of the guides. In the future all teachers will be encouraged to refer to the guides and to provide all learners with the guides prior to the session, in particular the Troubleshooting guide to avoid audio and technical issues. More guides will also be developed including the following:

- What Is It?
- Creating your Own Room
- Using your Room (Basic Features)
- Combined Guide for Teachers

The current guides will be improved to include additional sections about advanced features such as blocking tools and application sharing. A combined guide will also be available for the teachers that will allow ease of downloading and printing. These guides include:

- Getting Started guide for learners
- Getting Started guide for teachers/presenters
- Troubleshooting guide
- Advanced Features guide
- Wimba Classroom (Version 6.0) Presentation guide.

### ***Support***

**Recording:** All teachers in this case study remembered to record all sessions because they had been warned by the Flex:Ed staff members that there had been issues with

teachers forgetting in the previous semester. Some of the teachers turned on the recording as soon as they entered the room. The teacher from case study seven commented that she did this as “she did not want to forget.” The teacher from case study eight also started the recording too soon and the teacher from case study ten started the recording but then had audio issues. While this did not affect the live sessions, it did affect the recording as the first few minutes are silent and there is a chance learners could lose patience and not bother waiting for the actual content to commence. Wimba does not have the capability to edit the recording. This was rectified for the future by having a slide reminding the teachers to record not at the first slide (see Figure 4.110), but rather at a slide after the “How to Use the Tools” slide.



Figure 4.110: PowerPoint slide to remind the teachers to record (Kerry Trabinger © Canberra Institute of Technology 2012).

Many of the teachers in this iteration also discussed how they were excited about the recording feature and keen to use it in the future. The teacher in case study nine commented on her excitement about “the fact I can archive my lessons for those learners who were absent or those who wish to revise.”

**Headsets and Other Budget Issues:** As per iteration one, the teachers in case studies seven, eight and ten all commented on the cost for learners to purchase the headsets. This continues to be an issue with the Institute still not prepared to cover the cost of the headsets for teachers or learners. This will remain an ongoing request.

Another budget issue includes the cost of a webcam. This was why many of the teachers did not use webcams in this study and this issue needs addressing.

A final budget issue was for case study nine with no budget available from the department for the USB microscope. The researcher purchased this for the teacher.

**Time:** Teachers from case studies seven and eight both listed issues with the amount of time it takes to prepare the sessions. Interestingly, the teacher from case study ten

stated he found it took less time and effort to prepare his VC session compared to his face to face class. However, his sessions were not PowerPoint slide driven and just text on whiteboard. As mentioned in iteration one the Institute will not grant more preparation time for any teacher delivering a VC session.

**Institute Flexible Learning Network:** The researcher will ensure the current section in the Institute Flexible Learning Network continues to have a dedicated section for the VC. This section will include links to all guides, introduction PowerPoints, recordings and a discussion space.

**Creation of Videos:** Learners in case studies eight and nine stated they would like a video to watch on how to use the tools. In response to this the Flex:Ed area has created a short Camtasia “how to” video on using the tools (Figures 4.111 and 4.112).

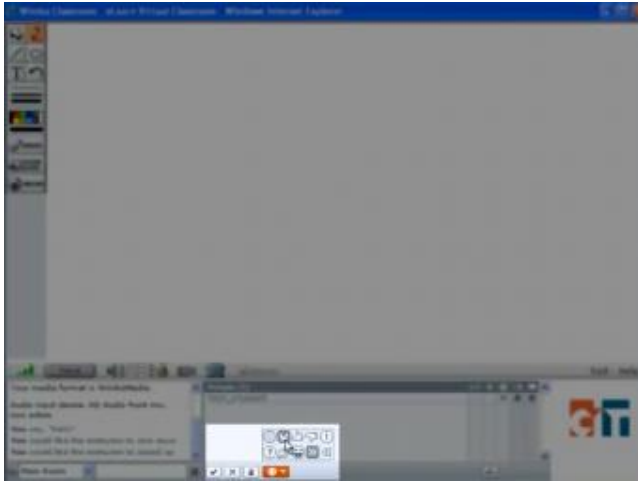


Figure 4.111: Video for learners showing use of emoticons (Amy Holland © Canberra Institute of Technology 2012).

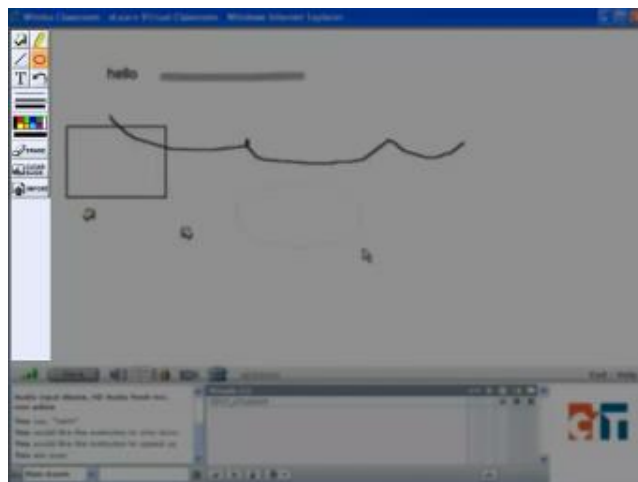


Figure 4.112: Video for learners showing use of drawing tools (Amy Holland © Canberra Institute of Technology 2012).

**Clock:** The teacher from case study eight commented that a clock would be useful. Unfortunately, no timer is available in Wimba.

**Upskilling of the Help Desk and Introduction Sessions:** The Flex:Ed help desk staff will be upskilled. This is so all staff are trained in the use of the VC, and as requested by the teacher in Case Study Ten, teachers will have a Flex:Ed staff member on an “as needs basis.”

As per iteration one all teachers in the future will be offered the support of a Flex:Ed staff member for their first VC session to assist with technical issues and tool use.

Teachers in case studies eight and nine requested that the researcher run a 15 minute “How to Use the Tools” introduction session with their learners and this worked well for encouraging confidence in the tool use very early on. The case study ten teacher commented that he felt it was important that the learners attended an introduction session in the VC prior to attending a live session as he believed “the best way to overcome the hurdle of learners using the VC is just getting them in to try it.”

Flex:Ed staff will encourage all future teachers to run a first “How to Use the Tools” session with the learners either by the teacher or a Flex:Ed staff member. This session would solve two issues:

- ensure all technical issues have been resolved before the first session
- learners will know how to use the tools and will be confident in their use and therefore be more likely to participate and remain attentive to the content.

Further investigation is needed into techniques for engagement for all learning styles. Teachers from case studies six, seven and nine commented that there were potential issues for international learners participating in the live VC room. The international learners in case studies four and seven participated the least in the VC sessions and needed prompting from the teachers. However, the use of the recordings by the learners would be beneficial as the learners could review any information missed in the session and also stop and start the recordings at their own pace. Further research needs to be undertaken on this topic. Teachers from case studies eight and ten also listed concern that the VC room may not suit all learning styles. Techniques

for encouraging international learners and all learning styles will be investigated further to ensure the delivery of the VC is equitable to all learners.

#### **4.4 CHAPTER CONCLUSION**

This chapter analysed the data collected from twelve case studies over two iterations. The results and conclusions as a whole will be discussed in the following chapter.

# CHAPTER 5: DISCUSSION

*Tell me, I'll forget. Show me, I'll remember. Involve me, I'll understand.*

Chinese Proverb.

This chapter will begin by synthesizing results from the data analysis for all case studies from iterations one and two. The beginning of the chapter will address research question one by investigating how the design of the VC, including classroom management, content organisation, presentation and selection and use of tools, can encourage and maintain attention. This section will also discuss how the technological issues and attitudes of teachers and learners towards the VC can affect the level of engagement that occurs.

The chapter will then address research question two by discussing the importance of both teacher and learner training, instructional design which incorporates interactivity, and the importance of providing guides and support for both teachers and learners. The chapter will go on to discuss the implications this study has for the theory of transactional distance and how the three elements of structure, dialogue and autonomy are affected in a VC. The nine types of interactions amongst teachers, learners, content and interface that are suggested for the success of a VC will then be discussed.

## 5.1 RESPONSE TO RESEARCH QUESTION ONE

Research Question One – How can teachers design content and/or activities to encourage interaction, engagement and attention while participating in a VC?

### 5.1.1 DESIGN OF THE VIRTUAL CLASSROOM SESSION INCLUDING CONTENT AND ACTIVITIES

#### Content Knowledge

All teachers in all case studies possessed high levels of content knowledge and were confident in the delivery of their topics. This assisted in the engagement as their confidence and enthusiasm were evident in all case studies.



## **Planning and Structure**

Many VC practitioners claim that, because of the multifaceted nature of the VC, planning is critical for the success of a session (Bower et al., 2014; Martin et al., 2011; Schullo, 2005). This study concurred with results revealing that teachers who were more prepared with a clear structure ran sessions with higher engagement and fewer technological and tool issues. This occurred in case studies one and two where the teachers were obviously very well planned and prepared and had allocated time and effort to prepare engaging sessions. Both used variety, graphic images and a number of slides that incorporated interactivity of the learners. It was obvious in these sessions that the learners were engaged with the amount of tool use that occurred. Teachers who had not taken into account the VC tool use with their planning, quickly realised, after their first sessions, the importance of preparing and made suitable changes by adding in variety to the delivery, adding in interactivity or preparing text to be displayed. Many teachers discussed the issue of this preparation requiring more time and effort and this will be discussed further in this chapter.

## **Variety**

Teachers who used a variety of delivery methodology, slides and tools seemed to engage the learners more. The teachers in case studies one and eight included a great deal of variety in displaying their slides and by their use of the whiteboard tools. The teacher in case study eight added another dimension to this variety by changing her use of the drawing tool on each slide with a pointing tool and then using a drawing tool. These teachers also included regular interactive slides in between the lecture slides to enable learners to remain focused in an activity, either in the chat or using the drawing tools.

The teacher in case study two did not include much variety in session one but did realise at the conclusion of her first session this was required and subsequently included slides and a video in her next session. The teacher in case study seven used straight lecture slides in the first session and also changed this for the second session to include more interactivity for the learners with the use of a group interactive brainstorming activity.

The teacher in case study nine varied her delivery by dividing her sessions into three clear sections, the first being lecture based slides with questions and answers, the second being a group drawing activity by the learners and the third being a

microscope slides with questions and answers. This worked well to engage the learners.

The teacher in case study ten delivered his session as lecture based. However, he did include questions and answers to engage the learners throughout the sessions with this improving in the second and third sessions. He also added variety after his first session by adding colour and drawings on the slides instead of using plain black and white text. This seemed to work to direct the learner's attention to the specific section of the screen that he was discussing. The constant addition of text on the screen further engaged the learners as there was a change on the screen regularly every 2.5 to four minutes.

The relevant real world experiences used by teachers were effective for capturing attention. Case study one discussed a cut finger, case study two discussed the *The Castle*, case study seven discussed the teacher's father's illness, case study eight discussed advertising by Coca Cola and case study ten used the example of someone falling off a cliff.

### **Ground Rules**

Clark and Kwinn (2007), Hofmann (2004) and Finkelstein (2006) all argued the importance of setting ground rules prior to the commencement of any VC session. This study affirmed this argument with the major occurrence of the learners playing with the tools during sessions emerging. This could have been resolved if clear ground rules were established prior to the commencement of the sessions. The only teacher to set ground rules was the teachers in case study nine and no issues occurred during the delivery of the session. However, in the other case studies many of the learners played with the tools and this caused:

- a delay in the delivery of the content while the teacher tried to resolve this issue (case studies eight and nine)
- other learners who did not play with tools complained at the end of the sessions (case study one)
- a distraction from the content on the slide to the learners writing (case studies one, seven and eight).

Finkelstein (2006) and Hofmann (2004) both suggested one strategy to encourage "buy in" is to encourage the learners themselves to establish rules as an icebreaker at

the commencement of the session. This idea would work well for a first session; however, for future sessions a quick reminder of the rules by a teacher would be sufficient. In the literature review it was also suggested that for establishing ground rules, the learners could be encouraged to agree to minimal distractions around them and to help avoid task switching. The Institute will look at including the importance of setting ground rules about the use of the tools in the VC and of learners to agree to minimal distractions, in any teacher and learner training.

#### **5.1.1.1 Slide Design**

This study affirmed the work of Clark and Kwinn (2007), Courville (2010) and Heacock (2010) who argued the importance of slide design as a critical aspect to engage learners in a VC.

##### ***Timing and Number of Slides***

There is very limited research on the exact timing or number of slides to be used in a VC. However, studies by Hofmann (2004), Clark and Kwinn (2007), Heacock (2010) and Courville (2010) suggest it is important to make frequent changes. The data collected in this study did not offer any further conclusions. However, it was clear that too many slides being shown too quickly could be an issue as the teacher in case study seven changed her slides on average every 1.6 minutes in her first session. In the second session she reduced the number of slides and timing to have changes every 3.1 minutes on average. She commented that this worked much better. Other case studies changed average duration of their slides from anywhere between one to four minutes. The Institute training and guides state that slides should be displayed for no more than four minutes before some change and all teachers complied with this.

##### ***Use of Relevant Graphic Images***

Heacock (2010) argued that if you use visual images with voice then this will lead to an enhanced retention of knowledge. This study found that learners were engaged more when the slides included relevant graphic images, as more activity in the chat or audio occurred.

##### ***Regular Action***

Heacock (2010) argued that movement in slides encourages attention as our eyes are involuntarily drawn to motion and therefore every time the VC screen changes in

some way the learner will look up. This study's findings concurred with Heacock as learners remained engaged even when slides were displayed for long periods as long as there was some movement on the screen. The teachers used the pointer and drawing tools to mimic face to face delivery where they might use either their hand or a laser pointer to point to a section on a screen in a classroom. Case study one used the pointing tool on a graphic slide to maintain attention and draw focus to a specific section on the slide. Case study eight used a variety of drawing tools on a diagram to maintain focus and draw attention to specific sections of the diagrams. Case study ten did not use PowerPoint slides and instead used the whiteboard. The teacher typed a question on the screen first but made regular changes to the slide to capture attention.

### ***Interactive Visuals and Slides***

The slides that demonstrated the most engagement in the VC by most learners were the slides that encouraged active participation such as group brainstorming using the whiteboard tools. Slides which were grouped in pairs also worked well.

### ***Variety in use of Whiteboard Tools***

There were times when the teachers needed to present lecture slides. While these slides would have been complemented with the addition of an image, the teachers were trying to impart large quantities of information in a short period of time. The teacher in case study eight, maintained attention by using a different drawing tool on each slide. This supports the claims by Heacock (2010) and Courville (2010) who both argued the importance of creating movement or change to maintain learner attention.

### ***Delay in attention when using consecutive Lecture Slides***

There were issues with attention when teachers displayed multiple straight lectures slide in a sequence. Learners seemed to disengage from the content, got bored and wrote on the slides. This seems to support the claims by both Clark and Kwinn (2007) and Hofmann (2004) who argued that presentations that do not include visuals and are instead text heavy fail to engage learners. This study highlights the importance of including graphic images, a break in lecture slides (with an interactive slide), using the drawing tools to create movement and using a variety of tools.

## Introductory Slide

The teacher in case study seven included an instructive slide for the learners to review the tools before the content and this enabled learners to interact confidently with all tools from the commencement of the sessions. . The researcher developed three instructive slides for teachers to use at the commencement of a session, however, feedback from the teachers indicated they would prefer this to be a one page slide and this has now been developed. See Figure 5.1.

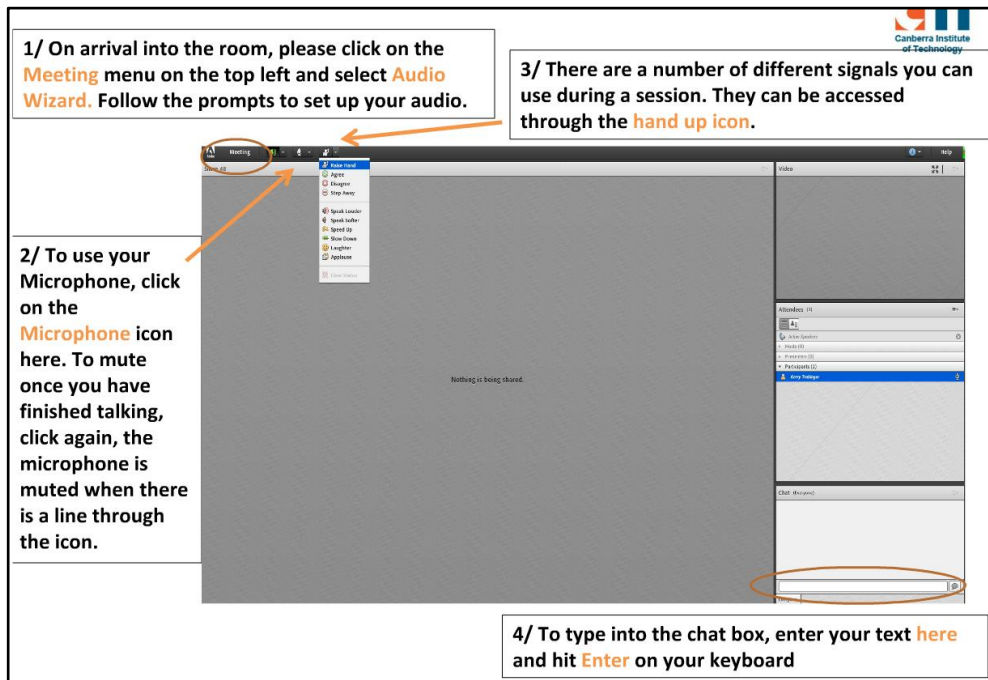


Figure 5.1: An instructive slide

### 5.1.1.2 Tool Use

The following Table 5.1 displays tool use by both teachers and learners.

Table 5.1: Teacher and learner tool use.

Case Study	Teacher's most frequently used tools	Tools used by all learners	Tools used by some learners
1	A, w c, ,r	W, t	C, e
2	A, w, c, WC, r	W, t	a, C, e
7	A, W, c, r	W, c	e, t
8	A, W, C, h, e, t, r	W, C, T, e	A
9	A, w, c, WC, r	W, c,	e, h, t
10	A, W, c, r	A	c, e, t

a = audio, c = chat, w = whiteboard tools, e = emoticons, t = tick-yes/cross-no, h = hands up, wc = webcam, \* = did not participate, (**capital indicates multiple use of the tool**)

All teachers used the audio to speak to the learners, the whiteboard tools to write on either their own slides or a blank whiteboard and the chat to post questions or make comments to the learners. The teachers in case studies two and nine also used a

webcam with the teacher in case study two displaying their own image and the teacher in case study nine displaying a USB microscope image of a maggot. The teacher in case study eight also used the emoticon and tick-yes/cross-no herself to encourage the learners to use this tool. The most common tool used by the teachers was the audio.

All learners in all case studies except ten used the whiteboard tools to write on either the teacher’s slides or blank whiteboard slides. All learners in case studies one, two and eight also used the tick-yes/cross-no function. In case study ten the main tool used by learners was the audio tool. Other tools used by learners through the sessions included the chat tool and emoticons.

The following table displays results of which tools the teacher and learners believed engaged the learners the most during the VC session.

**Table 5.2: Tools that engaged the learners the most.**

Case study	Learner end of VC poll results	Learner exit survey results	Teacher exit survey results
1	A 38%, W 29%, S 14%, C 5%, E 5%, N 9%	A 25%, W 50%, S 25%	W, C, S
2	A 50%, W 30%, WC 20%	A 50%, E 25%, WC 25%	A
7	A 33.3%, E 66.7%	A 25%, W 75%	W
8	A 46%, W 13%, C 27%, WC 7%, N 7%	A 50%, W 3%, S 50%, C 37.5%, E 62.5% (multiple responses)	A, S, C
9	W 50%, S 7%, C14%, E 29%	A 66.7%, E 33.3%, WC 33.3% (multiple responses)	N/A
10	A 11%, W 67%, S 11%, N 11%	N/A	A, W, C

A = audio, C = chat, W = whiteboard tools, E = emoticons, WC = webcam, S = slides, N = none of the above, N/A = not applicable.

The above data demonstrate the most common tool listed as audio, which was listed in all case studies. The next most engaging tool was the whiteboard tool, mentioned in all case studies except case study two. Other engaging tools included slides mentioned in case studies one, eight, nine and ten. Emoticons were listed in four of the case studies with chat mentioned in only three case studies. The webcam was listed as an engaging tool in case studies two and nine.

## **Tool Issues and Solutions**

### ***Whiteboard Text***

The VC had many issues with the whiteboard tools. This included the issue of text overlapping when multiple learners typed in the board, the text going off screen to the right in case studies one, two and nine and the text changing size to a large font in case study two. The teacher in case study ten found that although the text looked correct on his screen during the session, when he viewed the recording the text was off to the right.

This was overcome by the teacher in case study one creating slides with individual squares where learners were directed to type. In case studies two and seven, in the second and third sessions, the teachers directed the learners to write to the left of screen, and this helped the issue. In case study ten the teacher also typed in the middle of the screen and this solved the problem. Another solution when this problem happened would have been for learners to type in the chat as an alternative.

There was also a delay in text appearing on screen on the whiteboard in case studies two and ten. A solution for this issue would be for teachers to have an information slide prepared or have a cut and paste of the text ready to use. The teacher in case study ten also reduced the length of his typing to one line at a time so it would appear more quickly for the learners to view.

### ***Computer Literacy***

A learner in case study seven did not know how to use tools when asked and failed to hold down a button during the session to talk. Case study nine learners also did not know how to use drawing tools in the middle of a session.

A solution to this would be to ensure that all learners know how to use all tools prior to the commencement of a session. This would be achieved when teachers are provided with a PowerPoint slide to display at the commencement of sessions that would show how to use all basic tools.

The teacher in case study one forgot how to release the drawing tools for the learners in one session and the case study two teacher asked the participants to say yes or no, which confused them because she did not clearly indicate to use the tick-yes/cross-no platform. The teacher in case study seven did not use pointer tools or drawing tools on lecture slides. These case study teachers had participated in training on the VC but in another platform. In the exit surveys both teachers stated they did

not feel they needed more training; however from the above issues it is evident that they did require specific training for the platform they were using. The teacher in case study nine used a webcam to display a microscope image. This was the first time this had been attempted in a VC and there were some issues with sizing and pixelation. However, the teacher was confident she could avoid this in the future.

To solve these issues further training and practice are needed on the teachers' part, particularly to ensure they are up to date with the VC platform they are using.

### ***Interactivity***

Many VC practitioners argued that a critical component for success in a VC session is the inclusion of interactivity throughout a session (Bower et al, 2015; Christopher, 2015; Clarke, 2005; Clark and Kwinn, 2007; Hofmann, 2004). Case studies one, two and seven learners showed a marked decline in interaction and attention towards the end of the sessions. To prevent this from happening again it is important for the teachers to plan for interactivity throughout all sections of a session, and in particular in the last section when learners may be getting tired or bored.

In case study two learners were typing questions in the chat but the teacher was focused only on the slides and therefore missed this interaction. This issue of teachers having to monitor multiple sections of a screen at the one time will be discussed later in this chapter.

### ***Recording***

While all teachers used the recording feature, both teachers in iteration one forgot to record either a section of the session or a complete session. Teachers in iteration two were informed of this potential issue and were so concerned about not recording that they started the recordings too early, and while this did not affect the live session, for learners viewing the sessions at a later time the first few minutes were often silent. The teacher in case study ten also did not know how to stop a recording at the end of his first session.

To solve this Flex:Ed staff should be prepared to remind teachers to start the recording in any training sessions and to provide an entry slide which reminds the teachers to record. This information should be included in the guides. A solution to starting the recording early would be to edit the recording, but Wimba did not allow any editing of recordings.



## **Confidence**

It was evident from the study that teachers became more willing to try multiple tools as they became more confident in the use of the VC. This could be seen in case study seven where the learners increased their use of emoticons and ticks-yes, and in case studies seven and ten where there was an increase in the variety of tool use. The teacher in case study eight exercised a variety of tools and her lessons went very well, with all learners engaged constantly throughout the sessions. However, even this teacher expanded her repertoire with the whiteboard drawing tools as each session progressed by moving from just straight drawing tools to using the underline tool and the pen drawing tool.

The teacher in case study nine was so focused on the USB microscope that in the first session she displayed straight lecture slides with no whiteboard tools and limited interactivity. She also did not know how to release the whiteboard tools. Both these issues were due to overconfidence as, although she knew how to use the tools in another platform, the tools were different in the Wimba platform. The teacher in case study ten was not confident in the use of tools and this was evident in the first session. However, as his confidence increased so did both his use of the tools and also the learners' use and variety of tools.

To encourage teacher competence, teachers need to be trained in all tool use even if they have been previously trained in another platform. This will be discussed in a later section.

## **5.1.2 ENCOURAGING INTERACTION, ENGAGEMENT AND ATTENTION**

### **5.1.2.1 Technological Issues & Solutions**

#### ***Wizard***

Wimba requires a wizard to be completed to ensure the settings are correct on a computer prior to using a VC. There were many issues with this wizard either taking excessive time or not working on some computers. There were also many issues with the VC not working on some computers and in particular the computers at the Institute. This caused significant delays at the commencement of many sessions for teachers in case studies one, eight, nine and ten. Teachers could have ensured that Wimba was working by logging in to the computer they were going to use the day before or at a minimum 15 minutes prior to a session commencing.

### ***Audio***

In case study one the audio experienced echoing at the beginning of the first session. This was overcome by allowing only one speaker at a time rather than multiple speakers. Many learners could not get their audio working such as in case study one (three learners), case study seven (all learners in one session and one in another session) and case study eight (one learner). However, all these learners were able to use the chat as an alternative. In case study seven the teacher's voice level through the audio kept going up and down and the learners expressed frustration with this. This was due to the audio connection in the VC platform having pre-existing issues. New platforms have improved this and this issue seems to be resolved.

### ***Bandwidth***

The case study seven teacher had trouble with delay when changing slides, when she clicked to move onto a slide and commenced talking before the slide appeared for the learners and during this time learners could have been tempted to do other tasks. Later in the session she tried to overcome this by clicking before she needed to. This could have been due to bandwidth or internet connection at the Institute. The teacher in case study nine experienced significant issues with her computer, which was one of the older computers at the Institute, and was very slow in showing any slides. The teacher overcame this issue by clicking on the slide earlier than needed to compensate for the delay.

### ***Logging Out***

The teacher in case study seven was logged out of the room due to a technical issue on her computer and when she re-entered, it took five minutes to redisplay the slides. During this delay the learners could have task switched. In case studies ten and two learners were logged out in session one but they quickly returned and reengaged.

### ***Display***

There was an issue with some learners in some sessions not able to view a video. This occurred in case studies seven and eight. This was resolved by the teacher by either providing a link to view the video, or asking learners to view it later. However, it did take some minutes for the teacher to realise some learners could not view the video and during this time the learners could have moved to other tasks. Unfortunately, this was a common theme with the use of the Wimba platform.

There was a significant delay when the teacher from case study nine tried to get the microscope slide working and displayed at the correct pixelation. However, as all learners were aware this was innovative technology they were tolerant with this issue. The teacher commented that next time she would like to have a technological laboratory technician in the room with her managing the microscope.

### **Solutions**

It is a common theme in research studies that technology issues can affect the learning experience (Bower, 2011; Martin et al., 2012; Ng, 2007; Roughton et al., 2011). This study affirmed this claim by finding many technological issues arose that caused delays in the delivery of the content and therefore allowed learners the opportunity to task switch. It is critical that solutions be found to reduce the possibility of these technological issues occurring during a VC session. While many of the above issues have been resolved at the Institute with the introduction of Adobe Connect, issues such as internet connections, bandwidth, etc. will still occur and it is important for teachers to be prepared if this happens. The following are suggestions for reducing possible technological issues:

- providing guides and in particular the Troubleshooting Guide to the learners prior to the commencement of a session and ensuring that the Institute help desk contact numbers are prominent
- encouraging both teachers and learners to log in a day prior to test the VC room on their computer or at a minimum 15 minutes prior to the commencement of a session to ensure all tools, and in particular the audio, are working correctly
- allow and plan for technological issues (have a Plan A, B and C). For example, if a learner's audio does not work, ask the learners to use the chat or if the video does not work, have a cut and paste of the URL link to post in the chat
- if possible have a second computer/smartphone/tablet set up in case the one being used has any issues or is logged out.

#### **5.1.2.2 Attitudes**

Recent research reveals the importance of a positive attitude by the teachers and the learners on the use of a VC for the success of a session (Loch & Reushle, 2008;

Martin et al., 2012; Schullo, 2005; Todhunter & Pettigrew, 2008). This study found that the majority of teachers were overall positive about the use of the VC before, during and after the sessions, with the exception of the teacher in case study two who commented that she was reluctant to run more sessions until the Institute resolved technological issues or moved to another platform. She had mentioned Adobe Connect as her preference.

During the sessions when teachers experienced technological issues they all remained calm and positive and this helped ensure the success of the lesson. The learners often listed more negative comments than positive comments in their entry surveys, but this seemed to change in the exit surveys with learners listing comments equally positive and negative or having more positives than negatives comments. In case study one the learners were very vocal about not wanting to do VC session as they preferred face to face sessions and these learners were quick to complain about any issues that occurred. This could have affected their level of engagement.

### **Shared Advantages amongst Teachers**

#### ***Flexibility***

All case study teachers except the teacher in case study two, mentioned the main advantages of using the VC as flexibility, variety and convenience for themselves and their learners. The teacher from case study ten commented that “the learners do not have to come into the Institute, and the session can be run after hours to suit learners with jobs and/or lots of classes.” This supports previous research findings by Bower et al. (2015) and Todhunter and Pettigrew (2008).

#### ***Recordings***

Teachers in case studies one, eight, nine and ten commented on the ability to record sessions to be used by their learners for revision, or by learners who could not attend, as a major benefit. The teacher in case study eight commented that she was excited she had a recording so she “would not have to explain things over and over again.”

#### ***Increase in Quality of Work***

The teacher in case study eight commented in her exit survey that she believed the learners submitted better quality assignments due to the discussions that occurred in the VC.

### ***Adding Variety to Online Delivery***

The teacher in case study nine commented that the VC could add variety to her online delivery with the ability to show microscope slides. The teacher in case study ten also commented that the use of the VC had allowed him to add variety.

### **Shared Disadvantages amongst Teachers**

#### ***Technological Issues***

This was a major theme for all teachers. The teachers in case studies two and seven in particular complained about the Institute infrastructure causing issues with the technology. The teacher in case study seven commented that “if I am going to run a session I do not know if the computer will function properly.” The issue of bandwidth was mentioned by teachers in cases studies two and seven; however, it is anticipated that once the NBN is introduced these issues will be resolved. As mentioned in the previous section having both learners and teachers log in prior to the session commencing can resolve some of these issues. The teacher in case study nine stated that she would have a lab technician assist her in the VC in future sessions due to the technological issues she experienced in using the USB microscope. These findings support similar results found in previous research by Bower (2011), Martin et al. (2012), Roughton et al. (2011), and Todhunter and Pettigrew (2008).

#### ***Headsets and Equipment***

This was also a common theme by most of the teachers. Learners did not want to buy their own headsets and the Institute would not supply these for them. Unfortunately, this could not be addressed due to budget constraints. It should be a priority for any institution that wants to implement a VC to ensure all equipment is provided and that it includes headsets with microphones, webcams and any other necessary equipment. A solution may be to include the cost of a headset in the learner enrolment costs in the future.

#### ***Time and Effort***

This was mentioned as an issue in case studies one, seven, eight and nine. The teacher in case study ten stated he believed it was less tiring for him to prepare compared to a face to face session.

### ***International Learners/ Low Computer Literacy/Learning Styles***

The teacher from case study seven mentioned she was concerned with using the VC with learners who had low computer literacy. This teacher also mentioned she had to work harder to ensure the international learners were engaged. Case study ten also raised the question of whether the VC was good for kinaesthetic or less confident learners.

### ***Task Switching***

Many of the teachers listed in their entry and exit surveys the concern of learners not focusing on the lesson and task switching. The case study eight teacher believed her learner's task switched "always" and commented in her entry survey that she "was prepared for the challenge." This affirmative attitude assisted her delivery of the sessions as she used the tools regularly to maintain learner attention.

### ***Body Language and Personality Barrier***

The teacher in case study eight commented in the entry survey she was worried she would not be able to grasp the learners' personalities. However, she did not mention this in her exit survey. The case study ten teacher also commented in the entry survey he was concerned about the lack of face to face contact and lack of feedback. In the exit survey he commented he was concerned that it was harder to know if the learners understood what he was saying. However, he had made limited use of emoticons and this could have assisted in his understanding.

### ***Shared Advantages amongst Learners***

#### ***Flexibility***

This was a common theme in both the entry and exit surveys, particularly in the exit survey, with learners from all case studies commenting that they liked that they could study where they wanted. Comments included "I did not have to travel and could be back working just before and immediately after the class."

#### ***Time and Money***

Learners in case study two, seven and nine commented that they saved money and time by not having to travel. Comments included that "it is so convenient and practical and can save time and money for learners, great idea!"

### ***Recordings***

Learners in case study eight commented that they liked being able to watch a recording again after the lesson or to watch it if they missed a class. However, an interesting point was made by a learner who listed recordings as a disadvantage as this could mean fewer learners log in for the live session. This could be a potential deterrent for learner participation.

### **Shared Disadvantages amongst Learners**

#### ***Face to Face Sessions***

Learners in case studies one, seven, eight and nine commented in the entry surveys that they preferred face-to-face sessions with complaints against the VC including “isolating,” “not very social” and “less personal.” However, the number of such comments reduced significantly in the exit survey. The teacher in case study one commented that “they did complain a little – I think as they got more comfortable with the idea and how to use it (VC), they complained less.” This could indicate they found the sessions more engaging and social than they expected.

#### ***Technological Issues***

Learners in all case studies commented on technological problems including sound issues, dropping out of a session or the VC not working at all. A further issue raised by learners included bandwidth issues and the cost of download. Bower (2011) reported similar findings reporting “when learners had issues with practical usability with software this hindered their learning experience.”

#### ***Task Switching***

Learners in case studies one, eight and nine commented in the entry survey about a concern that they could be distracted. A learner in case study nine commented “you have the chance to multitask”. However, these comments were not repeated in the exit surveys.

#### ***Headset Purchase***

A common theme through this study was the complaint by learners in both the entry and exit surveys about not wanting to supply their own headset. This issue could not be addressed during the length of this study and learners were required to supply their own headsets.

## **Computer Literacy**

Case study two learners commented in the entry survey that they were concerned about not having the skills to use the VC. However, no learners commented on this in the exit survey.

### **5.1.2.3 Task Switching**

Current research reveals overwhelming evidence that learners are task switching at a high rate and that this has a negative impact (decline in productivity, accuracy and efficiency) on the learning that occurs (Judd, 2012; Lin et al., 2009; Kirschner & Van Merriënboer, 2013; Rubinstein et al., 2009; Risko et al., 2013). While there has been limited research on learner's task switching in VCs, studies do suggest learners are task switching when participating in a VC (Clark & Kwinn, 2007; Clay, 2012; Courville, 2010; *eLearning Guild*, 2005; *Towards Maturity*, 2011). One of the key goals of this study was to investigate if learners were task switching in the VC sessions and if this affected their appropriation of knowledge.

The following Table 5.3 records the level of task switching the learners reported during the VC sessions. It also lists the teacher's thoughts on learners task switching.

**Table 5.3: Learner task switching frequency.**

<b>Case study</b>	<b>Results of learner end of session poll</b>	<b>Results of learner exit survey</b>	<b>Average numbers of task switchers</b>	<b>Teacher's thoughts of learners task switching before</b>	<b>Teacher's thoughts of learners task switching after</b>
1	43%	100%	71.5%	Frequently	2 to 5 times
2	40%	75%	57.5%	Sometimes	Once
7	100%	50%	75%	Sometimes	Never
8	87%	100%	93.5%	Always	2 to 5 times
9	64%	71.5%	67.7%	Sometimes	N/A
10	88%	NA	88%	Always	2 to 5 times

N/A = not applicable

The above results indicate that learners task switched with an average percentage of 75.5% across all case studies (the above data was collected from six teachers, 72 responses from the end of session poll from the learners and 27 learners completing the exit survey). Therefore, the answer to this question is yes, approximately 75% of all learners task switched while participating in a VC session.

The following Table 5.4 displays the tasks learners switched to while attending a VC.



**Table 5.4: Tasks performed by learners during a VC session.**

Case Study	Results from teacher exit survey	Results from learner end of VC poll	Results from learner exit survey (multiple responses allowed)
1	e, fb	<b>tp</b> 33%, <b>w</b> 25% <b>e</b> 17%, <b>cri</b> 17%, <b>o</b> 8%	<b>tp</b> 50%, <b>e</b> 50%
2	e	<b>w</b> 60%, <b>d</b> 20%, <b>c</b> 20%	<b>e</b> 50%, <b>tp</b> 25% <b>nts</b> 50%
7	nts	<b>fb</b> and <b>tp</b> 100%	<b>tp</b> 50%, <b>e</b> 50%
8	tp, fb	<b>tp</b> 60%, <b>w</b> 26%, <b>tv</b> 7% <b>o</b> 7%	<b>tp</b> 25%, <b>e</b> 25%, <b>fb</b> and <b>tp</b> 25%, <b>e</b> and <b>fb</b> 12.5%, <b>e, fb, tp</b> and <b>o</b> 12.5%, <b>two of the following (fb, tp, e)</b> 25%
9	N/A	<b>tp</b> 65%, <b>w</b> 21%, <b>o</b> 14%	<b>tp</b> 20%, <b>fb</b> 40%, <b>e</b> 20%, <b>two of the following (fb, tp, e)</b> 20%
10	tp, fb	<b>tp</b> 50%, <b>w</b> 20%, <b>e</b> 10%, <b>tv</b> 10%, <b>o</b> 10%	N/A

e = email, fb = Facebook, cri = course related information, o = other, w = included all websites (Facebook, YouTube etc.), tp = text and phone, c = children, tv = television, nts = no task switching, N/A = not applicable

The most common task listed was the text/phone with the second being email, followed by the websites (including the use of Facebook and YouTube). Other tasks listed including looking after children, having dinner and watching television.

There were issues with correlating these data. When this study commenced, Facebook was still gaining in popularity and therefore the tasks listed in iteration one were different from the tasks listed in iteration two with survey questions changing in iteration two to include Facebook. The questions were also changed from learners able to provide open answers to having to select specific tasks.

The amount of task switching increased from iteration one where the learners recorded an average 64.5% task switching compared to iteration two at 81.05%. This occurred despite improvements being implemented prior to the commencement of iteration one including:

- The creation of Introduction ‘how use the tools’ slides and a ‘reminder to record’ slide.
- Informing all teachers about the whiteboard text issues
- Encouraging the teachers to attend ‘how to training’ sessions
- The development of new guides and all teachers being encouraged to use these for their own use and for their learners.

This increase in the amount of task switching may have been due to the increase in the use of smart phones and the increase in the use of social media during this time. The researcher suspects if this survey was completed now the use of social media would be the most common task and would include the use of Facebook, Twitter and Instagram. The role of social media should be investigated in further research on task switching.

Table 5.5 displays the results from learners and teachers of when they felt they learners were the least engaged.

**Table 5.5: Learner engagement measure.**

Case no.	Results of learner end of poll	Results of learner exit survey	Marked decline in engagement by learners			Results of teacher exit survey
			Session 1	Session 2	Session 3	
1	end	middle	NA	1 start, 5 middle 9 end (11 LT)	0 start, 0 middle 5 end (5 LT)	start
2	start	start and end	0 start, 2 middle, 1 end (5 LT)	0 start, 2 middle 3 end (3 LT)	NA	start
7	end	end	0 start, 5 middle 2 end (8 LT)	0 start, 4 middle 0 end (10 LT)	NA	end
8	end	middle and end	1start 2 middle, 6 end (14 LT)	1start 3 middle 2 end (7 LT)	0 start, 3 middle 1 end (7 LT)	middle
9	start	end	1 start, 1 middle 5 end (10 LT)	N/A	N/A	N/A
10	middle	NA	0 start, 1 middle 0 end (2 LT)	2 start, 0 middle 0 end (3 LT)	1 start, 0 middle 0 end (3 LT)	end

LT = learners in total, N/A = not applicable

Case study one learners listed either the end or middle as being the least engaging, and the teacher stated it was the beginning. However, in the two sessions there was a marked decline in participation at the end of the sessions. The teacher changed her delivery methodology for the last session as previously she had encouraged a great deal of interaction with the use of emoticons, chat or group activities on the whiteboard. However, in the last sections of both sessions the delivery methodology was straight lecture slides. This would allude to the importance of encouraging regular interactions to maintain the attention of the learners. The teacher stated that she suspected they were task switching in these last sections but she could not be sure.

Case study two results were more consistent with both learners and teachers listing the beginning as least engaging. However, there was a decline in participation in the middle of one session and the end of the other. The teacher predominantly used a webcam as her main engagement tool rather than slides. This worked well as she was very positive and enthusiastic. However, the researcher suspects if the teacher was less confident or enthusiastic the sessions would not have been so successful. The teacher encouraged participation by inviting learners to use the whiteboard tools and by asking many questions. However, there were times during the session where the teacher called on learners by name and they did not respond. The teacher commented “were they task switching or just trying to work out how to use the tools – hard to tell?” The teacher could have encouraged more attention by regularly using emoticons to ensure the learners were paying attention. The teacher also did not use PowerPoint slides to post information or questions and instead typed on the whiteboard. While she was doing this the learners could easily have switched to another task. The teacher commented that there was

lots of quiet time which can lose the learners [attention] – so should have set time limits, and issue of typing over should have set PPT, or quickly put in lines, or just used chat.

She included PowerPoint slides in the second session and this session ran more smoothly than the first.

Case study seven results were also consistent with learners and teachers listing the end as least engaging, although the results show there was a reduction in participation in the middle of both sessions. It was straight after multiple lecture

slides in a row with no interactivity that there was a major delay in responses from the learners. One learner started to type text on the slides when not prompted and demonstrated that they were bored. When the teacher asked individuals or the group for responses there were delays at the end of these lecture slides, but there did not seem to be delays at other times. One learner also put up the “speed up” emoticon, which demonstrated that he was becoming bored. There was also a four minute delay while the teacher had to reload slides and directly after this silence one of the learners stated that they had to leave. This may have been due to the delay. All these issues could have been dealt with by asking for emoticons or a tick-yes/cross-no at the end of each slide to ensure the learners remained attentive. The teacher realised after the delay in responses in session one that she needed to make her session more interactive and varied, and for the second session she included more interactivity and a video.

The results from case study eight showed similar perceptions with the learners and teacher as they both listed the middle as least engaging. In sessions two and three there was a very small decline in participation in the middle. The teacher maintained the attention of the learners throughout the session. She was one of the only teachers who believed that learners always task switched and this may have helped the engagement of the sessions as she designed the session to include a great deal of interaction with multiple tools. She regularly called learners by name throughout the session so all learners knew they could be called on at any time. If she sensed they were bored she addressed this by telling them how long there was left to go or what was coming next. She also asked them to use the emoticons and chat. She continuously encouraged the learners when they participated with the tools. This worked well with the international learners, who were hesitant to use tools at the commencement of the sessions, but by the end of the sessions, were interacting with all tools regularly. One learner was disruptive and typed without invitation on a slide and the teacher brought the learner back on task by encouraging him to be active in the lesson by posting up a web link.

Case study nine results had a mix of perceptions with the learners listing the middle as least engaging, the teacher the end, and the data indicating the end of the session. This decline was due to the teacher displaying the webcam and therefore no interaction was required by the learners so these statistics may not be accurate. However, the teacher could have asked for a tick-yes/cross-no to ensure they could

view an image correctly and to maintain attention. There was a delay in the session while the teacher was trying to get the USB microscope images working, although, as all learners were aware that this was new innovative technology, they all remained focused on the room. However, they became restless and started using the drawing tools on the displayed whiteboard screen. If this delay occurred regularly the learners could be tempted to task switch.

Results from case study ten once again presented a mix of perceptions, with learners listing the middle as least engaging, the teacher the end and the data marked the middle of one session and the beginning of the other two sessions. These lessons were designed to be lecture based. The teacher maintained attention by adding text regularly to the screen. He asked questions and if no response was given he added a hint, but there were silences while he waited for responses and the learners could have lost focus. He adjusted this for the second and third session and asked individual learners to answer questions. In the second session one learner was called to answer a question and when she did not reply the teacher called on her a second and third time. She then responded with “was on the phone but still listening.” The fact she did not hear the teacher calling her name three times could mean she was distracted from the content. During the first session there was a significant delay when the teacher typed text on the screen. This could have allowed learners to task switch. However, the teacher resolved this by writing text one line at a time. The teacher also realised after the first session he required more interactivity to keep the learners focused and did start asking the learners to use the emoticons. He did comment that

one possibility I might try in the future is allow learners to use the whiteboard as well. Just to make the lesson more interactive for them.

At the moment, the experience for the learners is pretty passive.

There were issues with the collection of these data. The first was the difference in an exact definition of what constituted the beginning, middle and end of each session. This was not specified to either the teachers or the learners and this may have resulted in incorrect responses. From the researcher’s perspective the sessions were equally divided into three sections based on the length of the session. However, this discrepancy may have skewed the results. For example, a section towards the end of the beginning section may have been analysed as the beginning from the perspective

of the researcher but may be seen as the middle from the learners. With the issues in data collection the above statistics cannot conclusively answer the question of when the learners were the least engaged. However, it does suggest that a teacher's perspective can be very different from a learner's perspective.

The findings from the data indicated that learners definitely task switched, with 75% of the learners reporting that they did. The most common task listed was texting/using the phone, the second was using email and the third using websites including Facebook and YouTube. This study showed that the time learner's task switched varied depending on the teachers, learners and sessions. So the exact time frame could not be conclusively answered. However, the above discussion suggests that the learners appeared to task switch when there was limited interactivity.

The above data suggests that learners were doing other tasks and were therefore not actively participating in and absorbing the content being delivered by the teacher or participating in the discussions. This was highlighted by the learner in case study ten who when called on to participate in the discussion did not hear the teacher ask her the question initially and then admitted she was on the phone. Learners task switching and not paying attention caused a delay in content delivery of the session as in some cases the teachers were waiting for responses from these learners.

#### **5.1.2.4 Solutions**

The following solutions were proposed according to the issues that were raised in this study.

##### ***Designing for Regular Interactions***

It is critical that teachers design their sessions to include regular interactivity with the learners to maintain attention. This could be as simple as asking for a tick-yes/cross-no, asking the learners to post a comment in the chat or encouraging active participation through a group whiteboard drawing tool activity.

From the results of this study the Flex:Ed staff now encourage all teachers to read the tips and tricks section in the guides and in particular the section which recommends there should be no more than four slides without interaction, e.g. tick or cross, emoticons etc. In addition, they were advised that they should not have a slide displayed for longer than four minutes. This will be discussed later in the chapter.

Another method to gain regular interaction is to call learners by their names, to avoid delays and to ensure all learners remain attentive when asking questions.

### ***Use of Nanny Software***

Learners could be encouraged to use “nanny” software. This software can allow the learners to set time restrictions that block web access to certain sites, for example Facebook or email. The learners could set this to block access to these sites during the time they are participating in the VC. Common nanny software programs include K9 Web Protection and Self-Control.

### ***Educating Teachers and Learners***

The teacher in case study eight commented that she believed the learner’s task switched always and therefore made sure she designed for interaction. This highlights the importance of educating teachers that their learners will be task switching and that this task switching can affect the learning experience. It is equally important that learners are also educated on task switching and how it affects their retention of knowledge in these sessions.

## **5.2 RESPONSE TO RESEARCH QUESTION TWO**

Research Question Two: What training, guides and support do VET teachers and learners require to provide an environment that supports learners in the VC?

### **5.2.1 TEACHER TRAINING (PROFESSIONAL DEVELOPMENT)**

The following table displays the teachers’ previous experience with participating in or teaching in a VC. It also shows the type of training the teachers had participated in.

**Table 5.6: Teacher training and previous experience.**

<b>Case Study</b>	<b>Teacher previous experience</b>	<b>Teacher training</b>	<b>Teacher comments</b>
1	PW, TO	FLO	Would like to see ‘how to’ instructional videos
2	PW, TW	TE	NA
7	PW, TW, PO	ONE	NA
8	PO	ONE	More session on Wimba in the fortnightly development sessions
9	PW, TO	FLO	Information about recordings, polling, video and showing webpages
10	PW, TO	FLO	NA

FLO = Facilitating Learning Online course, TE = training by external provider, ONE = one hour training on how to use VC for beginners, PW = participant in Wimba sessions, PO = Participant in other platforms, TW = taught sessions in Wimba, TO = taught in other platforms, NA = not applicable

In case study one the teacher had completed the comprehensive Facilitating Learning Online (FLO) course run by the Institute. She commented that she did not need any further training. And while the knowledge this teacher acquired during this course was demonstrated through her excellent planning, preparation, use of slides and use

of the tools, the course was conducted in a different platform called VET Virtual. Because of this she had issues with her own whiteboard text tool and did not know how to allow learner access to tools. If the teacher had participated in the one hour training session or read the guides these issues may not have occurred.

In case study two the teacher had completed training by an external provider, had delivered sessions in a different VC platform and felt confident. However, this confidence was detrimental as she did not practise using the VC prior to her first session. As many of the tools she had used previously were not available in Wimba, or were slightly different, this caused frustration to her and her learners. Prior practise with the VC would have solved the tool issues. The teacher also commented that she needed to improve her “ability to remember to do things like turn on the archiving + enabling learners to use the white board + remembering to upload the PPT beforehand!” The teacher also commented that “I have to work out how to be quicker in going from one application to another + writing on the white board – I am too slow.”

In case study seven the teacher completed a one hour “How to Use the VC for Beginners” virtual training session run by the Institute. While this did assist the teacher in her delivery she experienced an issue of not knowing how to use the blocking tools and this knowledge would have assisted her in blocking the learner who continued to write on her slides.

In case study eight the teacher participated in a one hour “How to Use the VC for Beginners” session and a one on one training session with the researcher. The teacher was very confident and comfortable using the VC room.

In case study nine the teacher had completed the “Facilitating Learning Online” course. However, as in case study one it was in another platform and some of the tools were located in different areas. Had the teacher practised in the Wimba classroom in a trial run some of the issues, such as not knowing how to allow access to the tools and webcam, would have been avoided. Had a Flex:Ed support teacher not been in the room to release these tools on the teacher’s behalf, the session would not have been as successful.

In case study ten the teacher had participated in some Wimba sessions and had also taught in a few sessions in another platform. He had also completed the “Facilitating Learning Online” course and a one on one session with a Flex:Ed staff



member. He went into the first session very confident and this could have been detrimental as he did not practise with the tools before running the first session. Before commencing the first session prior practise in the VC would have solved the tool issues. He did not believe he required any additional training.

The above results highlight some important issues in training teachers. Analysing these results, it is clear that participating in training is crucial to a successful VC session. This finding supports previous research by Clark & Kwinn (2007), Cornelius (2014) and Todhunter and Pettigrew (2008). This study further identified the importance of specific training in the VC platform to be used for the delivery of the sessions. Teachers in all case studies, except case studies seven and eight, had all trained or taught in other platforms and thereby assumed they had the knowledge required to successfully run a VC session using Wimba. All teachers experienced delays in delivery due to not knowing how to use the Wimba tools. The teacher in case study eight had completed the basic training but this did not include how to use the blocking tools. Therefore, it is important to include more advanced tools in the “How to Use the VC for Beginners” training. All teachers will be encouraged to attend both the improved “How to Use the VC for Beginners” training course and the “How to use the VC – Advanced Sessions” course prior to delivering a VC session. Sessions will be run during a semester as well as before the commencement of sessions. For teachers who cannot make these sessions recordings will be available for viewing.

Participating as a learner prior to being a teacher is another method to ensure a successful VC. The teachers who participated in the FLO all participated in this course as learners and this assisted in their understanding of how the VC allows the opportunity for learners to task switch when there is a lack of interactivity in its design. The “How to Use the VC for Beginners” training course run by the Institute will have the teachers logged in as learners for the first half of the session to experience a learner’s perspective.

Many studies suggest offering teachers new to a VC an assistant to mentor them, particularly through a first session (Loch & Reushle, 2008; Pelliccione & Broadley, 2010; Schullo, 2005). The Institute will continue to offer the assistance of a Flex:Ed staff member to be in the VC room for the first time a teacher uses a VC with their learners.

These results also highlight the importance of practice in most case studies. All Institute teachers will be encouraged to practise their session in a VC room prior to delivery, particularly when delivering for the first time. This is supported by Clay (2012) who suggested teachers should always do a dry run and Christopher (2015) who proposed teachers should record themselves.

Another essential element revealed in these results is the importance of teachers having a Plan B. Many teachers experienced issues with tools not working the way they had designed and had to resolve these issues in future sessions. Teachers will be encouraged to have Plan A, B and C to allow for alternatives if issues arise.

### **Essential Virtual Classroom Skills**

Findings from literature and this study suggest that a teacher's competence in the use of the VC technology is critical to the success of a session (Bower, 2011; Loch & Reushle, 2008; Martin et al., 2011). This study will use Bower's (2011) list of competencies as a basis for the essential skills required by VC teachers. Bower (2011) categorises these skills into four key areas of operational, interactional, managerial and design. These areas are broken down to their finer elements below.

**Operational skill** is the ability to operate the tools and functions of the VC and include:

- knowledge of technology use for self and learners
- knowledge of tool use for self and learners.

**Interactional skill** is the ability to effectively perform a task or solve a problem using the technology or tools in a VC. These skills include the ability to:

- engage, control and manage learners and interactions, to bring people in, to interrupt those who 'hog' and to manage small groups
- to think like a radio announcer (Bucceri & Hemmings, 2003), to keep voice upbeat and energised
- to be able to task switch.

**Managerial skill** is the ability to manage a group or class while providing support on how to use the technology and interact effectively. These skills include the ability to:

- be flexible and to adapt to issues and to be aware of all possible issues that may occur and have a backup plan
- to be able to task switch quickly and efficiently
- to train learners on how to use tools
- to hold learners accountable in the session by setting ground rules
- to have facilitation skills
- to have time management skills
- to have presentation skills
- to have verbal skills
- to have evaluation skills
- to have the preparedness to practise and be a learner before a teacher.

**Design skill** is the ability to select and organise tools in a way that optimises interaction and best supports activity management. These sorts of skills include:

- the ability to create activities that will work effectively in a VC and will encourage interaction
- the ability to plan.

### **Teacher Task Switching Skills**

It is an interesting paradox that the topic of this research is how teachers can discourage learners from task switching, but the very nature of a VC platform requires a teacher to constantly task switch in the session from one area of the platform to another (Clark & Kwinn, 2007; Cornelius, 2014; Finkelstein, 2006; Hofmann, 2004; Schullo, 2005). For example, a teacher must switch between using the audio to deliver the lecture, using the pointing tools or drawing tools on the whiteboard to explain a key issue, monitoring the learners' text in the chat and responding to any emoticons. This can be overwhelming for teachers. Teachers in this study commented about this issue with the teacher in case study two commenting "I was so involved in what I wanted them to learn that I did not always look at the writing and did not really use the icons that much," and the teacher in case study two commented "I have to work out how to be quicker in going from one application to another + writing on the white board – I am too slow."

The ability to quickly switch from one task in the VC to another then becomes a critical skill required by a teacher for the success of a VC session. This is a skill that can be acquired through practice and will increase with experience and confidence. There are some tips to help teachers manage their room and these include:

- having an assistant for the first session until they are comfortable with using the tool
- the importance of “keeping it simple” (KIS) at the beginning by using only the basic tools
- pre-preparing all that they can prior to the commencement of a session including cut and paste text or preloading PowerPoint slides
- utilising new features in platforms like using colour options in text
- ensuring that ground rules are set.

## **5.2.2 INSTRUCTIONAL DESIGN**

### **ADDIE**

With the findings from the literature review and this study, the following instruction design model has been developed based on the ADDIE e-learning design model originally developed in 1978 for the U.S Army. ADDIE is an acronym for analyse, design, develop, implement and evaluate and each of these elements will be discussed below. This model is based on a combination of the infographic model created by the National VET E-learning Strategy (2014) and the Blended Synchronous Learning Design Framework created by Bower et al. (2014).

#### ***Analyse***

The analyse elements involve having Institute support, including equipment for both self and learners. In this stage, the teacher works out what is required and has clearly defined learning outcomes for the session. They also decide on the time frame for session length.

#### ***Design***

The design element encompasses active learning and interactivity. It includes designing technologies to match the lesson (what tools, time frames, what techniques, what slides, what will be included on slides, etc.), ensuring a match of technologies to the lesson requirements. In this stage a teacher should set up, test in advance and be highly organised.

### ***Develop***

In this stage the teacher should create slides, interaction opportunities, activities and develop all session requirements. When this is done content is uploaded into the VC.

### ***Implement***

This is the step in which to prepare and practise. The teacher should prepare the learners and ensure all learners know how to use tools prior to, or at commencement of a session, and have access to guides and support. Teachers should log in 15 minutes prior to a session to check all technology. During a session they should ensure regular learner interaction, be flexible, adaptable and remain composed. Having the knowledge about how to use technology and how to troubleshoot issues that may occur is important. Tactics to encourage participation including the use of audio and visual modalities should be planned in advance. Access to a second computer may be helpful, as is an assistant for a large group or a first session.

### ***Evaluate***

After the session it is important to reflect on what worked or did not and what might be changed for the next session. Sharing with other teachers can build collegial support and knowledge.

### **ADDIE: Design and Develop Considerations**

This thesis does not have the scope to discuss each of the above phases in detail; however, there are two major phases that are critical to the success of a virtual classroom, namely the design and develop phases which includes the planning, and preparation.

### ***Length of Sessions***

One of the first steps in planning a VC session is deciding the length of time required for a session to be conducted. Research studies suggest the optimal time as being no more than 90 to 120 minutes, and if 120 minutes, a break is suggested in the middle (Bucceri & Hemmings, 2003; Christopher, 2015; Hofmann, 2004). Based on previous studies the Institute has set a guide for teachers that no session should be conducted for no longer than 60 minutes and in this study no session was conducted for longer than 45 minutes.

### ***Planning for Interactivity***

Research studies concluded that a critical component for the success of a VC session is the inclusion of interactivity and learner interaction with the use of emoticons, chat, audio, whiteboard pen feature and other tools (Bower et al., 2015; Chen et al., 2011; Christopher, 2015; Clarke, 2005; Clark & Kwinn, 2007; Hofmann, 2004). This study also highlighted the importance of including regular interactions even if just with an emoticon to maintain the attention of the learners and reduce the opportunities for learners to task switch. The Institute will encourage all teachers to develop a lesson plan for their VC which includes clear indication of when and how they will include interaction to engage the learners.

### ***Timing***

Research studies also highlighted the importance of planning for regular interactions with the suggested time frame being every three to five minutes (Clark & Kwinn, 2007; Hofmann, 2004). The importance of this regular engagement of the learners was highlighted in this study when the learners had a delay in replying after a series of lecture slides with no interactivity.

### ***Slides and Visuals***

This study highlighted the importance of using effective slides in a VC session to encourage engagement. The more successful slides incorporated relevant images and activities. The less successful slides were slides with straight text. The study highlighted how the slides that included whiteboard drawing tools, such as the pointer tool or drawing tools, also worked well to engage attention. This supports the research by Heacock (2010) and Courville (2010), who both claimed that any movement on a slide will attract the attention of learners.

## **5.2.3 LEARNER TRAINING**

The following table displays the learners' previous experience with participating and training in a VC.

**Table 5.7: Learner training and experience in a VC.**

Case Study	Previous experience	Training
1	100% NE	75% NT, 25% B
2	80% NE, 20% VW	100% NT
7	100% NE	100% I
8	91% NE, 9% VW	62.5% I, 37.5% NT
9	86% NT, 7% PW, 7% VW	50% I, 50% NT
10	N/A	N/A

NE = no experience NT = no training, B = basic walkthrough of tools, I = introduction session with researcher, VW = viewed recording of a Wimba session, PW = participant in Wimba sessions, N/A= not applicable.

The literature review surfaced the importance of providing learner training to ensure learners are comfortable with the environment (Bower, 2011; Bucceri & Hemmings, 2003; Grant & Cheon, 2007; Schullo, 2005) and therefore able to focus on the content in the session.

The majority of the learners in this study had no previous experience in using a VC and therefore had no knowledge of the use of the tools in a VC. In iteration one the learners had no prior training. In iteration two the learners in case studies seven and eight were given a 15 minute “how to” session prior to the commencement of their first class VC session. This worked well as there were limited tool use issues in these sessions. The teacher in case study ten also commented that he thought it was important for the learners to have a practice session prior to commencing a session and would ensure this happens at the commencement of each semester. This confirms the importance of learners having some kind of training in the use of the VC prior to commencing content sessions.

Research suggested while training is needed for learners this only needs to be limited. Schullo (2005) suggested only half an hour demonstration. Grant and Cheon (2007) claimed learners need only a simple exercise at the beginning of a session. Bucceri and Hemmings (2003) claimed learners just need to attend a check-in session before the first session to identify and resolve any technical issue and familiarise themselves with the VC.

However, feedback from Flex:Ed staff members revealed they believe this may not be enough with one staff member stating that

most of the time the first time sessions I’ve seen have been spent on getting the technical aspects set up and only a few minutes on getting comfortable with the environment. Some learners find that enough, but others are left bewildered – not a great first experience. For their sake, we need to be doing more “in class” support too.

This alludes to a further paradox in this study that, while the focus is on how to discourage learners from task switching the very nature of the VC requires the learners to focus on many different areas, including listening to the teachers, watching the whiteboard and using the whiteboard tools, using the hold button if they want to speak, looking at and typing in the chat block and using the emoticons. This study concurs with research by McBrien et al. (2009) who claimed the multifaceted nature of a VC may cause learners to become overwhelmed.

Ideally, the Institute should encourage teachers to run a first session just on tools. If this is not possible due to budgeting or staffing issues, then the institute should encourage teachers to allocate time at the beginning of the first VC session to show the learners how to use the tools. A Flex:Ed staff member and a learner also commented that they would like to see creation of short “how to” videos. The Flex:Ed team developed these and will encourage teachers to share them with their learners prior to using a VC.

### 5.2.4 GUIDES

The following table shows the use of guides by both teachers and learners.

**Table 5.8: Guides used by teachers and learners.**

Case Study	Teacher	Learners
1	NO	NO
2	NG	NO
7	NG	50% NO, 50% NG
8	NUG (only used Wimba book)	50% NO, 50% NG
9	NUG	50% NO, 50% NG
10	NUG	*

NO = no guides, NG = knew of guides, NUG = Knew of and used guides, \* = no data available

It was concerning to the researcher and the Flex:Ed staff that the teachers in the first iteration did not use the guides themselves or promote the “how to” guides for their learners. In response to this the guides were printed and supplied to all teachers in iteration two for their own use and they were encouraged to print out or email guides to the learners. In response to feedback from the teachers a new guide was also created for the teachers called the Teacher/Presenter Advanced Guide which included further information about administrating the Wimba VC and included a section on recording.

At the conclusion of iteration two it was once again concerning to the researcher and the Flex:Ed staff that the teachers in this iteration also did not utilise all the guides or promote the “how to” guides for their learners. In this iteration 50% of all



learners were not aware of the guides. In the future all teachers will be encouraged to refer to the guides and to provide all learners with the guides prior to the session, in particular the Troubleshooting Guide to avoid technological issues.

The following examples from the case studies highlight the importance of the teacher's effective use of the guides, which include providing the learners with the guides.

The teacher in case study two commented "I think the problem was that although there was information, I never had time to look at them – too busy." Case study one teacher commented that she did not use the guides as she "knew what to do from the FLO course." However, this training was in another platform and the operation of the tools was different. Had this teacher looked at the guides she would have seen the differences in the location and set up of the tools. The teachers in case studies eight and nine would have benefited from referring to the Troubleshooting Guide to solve the audio issues that occurred at the beginning of both sessions.

In case studies one and eight, some learners could not get audio/sound working and the Troubleshooting Guide may have provided a solution. In case study two, one learner stated in the exit survey that she "hadn't seen any, not aware of guides." This would have been useful for the learners, particularly those who had some technological issues with logging in as the Getting Ready Guide clearly instructs the learners to run the wizard the day prior to the session. Referring to this guide would have assisted in ensuring all technology and audio were working well at the commencement of the sessions. The guides were improved after feedback from the teachers in iteration one and further improved after feedback at the conclusion of iteration two.

## **5.2.5 SUPPORT**

### **Institute Support**

Studies by Bower (2011), Conti (2012), Loch and Reushle (2008) and Roughton et al. (2011) all highlighted the importance of institutional support for the success of the use of VCs by teachers and learners. This study concurred with these findings, and suggests the following support should be provided by institutions.

### ***Time***

Many case studies unearthed a common theme by the teachers regarding the amount of time and effort required to prepare an interactive VC session. The teacher from case study one discussed the amount of time it took her to create the interactive slides, and include images and topics that would capture the learners' attention. Teachers in case studies one, two, four and six agreed that preparing and delivering a VC session required a great deal of time, especially when compared with face to face sessions. Interestingly, the teacher in case study ten stated he thought it took less time and effort compared to his face to face sessions. This issue was discussed with the Institute's management but due to budget issues the decision went to their respective departments and most departments would not allow additional time for online or VC development.

### ***Help Desk***

Support for teachers and learners in the use of a VC should be provided. If a help desk is an IT help desk or a learning management system help desk, all staff must also be trained in the use of the VC tools and technology. This was an issue in iteration one where one staff member tried to obtain help via the help desk and the staff member was unable to assist as they were not trained.

### ***Guides***

The use of the guides to assist teachers and learners in the use of tools and technology (particularly audio) has been discussed at length this study. The Institute must allocate a budget to the design, update and production of guides for both teachers and learners.

### ***Equipment***

This was a common complaint during the study, particularly in regards to the learners not being provided with headsets with microphones. If Institutions want to encourage teachers and learners to use VCs all required equipment must be provided. For learners the cost could be included in course costs but at a minimum these headsets must be available for purchase from the Institute. The teachers must be provided with good quality headsets with microphones, webcams and other equipment as required, such as a USB microscope.

## ***Encouragement***

The importance of encouraging the teachers to “buy in” to VCs was also discussed in studies (Bower et al., 2014; Martin et al. 2011). This could be in the form of additional time or incentives. At the Institute all training sessions highlight additional benefits of using a VC (see Figure 5.2) including encouraging the teachers to use the VC to participate in meetings as an introduction to the VC.


<ul style="list-style-type: none"><li>▪ <b>Time saving (no need to travel between campuses)</b></li><li>▪ <b>Petrol cost savings and less carbon emissions</b></li><li>▪ <b>Connect with industry members from around Australia</b></li><li>▪ <b>Record the session and use for Audit requirements</b></li></ul>	
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Figure 5.2: List of benefits.

## ***Further Support***

### ***Entry Tool Slide***

During case studies one, two, eight and ten, the teachers had to interrupt the flow during their sessions to explain how to use tools. At the completion of iteration one, introduction slides were created on the use of tools; however, no teachers in iteration two used these. These slides were improved at the end of iteration two and have now been condensed to one slide and all teachers at the Institute are now encouraged to use this slide at the commencement of all sessions.

### ***Staff Support***

The assistance of an experienced user of the VC, or trained staff member (Flex:Ed), should be provided to all teachers for their first session. Other support could be provided on an as needs basis.

### ***Recording***

The issue of teachers forgetting to record sessions was a common theme in this study. After iteration one, the Flex:Ed team developed a slide to be included at the commencement of any session to remind teachers to start a recording. All training and support of new and existing teachers will emphasise the importance of remembering to record sessions.

### ***International Learners***

This study revealed that international learners seemed more reluctant to participate in the sessions compared to other learners. Teachers in case studies four, seven and nine

commented that there were potential issues for international learners participating in the live VC room. Teachers need to take this into consideration and offer additional support for these learners. One suggestion is offering one on one instruction on how to use tools prior to a first session. The teacher in case study eight found that through constant reassurance and praise, she encouraged her international learners to participate more often. For the international learners recordings would be beneficial as the learners could review any information missed in the session, and also stop and start the recordings at their own pace. Further research needs to be undertaken on this topic.

### ***Videos***

There were requests from learners, teachers and Flex:Ed staff members for the creation of “how to” videos. These were created as a short, four minute How to Use the Tools video available to learners and in all training sessions for teachers.

### ***Online Resources***

At the conclusion of iteration one there was a suggestion that resources for the VC be added to the Institute’s Flexible Learning Network site. A new section was added and included links to all guides, contact details for the help desk and Flex:Ed staff members. There was also a discussion forum space created for all teachers to post their issues, ideas and experience.

### ***Tips and Tricks***

The researcher developed a list of strategies, or “tips and tricks”, for all Institute teachers and these are highlighted in all training sessions (see Figure 5.3) and included in the guides.

# Tips and Tricks



## Quick Tips

- Limit sessions to a maximum of **55 minutes** (ideally with break in the middle)
- Make sure you have **set ground rules** for using the Virtual Classroom and be prepared to use your **blocking tools**. You could set ground rules in a text icebreaker
- No more than **4 slides** without interaction e.g. Tick or cross, hand raise etc
- Cover each slide in less than **4 minutes**
- **Close all other applications**. Running other applications on your computer can slow your connection to the eLearn Virtual Classroom
- If you have a large class/session then **partner with a colleague** who can monitor the text and any technical problems (when possible)
- Present somewhere you cannot be disturbed (put up a **sign on your computer**)
- Make sure you are comfortable with the Virtual Classroom and **practice practice practice**
- At the end of the session **RESET** your room back to how you want it for your next session.

## Have alternate Plans A, B and C

- Have a **second** computer/laptop/smartphone set up in case the one you are using has a problem (if available)
- If a participant's **microphone does not work**, don't panic, just ask them to write any questions or comments in the chat.
- If the computer lags or freezes '**pause**' your webcam so only a still picture appears.

Figure 5.3: Tips and tricks for teachers.

## 5.2.6 IMPLICATIONS FOR TRANSACTIONAL DISTANCE

Moore (1973; 1989; 1993; 2013) argued that the separation of learner and teachers involved in distance learning can affect teaching and learning due to the potential for misunderstandings. However, it is important to consider that Moore's (1973) original transactional distance theory was developed prior to the development of VCs. The VC offers the opportunity to assist in breaching this perceived distance through the use of technology.

### 5.2.6.1 Structure

Structure refers to the design of the course delivery. While previous research has indicated that it is important to have a low structured course in distance education to help overcome the possibility of learners experiencing transactional distance, more recent research has concluded that this is not true of a VC session (McBrien et al., 2009; Moore & Kearsely, 2005). Moore (2013) himself contends that the very nature of a VC (which he refers to as "synchronous video conferencing") may require a more structured session. This study investigated structure through classroom management, content organisation and presentation. These topics were discussed in detail in chapter four and while there were no clear results that indicated the exact

level of structure required for a successful session, it can be concluded that structure varies from session to session. It depends on the topic and content being delivered, the personality of the teacher and the variables in the learner cohort. The results from this study found that teachers who had well-planned and well-structured sessions (or sections of sessions) maintained learner engagement and attention and therefore reduced the chance for learners to task switch.

### 5.2.6.2 Dialogue (Interactions)

This study reinforced the views of many researchers (Bower, 2008; Bower et al., 2014; Moore, 1973, 1989, 1993, 2013; Moore & Kearsley, 2005; Schullo, 2005) who concluded that the greatest impact on learners succeeding in distance education is effective interactions and that increasing the frequency of the interactions can help reduce a learner’s potential to experience transactional distance. This study examined nine different forms of interactions that occur in a VC, as depicted in Figure 5.4, and suggests that the success of a VC requires effectiveness in each of these interactions. These interactions are discussed in detail in the following section.

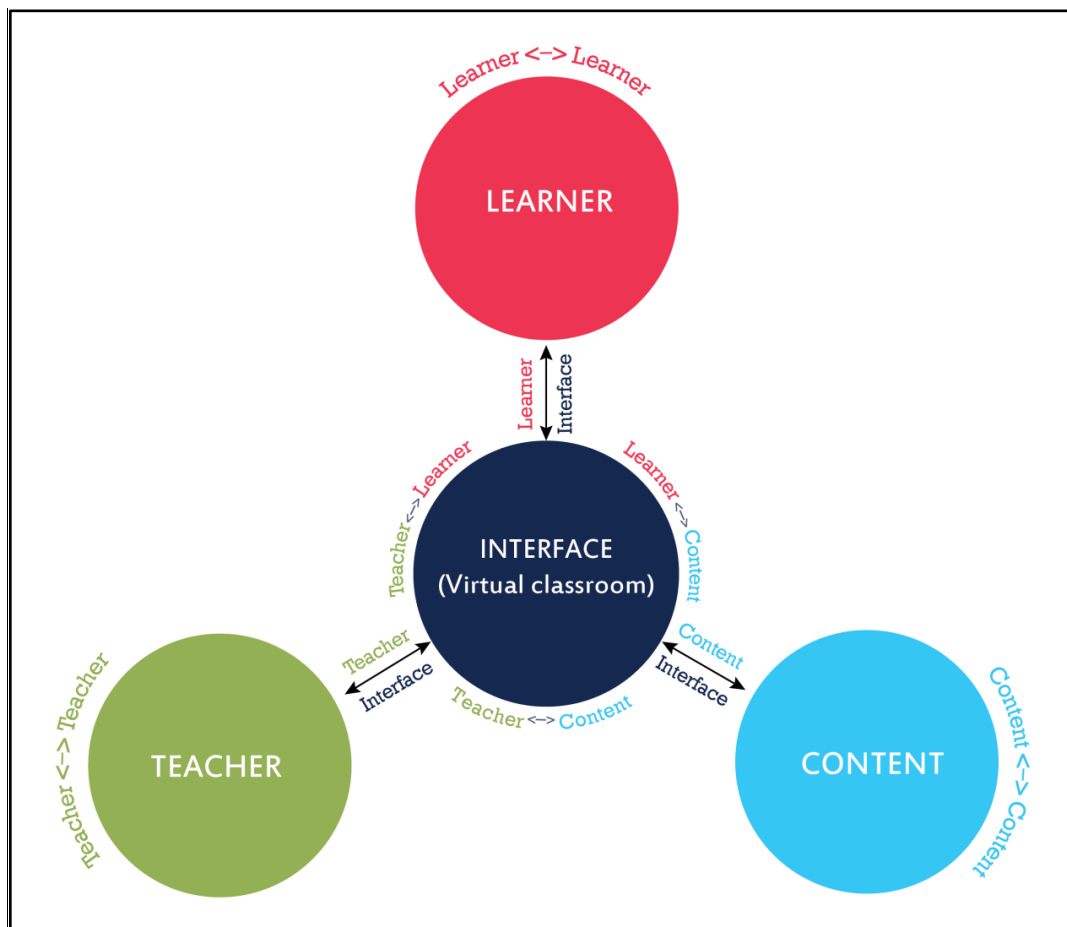


Figure 5.4: Virtual Classroom Interactions © Kerry Trabinger 2016 (adapted from Educational Interactions from Anderson, 2004, p. 46).

## **Professional Development and Instructional Design – Interactions**

This research demonstrated that the multifaceted nature of the VC demands a high level of planning and preparation. This included teacher training (teacher-teacher) interactions to ensure the effective use of the tools and technology, and the considerations in instructional design which include designing for interactivity (teacher-content, content-content and content-interface).

### ***Teacher-Teacher Interaction***

This study affirmed the work of Anderson and Garrison (1998) who introduced the interaction of teacher with teacher. This interaction is the training and support teachers receive from other teachers. This study highlighted the importance of effective training for teachers in the use of the VC, including the use of tools and technology. It also highlighted the importance of building a teacher's confidence, and this would be supported by providing an assistant in a first session. This was highlighted in case studies seven, eight and ten where the teachers who had an assistant in the room for the first session were able to quickly resolve technological and tool issues.

Another issue is the importance of having an Institute teacher available for assistance on demand. The teacher in case study ten commented that he believed having someone from the Flex:Ed team available on a "needs basis" was important. The Institute will ensure Flex:Ed staff members are available to assist all teachers in their first session, and that help desk staff will be trained in using VCs and available to help teachers for real time support. It was also suggested in this study that teachers could share success stories. A section in the Institute's Flexible Learning Network is now dedicated to the VC and includes a discussion space for teachers to post success stories, issues and tips and tricks.

### ***Teacher-Content Interaction***

This study again agreed with Anderson and Garrison (1998) about the importance of having successful interactions between the teachers and the content they are delivering. Anderson (2004) further argued that the development of excellent content and learning activities is an essential element in any educational delivery. This study highlighted the importance of instructional design for any teacher using a VC with particular emphasis on the creation of content that encourages interactions such as using whiteboard screens or webcam images and accurately designing and timing

slides and learning activities. This is seen as a critical component to ensure learners remain attentive and engaged and reduce their opportunity to task switch.

### ***Content-Content Interaction***

The interaction between content and content has not been paid much attention by researchers. However, the nature of the VC affords many opportunities for interactions between content. It is important that teachers design the content interactions in a way that will assist knowledge retention by learners and encourage the learners not to overlook any content. An example of content-content interaction in this study was in case study nine where the learners were viewing a PowerPoint slide with information about maggot size while alternating with viewing a microscope image of a maggot. It is important for these interactions to be relevant and consistent. For example, if the teacher was displaying a slide with content about the size of a fly but was then displaying a microscope slide of a maggot, this could be confusing for the learners.

### **Learner Interactions**

#### ***Learner-Teacher Interactions***

This interaction can be viewed as one of the most important interaction of the nine interactions. The effectiveness of this interaction is crucial in a learners understanding of the content being delivered (Moore, 1993). In the VC these interactions were conducted via audio, whiteboard screen, chat, emoticons and webcam. A major finding in this research was that a teacher needs to maintain constant connection with the learners through other forms of interaction in addition to voice to reduce the opportunity for task switching. In this study the teacher often interacted with multiple media. All teachers used the audio and all teachers used the whiteboard tools. The teacher in case study two also interacted by using a webcam image of herself. Case study nine included a webcam image of the teacher interacting with a maggot on a microscope slide.

All learners in this study interacted passively by listening to the teacher's voice. However, all case studies except case study ten included some forms of active interaction asking learners to interact using whiteboard drawing tools. The teachers from case studies one, eight and nine also encouraged the learners to use the chat and emoticons. Findings in this study suggest that sessions that include more active



interactions maintain a learner's attention better than those lessons with fewer opportunities for active interactions.

Another finding in this study was the importance of teachers encouraging the learners to participate in active interactions. The teacher in case study eight did this well by constantly encouraging and praising her learners, and this session recorded the highest level of active interactions.

### ***Learner-Content Interaction***

This interplay between learners and the content being delivered is also a critical component of any educational delivery. Moore (1993) claimed that without this interaction there cannot be education. All learners interacted with the content by listening to their teacher's words and by viewing PowerPoint slides or whiteboard slides. This study highlighted the importance of using a multimodal delivery in a VC to ensure the slide design include relevant images and less text. Another important finding was the benefits of the use of real life examples to explain content, such as a cut finger when discussing first aid in case study one, discussion about a well-known movie in case study seven and even using the example of falling off a cliff when trying to explain mathematical equations in case study ten.

An issue that occurred in some case studies was videos not being viewable by all learners. This hindered the discussions that followed as these learners did not have the information required to participate. It is therefore critical teachers take into account that all content must be accessible to all the learners.

### ***Learner-Learner Interaction***

The interplay between learners in traditional online learning is limited to asynchronous interactions where there is a delay in a learner responding to another learner (Moore, 1993). The VC platform is able to overcome this issue by allowing the opportunity for immediate responses. In this study the learners interacted with each other predominantly with audio and chat. Case studies two and seven used the whiteboard screen to encourage learners to work together by either creating diagrams or completing tables. However, this learner-learner interaction should be directed by the teacher to ensure the learners remain focused on the session.

## **Technology and Tools Interactions**

A major finding in this study was that for the success of a VC it is important to have successful use of the interface, which includes technology and tools. If learners or teachers were not able to use a tool, then engagement levels declined. . In other cases, learners were unable to participate effectively during a session, and in some cases they were not able to access the room at all.

### ***Learner-Interface Interaction***

This study affirmed the work of Bower (2011), Hillman, Willis and Gunawardena, 994), and Todhunter and Pettigrew (2008) who all claimed it is important for a learner to be able to interact with the interface for the success of a session. This study found that there were many technology issues which occurred and this affected a learner's experience in the VC. Issues that occurred included the time taken for the learners to run through the wizard and/or get their audio working correctly and not being able to use some of the tools (such as not knowing how to hold down a microphone button or how to use the drawing tools). Another issue was that learners using Macs were unable to participate at all. However, these issues can be overcome by encouraging learners to log in one day or at least 15 minutes prior to a session, ensuring learners receive training in the use of the tools in the VC and ensuring learners are provided with guides, in particular the Troubleshooting Guide.

### ***Teacher-Interface Interaction***

This interaction between a teacher and the VC technology and tools is a critical component in the success of a lesson. If a teacher cannot log into a room, or their audio does not work, the session cannot proceed at all. In this study there were many issues that occurred including audio issues, teachers not being able to get the Wimba wizard working, some tools not working (particularly the whiteboard text tool), not knowing how to use tools or problems displaying videos or webcam images. These issues can be avoided by

- encouraging teachers to login one day or 15 minutes prior to the session to ensure all technology and tools are working correctly
- teachers undertaking training in all tools
- having teachers utilise a Flex:Ed staff member to be an assistant for a first session

- having teachers be aware of potential technology issues and have alternative plans ready
- having all teachers aware of and utilising the guides and in particular the Troubleshooting Guide.

### ***Content-Interface Interaction***

There is very limited discussion about the interaction between content and interface in educational delivery. This study concludes that this is an important interaction for the success of a VC, as the very nature of a VC (with the ability to display content and interact with content in multiple ways) can either enhance or impede knowledge retention by the learners. This therefore needs to be a major consideration for instructional design when a teacher is planning and designing a VC session. In this study teachers chose to impart content with voice, slides or whiteboards and in particular the use of drawing tools, webcam images and videos. The whiteboard drawing tools in particular enabled the content and interface (tools) to work together to impart knowledge. Findings from this study suggest that there needs to be consideration to how the content will be displayed, where this content will be displayed and when this content will be displayed in the interface.

Another important consideration is if the content is suitable in a VC. For example, the teacher in case study one had imported animated slides that did not work in the platform. Another example included case studies where a video was not able to be shown. The information contained in either the animation or the video could have been converted to the form of a PowerPoint slide.

### **Nine Interactions**

This section highlighted the need for teachers to plan and implement all nine interactions to ensure the success of a VC session. It begins with teacher training (teacher-teacher) and then moves onto the teacher's instructional design considerations when developing content suitable for the VC (teacher-content, content-interface and content-content). The success is also dependent on the teacher's successful use of the tools and technology in the VC (teacher- interface and content-interface). The success or disruption of any of these interactions can enhance or hinder all learner interactions (learner-teacher, learner-learner, learner-content and learner-interface).

### **5.2.6.3 AUTONOMY**

In this study it was found that if learners were given more flexibility this led to a loss of engagement and attention to the content and afforded the learners the opportunity to task switch. Unlike research findings about traditional distance education, where it was viewed that for success there is a requirement for a high level of autonomy in deciding what, when and how much is learnt (Moore, 1993), the nature of the VC means that, as with structure, this requires a different approach.

### **5.2.6.4 BALANCE**

Moore has always concluded that with transactional distance there is no set prescription for the correct balance of each element of structure, dialogue and autonomy. Rather he concluded there is “no magic ratio to fit every course. It is the task of the designer to evaluate and plan for dialogue and structure depending on the learner cohort and content” (Moore, 1993, p. 28). While this study concurs with Moore’s claim, it can be concluded from this study that in a VC it is important to have sessions high in structure and low in autonomy to keep learners engaged and focused on the session. It is also important to include an appropriate and optimal mix of all nine interactions (learner-teacher, learner-content, learner-learner, teacher-teacher, teacher-content, content-content, teacher-interface, learner-interface, content-interface), to be able to conduct successful VCs that encourage maximum attention and participation, and thereby reduce the opportunities for learners to task switch.

## **5.3 CHAPTER CONCLUSION**

This chapter discussed the combined findings from both iterations in this study. The following chapter will provide a final conclusion to both research questions.

# CHAPTER 6: CONCLUSIONS

*Your conscious brain cannot multitask. If I'm speaking to you and checking my iPhone at the same time, I'm doing neither. This is why our society is frazzled; this misconception that we can consciously do more than one thing at a time effectively.*

Deepak Chopra, Indian American author and public speaker, 2015.

This chapter will discuss the final answers to the two research questions and the limitations that applied to this study. The chapter will conclude with future directions for the VC and suggestions for future research.

## 6.1 FINAL RESPONSE TO RESEARCH QUESTION ONE

**Research Question One – How can teachers design content and/or activities to encourage interaction, engagement and attention while participating in a VC?**

A teacher should recognise the importance of good instructional design when developing a VC session. An adapted ADDIE instructional design model to suit the VC has been provided as a guide for teachers to consider. This model is based on a combination of the E-learning infographic model (National VET E-learning Strategy, 2014) and the Blended Synchronous Learning Design Framework (Bower et al., 2014). Particular importance must be placed on the Analyse phase or 'planning' of all aspects of the session, including having a session that is well structured and includes clear guidelines and ground rules and uses a variety of delivery methods. In the Design and Develop phases, slide design should also be considered and should include frequent slide changes, use of relevant graphic images with limited text, slides that encourage interactivity by the learners and if possible provide group activities and regular movement on the slides by using tools such as the pointer tool or the drawing tool. A teacher should avoid wherever possible displaying consecutive heavy text lecture slides. In the Implement phase, teachers should be familiar with all tools and include instructions for the learners on how to use the tools either prior to a first session or at the beginning of a session. Teachers should plan for regular interaction through the use of tools by the learners to encourage engagement and attention. Teachers should be aware that technical problems may

occur and have alternative plans in place. Teachers should also include the Evaluation phase to reflect on what areas could be improved for future sessions.

The attitude of a teacher to using a VC may influence learners in how much they are prepared to participate in a VC and teachers should remain enthusiastic about the use of the VC even when issues with technology occur. Teachers should encourage the learners about the use of the VC by emphasising the positive aspects of the VC, including the flexibility of access, the availability of recordings at a later time, and the interactive opportunities the VC affords compared to traditional online delivery.

Teachers need to be aware that their learners will try to task switch and this may include using their phone or social media sites, and therefore should design sessions that will encourage the learners to remain focused on the content. Suggestions include designing for regular interactions by frequently changing slides, varying delivery, regular use of tools or asking learners by name to answer questions. Other suggestions include the use of Nanny Software and educating the learners about the possible negative outcomes of task switching which may include an increase in errors, increase in time taken to complete a task and a possible reduction in retention of knowledge.

An outcome of this study has been the discussion about the nine interactions that occur between the teacher, learner, interface and content while participating in a VC, and the importance of considering and acting on each of these interactions to ensure the success of a VC session.

## **6.2 FINAL RESPONSE TO RESEARCH QUESTION TWO**

**Research Question Two: What training, guides and support do VET teachers and learners require to provide an environment that supports learners in the VC?**

Professional development is the key to building the knowledge and skills that are critical for the success of a VC session. Teachers should be provided with training in all aspects of the VC and if possible experience being a learner in a VC session prior to teaching. Training should include the use of all tools including advanced tools such as blocking tools, and include hints to overcome technical issues that may occur. Other suggestions include having a mentor (assistant) in the VC with the teacher during the first session for support and encouragement. Teachers should also be encouraged to run a practice session prior to delivering a live session to practise

using all the tools and to develop the task switching skills they will need to monitor all areas in a VC. It is also important that learners are provided with training in the use of a VC either prior to the session or at the commencement of a session.

Guides should be provided and be easily accessible by both teachers and learners prior to the commencement of a first session. In particular, a troubleshooting guide should be provided.

Institutions should provide adequate support and encouragement for teachers in the use of a VC. This support should include allocating time for training, planning and preparing a VC session and allocating time for a mentor to support a first session. A help desk should also be provided for “just in time” assistance for both teachers and learners. All required equipment should be provided, including headsets with microphones for both teachers and learners and webcams for the teachers.

### **6.3 CONTRIBUTION TO THE FIELD**

This study added to the limited research on the use of VCs in the VET sector in Australia. The study investigated if learners were task switching in VCs, how this could impact on the teaching and learning that occurred and provided suggestions on how to maintain learners’ attention on a VC session.

Another outcome of this study has been the creation of guidelines that assist in the design and delivery of VC sessions to encourage maximum engagement by learners and help discourage learners from taking the opportunity to task switch. Information provided in these guidelines includes:

- teacher training (professional development)
- learner training
- instructional design
- guides for both teachers and learners
- support for both teachers and learners.

The findings from this study will benefit teachers, learners, instructional and educational designers and support staff from the Canberra Institute of Technology and other VET institutes, including both private and public registered training organisations in Australia and from across the world. The findings can also be

transposed to assist K-12 schools and the university sectors in Australia and worldwide.

## **6.4 LIMITATIONS**

The initial research was to comprise a total of ten cases studies, each analysing the data of one teacher and their learners. While more teachers than required agreed to participate in the research, complete data were only collected from six of the twelve teachers, with limited data collected from the other six. The teachers were not able to fully participate due to a number of factors including:

- negative feedback from a learner that caused a teacher to withdraw from the research
- budget issues including the cost of purchasing headsets by both teachers and learners
- reduction in staff numbers and therefore larger workload which meant a teacher could no longer participate
- a teacher taking long term leave
- a teacher being promoted and no longer in a teaching role
- a teacher requiring mobile connectivity and Wimba unable to provide this.

There was also a reduction in the expected number of learners completing all surveys with only 64 of the participating 75 learners completing the entry survey, and only 27 completing the exit survey. There were also only 72 responses received from all learners for the end of session polls (learners provided separate responses for each session). A further issue was that many teachers forgot to record full sessions and therefore Wimba analytics were unavailable for these sessions. However, the breadth of data collected ensured that some conclusions could be reached.

The researcher included different questions in the exit and entry surveys and the end of session poll for the learners, and this made it difficult to correlate information. Another issue was with allowing multiple answers to some of the questions, for example the question “what did you task switch with?” made it difficult to correlate.

There was also confusion in the definition of what constituted the beginning, middle and end of a session. The researcher did not specify this and this could have



skewed the results as there may have been differing opinions between the researcher, learner and teachers, making the data difficult to analyse.

Another issue was the researcher's role in making unbiased observations. In particular the researcher was required to make value judgements on the design and delivery of the teachers' sessions due to the nature of the observation tool. However, the researcher made every effort to ensure the data was unbiased by including the Flex:Ed team in the research and also ensuring data was compared from multiple sources including both qualitative and quantitative data.

## **6.5 FUTURE FOR VIRTUAL CLASSROOMS**

### **6.5.1 CANBERRA INSTITUTE OF TECHNOLOGY**

At the conclusion of this study the company Blackboard purchased Elluminate and Wimba and both were put out of operation with the creation of Blackboard Collaborate. The Institute chose not to use Collaborate but rather to use Adobe Connect predominantly because of the mobile capabilities that Adobe Connect offered at the time. Other improvements included the ability to cut sections of a recording; improved audio and webcam connections; improved whiteboard tools, including no issues with the drawing tools; and an expanded selection of drawing tools, including the ability to size text and move text on the screen. Since this move the uptake of VCs at the Canberra Institute of Technology has increased dramatically from 55 staff members using Wimba at the conclusion of this study in 2012 to 179 staff members having an Adobe Connect room by mid-2013.

### **6.5.2 INNOVATIVE TECHNOLOGY**

As technology evolves and devices become more affordable there are many exciting possibilities for the use of innovative technology in VCs. This study investigated the use of a USB microscope being displayed via the webcam tool and this could evolve to include the use of Point of View (POV) eye glasses. Many VC platforms now afford teachers and learners the ability to participate on devices like smartphones and laptops. At the present time there is limited functionality available but this may increase in the future with advances in technology. A more recent mobile device is the Smart Watch. The Apple iPhone currently interacts with the WebEx VC platform but at this stage allows only very minimal interaction. Another possibility for future

use includes learners' participation in a VC through a smart television. While there is no current literature or research on the use of these devices for accessing or participating in VC sessions, they are currently being used by potential learners to access apps on the internet. As most VCs today allow simple connection via the use of an app, any device that has internet connection with audio affords the possibility for a learner to use this technology to interact with a VC.

### **6.5.3 VIRTUAL PLATFORM IMPROVEMENTS**

Current VC platforms such as Adobe Connect are constantly improving, evolving and incorporating new and additional tools and plugins. Additional Adobe Connect tools currently being used by the Institute teachers to assist engaging learner attention include the randomiser (see Figure 6.1). This tool collects all learner names from an attendee lists and uses a randomised spinner that selects a name. This encourages learners to remain engaged at all times as they cannot anticipate when their names will be called. Adobe Connect also has an additional tool available at an additional cost called the engagement meter (see Figure 6.2). This tool is a quick way for teachers to view how engaged their learners are during the session. Further advances include improved analytics, which enable more in-depth evaluation of an individual VC session and enable both individual teachers and the institute to track the effectiveness of a session minute by minute; including measuring how often learners use the tools and functions in a room.

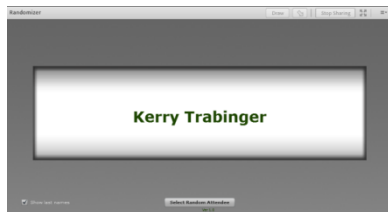


Figure 6.1: Adobe Connect randomiser.

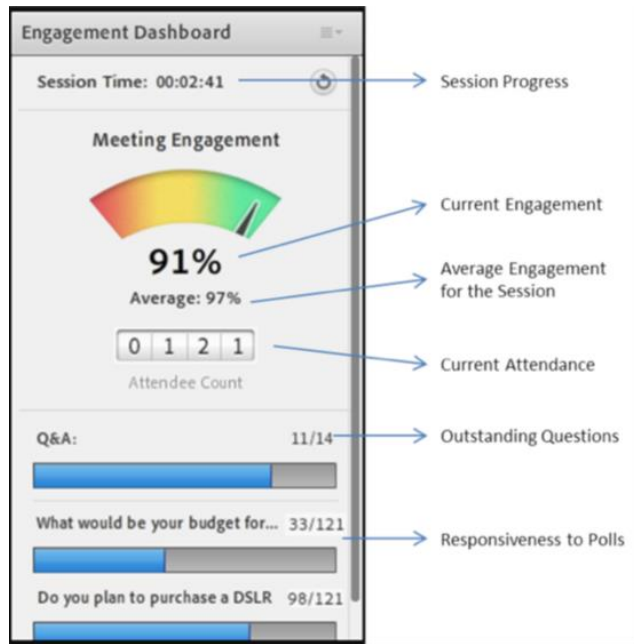


Figure 6.2: Adobe Connect engagement meter © Webqem 2014.

## 6.6 FUTURE RESEARCH

With the increase in use of VCs within education, further studies are required to determine the optimal conditions for a VC that ensures maximum learning outcomes. This study uncovered many areas that require further investigation.

This study was conducted over two semesters; however, each semester included a different cohort of teachers. This study was also conducted at the one institute using the one VC platform. Future studies would benefit from including the same teachers over a longer period of time, including a cross institutional study and including a study comparing the use of different VC platforms.

More focused research should be conducted on each element of transactional distance in relation to a VC session and in particular the element of dialogue. Research findings from this study suggest the success of a VC is dependent on the successful execution of each of the nine interactions that occur between the teacher, learner, content and interface. Future studies should be concentrated on each of these interactions. For example, one study could be focused on the teacher-teacher interaction and investigating Professional Development requirements for both teachers and learners. A further study could focus on interface interactions with emphasis on technology and could investigate whether the introduction of the NBN

can assist in engagement, or include more specific research into the use of advanced tools such as screen sharing and breakout rooms.

An interesting theme to emerge from this study was that teachers delivering a VC session need to be able to task switch due to the multifaceted nature of a VC. Further research should be conducted on this issue, including specific studies on possible cognitive overload for a teacher and possible solutions.

Another suggestion would be to conduct more concentrated studies on whether the different characteristics of learners can affect the level of task switching which occurs and which learners would thrive in a VC session and which learners would need additional support. This could include differences in age groups, genders and nationalities.

This study was an investigation into individual VC sessions. Future studies would benefit from including research into complete course delivery including sessions conducted over a semester and investigate if engagement levels change during the semester and whether creating a sense of community can assist in engagement.

With the introduction of advanced features in new VCs, including the use of additional plugins and tools such as the engagement meter, further research should be conducted on how these plugins can assist learner engagement levels. While this study included the use of innovative devices such as a USB microscopy, further studies could also include learner use of devices such as smart televisions and POV glasses.

## **6.7 CONCLUDING REMARKS**

This study concluded that learners are task switching while using VCs. Findings from the studies discussed in the literature review and this study suggest task switching has a negative effect on the teaching and learning that occurs. The study also highlighted the importance of ensuring all teachers are provided with resources to be able to plan, prepare and deliver sessions that encourage maximum attention by the learners and therefore reduce the opportunity for learners to task switch. This study provided suggestions for the success of a VC and included the development and implementation of training for both teachers and learners, instructional design considerations and content to be included in guides for teachers and learners. This study also highlighted important areas of support that should be provided by institutions for teachers and learners.

Although there is no magic formula for the levels of structure and autonomy to reduce the potential for learners to experience transactional distance, findings from this study do suggest that high levels of structure and low levels of autonomy work best for a VC session to maintain the attention of the learners. A further finding was that interactions between teachers, learners, content and interface should all be equally considered and facilitated effectively for the success of a VC session.

While this study added to the limited body of knowledge on the use of VCs in the VET sector, it also posed many additional issues and questions. It is hoped that these findings will lead to additional discussion and research on the use of VCs; and in particular the issue of how to retain the attention of learners while they are participating in a VC session.

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# APPENDIX DOCUMENTS

## APPENDIX A – ENTRY SURVEY FOR TEACHERS

### ITERATION ONE AND TWO

#### Background

Gender? male/female

#### Your Age

- Less than 25 years
- 25 – 34 years
- 35 – 44 years
- 45 – 54 years
- 55 years or more

#### How long have you worked at CIT?

- 1 year or less
- 2 – 5 years
- 5 – 10 years
- 10 years or more

#### Teaching Status

- Full time
- Part time
- Casual

#### Which Centre are you located in?

#### What discipline are you teaching for this Virtual Classroom study?

#### On average what percentage of your courses are delivered online?

- None
- 10 – 24%
- 25 – 50%
- 51 – 75%
- 76 – 100%

#### On average how much times do think learners spend online each day (including searching the internet, working in eLearn, on Facebook, Twitter etc. This includes time on these platforms on their phone)?

- No time

- 1 – 2 hours
- 3 – 4 hours
- 5 hours or more

**How often do you think learners multitask (two tasks at once) in their daily life e.g. texting while emailing, texting when in a face- to-face class, or texting while watching TV and checking their Facebook?**

- Never. They only do one task at a time
- Sometimes
- Always

**What is your previous experience as a participant in any Virtual Classrooms such as the eLearn Virtual Classroom, Wimba, Elluminate, Adobe Breeze, Vyew, Vet Virtual etc.?**

- None
- Have seen a recording of a session
- Have been in one or two sessions
- Have been in many sessions

**What is your previous experience as a participant in the eLearn Virtual Classroom at CIT?**

- None
- Have seen a recording of an eLearn Virtual session
- Have been in one or two sessions
- Have been in many sessions

**What is your experience being a teacher/presenter in any Virtual Classrooms such as the eLearn Virtual Classroom, Wimba, Elluminate, Adobe Breeze, Vyew, Vet Virtual etc.?**

- None
- Have taught one or two sessions
- Have taught many sessions

**What is your experience being a teacher/presenter in the eLearn Virtual Classroom at CIT?**

- None
- Have taught one or two sessions
- Have taught many sessions

**What training have you participated in for the eLearn Virtual Classroom?**

- None
- Learn e-Learn course (quick show and tell of the VC)
- A Flex:Ed lunchtime one hour session
- Facilitating Learning Online
- Other

**Have you used any How to Guides for the eLearn VC available from Flex:Ed? If so which ones?**

**What advantages do you think the eLearn VC offers you as a teacher?**

**What disadvantages do you think the eLearn virtual Classroom offers you as a teacher?**

**What if any do you see as the main barriers to using VCs with your learners?**

**Do you have any other comments?**

## **APPENDIX B – TEACHER SEMI-STRUCTURED INTERVIEW QUESTIONS FOR ITERATION ONE AND TWO**

### **Training**

What training have you participated in for the eLearn Virtual Classroom?

Do you recommend any improvements to the current training?

### **Guides**

Are you aware of the current how to guides available to CIT teachers for the eLearn Virtual Classrooms from <https://teacher.cit.act.edu.au/>

If so which ones have you used?

Do you recommend any improvements to these handouts?

What other information would have helped you before commencing using the eLearn Virtual Classroom with your learners?

### **Strengths and Weaknesses**

What do you see as the strengths of the eLearn Virtual Classroom for teaching?

### **Tools, Design and Interaction**

How are you encouraging interaction and focus by your learners while using the eLearn VC?

What tools worked well to engage your learners?

What tools did not work well?

Which tools have you found engaged your learners the most?

How could you improve the design of your power points to increase more engagement by your learners?

### **Other thoughts**

Any thoughts on improving your sessions in the future?

Are there any aspects of the eLearn VC that you are excited about?

Any other thoughts/problems/issues?

## **APPENDIX C – TEACHER EXIT SURVEY FOR ITERATION ONE AND TWO**

### **Background**

**Gender?** male/female

### **Your Age**

- Less than 25 years
- 26 – 34 years
- 35 – 44 years
- 45 – 54 years
- 55 years or more

### **How long have you worked at CIT?**

- 1 year or less
- 2 – 5 years
- 5 – 10 years
- 10 years or more

### **Teaching Status**

- Full time
- Part time
- Casual

### **Which Centre are you located in and what discipline are you teaching for this Virtual Classroom study?**

### **On average what percentage of your course did you deliver online this semester?**

- None
- 10 – 25%
- 26 – 50%
- 51 – 75%
- 76 – 100%

### **On average how much times do think learners spend online each day this semester (including searching the internet, working in eLearn, on Facebook, Twitter etc. This includes time on these platforms on their phone)?**

- No time
- 1 – 2 hours
- 3 – 4 hours
- 5 hours or more

### **During you VC sessions how many times do you think on average your students multi-tasked/task switched?**



- None
- Once
- 2 to 5 times
- 5 to 10 times
- More than 10 times

**If you believe they did multitask/task switch during your VC session what tasks did you think they did?**

- Did not multitask
- Email
- Text
- Facebook
- 2 of the above
- 3 of the above
- All of the above and other tasks

**Which tools do you believe engaged the learners the most during your VC sessions?**

- Emoticons
- Whiteboards tools for example writing or drawing on the whiteboard
- Use of Chat
- Use of Webcam
- Engaging Power Point
- Voice (Audio)
- None of the above

**Which tools do you believe created a sense of presence or community with yourself and your learners in the VC sessions?**

- Emoticons
- Whiteboards tools for example writing or drawing on the whiteboard
- Use of Chat
- Use of Webcam
- Engaging Power Point
- Voice (Audio)
- None of the above

**Which part of the sessions (on average) do you believe the learners were engaged the most?**

- Beginning
- Middle
- End

**Were you given any training prior to commencing your VC sessions?**

- Facilitating Learning Online (part of the Advanced Diploma)
- Flex:Ed lunchtime virtual session for beginners
- Flex:Ed lunchtime virtual session for advanced users/teachers
- One on one training with Flex:ed staff member

- One on one training with other CIT staff member
- Other
- Not given any training

**Do you recommend any improvements to the current training program by Flex:Ed? And if so what?**

**Would you like to participate in any further training on the use of the eLearn VC? And if so what?**

**Do you have any other suggestions for improvements to the Flex:Ed handouts on the use of using the VC**

**What other information would have helped you before commencing delivering your session using the eLearn VC.**

## **APPENDIX D – ENTRY SURVEY FOR LEARNERS FOR ITERATION ONE AND TWO**

**Gender** – male/female

**Your Age**

- U18
- 18 – 21
- 22 – 25
- 26 – 45 years
- 46 – 54
- 55 years or more

**What course are you enrolled in?** e.g. Cert 3 in Business

**Status as a learner**

- Full time
- Part time

**On average how much time do you spend online each day (including searching the internet, working in eLearn, on Facebook, Twitter etc. This includes time on these platforms on your phone)?**

- No time
- 1 – 2 hours
- 3 – 4 hours
- 5 hours or more

**How often do you multitask (two tasks at once) in your daily life e.g. texting while emailing, texting when in a face to face class, or texting while watching TV and also checking your Facebook?**

- Never. I only do one task at a time
- Sometimes
- Always

**Where do you intend to log into the eLearn VC?**

- My home
- CIT Classroom
- CIT Library and learning Centre
- Other Library
- Work

**What is your previous experience being a learner in any Virtual Classrooms such as the eLearn Virtual Classroom, Wimba, Elluminate, Adobe Breeze, Vyew, Vet Virtual etc.?**

- None
- Have seen a recording of a session

- Have been in one or two sessions
- Have been in many sessions

**What is your previous experience being a learner in the eLearn Virtual Classroom at CIT?**

- None
- Have seen a recording of an eLearn Virtual session
- Have been in one or two sessions of eLearn Virtual sessions
- Have been in many eLearn Virtual sessions

**What advantages do you think that the use of the eLearn VC offers you as a learner?**

**What disadvantages do you think that the use of the eLearn virtual Classroom offers you as a learner?**

**Any other comments?**

## **APPENDIX E – LEARNER EXIT SURVEYS**

### **LEARNER EXIT SURVEYS ITERATION ONE**

**Gender – male/female**

**Your Age**

- U18
- 18 – 21
- 22 – 25
- 26 – 45 years
- 46 – 54
- 55 years or more

**What course are you enrolled in? e.g. Cert 3 in Business**

**Status as a learner**

- Full time
- Part time

**On average how much time did you spend online this semester (including searching the internet, working in eLearn, on Facebook, Twitter etc. This includes time on these platforms on your phone)?**

- No time
- 1 – 2 hours
- 3 – 4 hours
- 5 hours or more

**During each of your Virtual Classroom sessions how many times (average) did you multitask/task switch?**

- Never. I only do one task at a time
- Once
- 2 to 5 times
- 5 to 10 times
- More than 10 times

**If you did multitask/task switch during these VC sessions what did you do?**

- Did not multitask
- Email
- Text
- Facebook
- 2 of the above
- 3 of the above
- All of the above and other tasks

**Which tools did the teacher use that did engage you the most?**

- Emoticons
- Whiteboards tools for example writing or drawing on the whiteboard
- Use of Chat
- Use of Webcam
- Engaging Power Point
- Voice (Audio)
- None of the above

**On average which part of the session engaged you the most?**

- Beginning
- Middle
- End

**On average which part of the sessions engaged you the least?**

- Beginning
- Middle
- End

**Where you given any training prior to commencing your Virtual Classroom session?**

- Yes
- No

**If your answer to the previous question was yes to participating in training what kind of training did you participate in?**

**Is there any additional training you would have liked to have participated in?**

**Are you aware of the current 'how to' handouts on the use of the VC available to CIT students.**

- Yes
- No

**If you are aware of the handouts which ones have you used?**

**Do you recommend any improvements to these handouts? If so what?**

**What other information would have helped you before commencing participating in an eLearn VC?**

**Did you have any problems using the Virtual Classroom? If so what were the problems?**

**Where did you intend to log into the eLearn VC?**

- My home
- CIT Classroom
- CIT Library and learning Centre
- Other Library
- Work

**Where did you obtain your headset with mic?**

- I have one already
- I purchased it from the CIT bookshop
- I purchased it from the shop external CIT
- I was given it by my teacher
- I did not use one (I just used the speakers on my computer)

**What advantages do you think that the use of the eLearn VC offered you as a learner?**

**What disadvantages do you think that the use of the eLearn virtual Classroom offered you as a learner?**

**Any other comments?**

## **LEARNER EXIT SURVEY – ITERATION TWO**

**Gender – male/female**

**Your Age**

- U18
- 18 – 21
- 22 – 25
- 26 – 45 years
- 46 – 54
- 55 years or more

**What course are you enrolled in? e.g. Cert 3 in Business**

**Status as a learner**

- Full time
- Part time

**On average how much time did you spend online this semester (including searching the internet, working in eLearn, on Facebook, Twitter etc. This includes time on these platforms on your phone)?**

- No time
- 1 – 2 hours
- 3 – 4 hours
- 5 hours or more

**During each of your Virtual Classroom sessions how many times (average) did you multitask/task switch?**

- Never. I only do one task at a time
- Once
- 2 to 5 times
- 5 to 10 times
- More than 10 times

**If you did multitask/task switch during these VC sessions what did you do?**

- Did not multitask
- Email
- Text
- Facebook
- 2 of the above
- 3 of the above
- All of the above and other tasks

**Which tools did the teacher use that did engage you the most?**

- Emoticons
- Whiteboards tools for example writing or drawing on the whiteboard
- Use of Chat
- Use of Webcam
- Engaging Power Point
- Voice (Audio)
- None of the above

**On average which part of the session engaged you the most?**

- Beginning
- Middle
- End

**On average which part of the sessions engaged you the least?**

- Beginning
- Middle
- End

**Could the teacher have added/deleted/changed the way they delivered the session to make you more attentive/engaged? If so how or what would you suggest to improve the sessions?**

**Where you given any training prior to commencing your Virtual Classroom session?**

- Yes
- No

**If your answer to the previous question was yes to participating in training what kind of training did you participate in?**

**Is there any additional training you would have liked to have participated in?**

**Are you aware of the current 'how to' handouts on the use of the VC available to CIT students.**

- Yes
- No

**If you are aware of the handouts which ones have you used?**

**Do you recommend any improvements to these handouts? If so what?**



**What other information would have helped you before commencing participating in an eLearn VC?**

**Did you have any problems using the Virtual Classroom? If so what were the problems?**

**Where did you intend to log into the eLearn VC?**

- My home
- CIT Classroom
- CIT Library and learning Centre
- Other Library
- Work

**Where did you obtain your headset with mic?**

- I have one already
- I purchased it from the CIT bookshop
- I purchased it from the shop external CIT
- I was given it by my teacher
- I did not use one (I just used the speakers on my computer)

**What advantages do you think that the use of the eLearn VC offered you as a learner?**

**What disadvantages do you think that the use of the eLearn virtual Classroom offered you as a learner?**

**Do you have any other comments?**

## APPENDIX F – VIRTUAL CLASSROOM OBSERVATION TOOL

SESSION DETAILS		Session 1	Session 2	Session 3
Date				
No of Learners				
Qualification Level				
Name of Session				
Duration				
<b>SUMMARY</b>				
Did the teacher's design of the sessions encourage engagement (PowerPoints)?				
Did the teacher's selection and use of the VC tools encourage engagement?				
Did the teacher's management of activities encourage engagement?				
Did the teacher maintain the learners attention during the sessions?				
Was there a sense the learners were multitasking. Why or why not?				
Did any technical issues affect the level of engagement				
Did the teachers and/or learners positive/negative attitudes affect the amount and frequency of dialogue?				
Notes for improvements				
Final Comments				

## STRUCTURE

<b>Classroom Management</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Began on time in an orderly organised fashion			
Set ground rules for behaviour			
Did not digress from main topic			
Appeared well prepared for class, clearly organised and explained activities			
Provided opportunities for dialogue about the activity with learners and/or self			
Provided sufficient wait time			
Allowed opportunity for individual expression			
Was able to admit error/insufficient knowledge and respected constructive criticism			
Responded to distractions well			
Gave prompt attention to individual problems			
Completed session in required time frame			
<b>Content Organisation</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Good lesson plan with clear goal of lesson, introduction, body, conclusion.			
Use of lecture			
Use of questioning			
Engaging Power points			
Use of breakaway room (group work)			
Teacher method appropriate for content			
Made course relevant to real world experience			
Explained difficult terms in more than one way			
Learners collaborated as a group e.g. brainstorming			
Any problem solving activities			
Any other approaches			
<b>Presentation</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Spoke confidently with good voice quality			
Communicated a sense of confidence, enthusiasm and excitement towards content			
<b>Ideas for improvement</b>			

## DIALOGUE: TEACHER, LEARNER, CONTENT

Teacher – Learner	Session 1	Session 2	Session 3
Was teacher positive and confident about the topic			
Checked learner comprehension			
Knew and used learners names			
Responded to learners as individuals			
Praised learners for contributions			
Encouraged questions, involvement, debate or feedback			
Encouraged learners to answer questions by providing cues or encouragement			
Teacher feedback was informative and constructive			
Teacher listened carefully to comments and questions			
Teacher answered questions clearly/directly			
Recognised when learners did not understand			
Good rapport with learners			
Treated members of class equitably and did not criticise learners			
Learners asked questions of the teacher			
Learners volunteered information			
Learners presented information			
Learners feedback was on topic			
Ideas for Improvement			

<b>Learner-Content</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Reading			
Listening			
Writing e.g. on whiteboard or chat			
Presentation – verbal, graphical			
Discussions			
Responds to questions			
Participates in Polls			
Ideas for improvement			

<b>Learner-Learner</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
On task academic discussions with each other			
Off task academic discussions			
Social discussions			
Learners encouraged each other			
Learners used each other's names			
Did not criticise each other			
Learners maintained good rapport/mutual respect and treated each other equitably			
Ideas for improvement			

## **DIALOGUE: TEACHER INTERFACE**

<b>Technology</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Trouble connecting			
Trouble with microphone			
Unable to use tools			
Unable to use recording			
Other technical issues			
Did teacher voice frustration with interface			
Was teacher positive about the use of the VC			

<b>Tools</b>	<b>Session 1</b>	<b>Session 2</b>	<b>Session 3</b>
Power Point – how many and how often			
Tools used			
How often were tools used			
Were the tools used effectively			

## DIALOGUE: LEARNER-INTERFACE

Technology	Session 1	Session 2	Session 3
Trouble connecting			
Trouble with microphone			
Unable to use tools			
Other technical issues			
Did learners voice frustration with interface			
Were learners positive about the VC			

Tools use by Learner	Session 1			Session 2			Session 3		
	Beg	Mid	End	Beg	Mid	End	Beg	Mid	end
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
How often were the tools used by the learners?									
Were tools used effectively by the learners?									
Ideas for improvement.									

## LEARNER AUTONOMY

	Session 1	Session 2	Session 3
Teacher used dialogue with learners			
Learners were given options on how they will interact and learn the material			
Participation activities were included e.g. chat			
Learning was not dependent on teacher			
Learners discovered information that they needed for the session rather than being provided all of it			
Discussion was dominated 1 or 2 learners			
Learners asked a lot of productive questions			
Learners who struggled with technology bounced back and participated			
Instructor provided challenges the learners seemed to enjoy the session			
Learners seemed to have positive attitude			

## TASK SWITCHING

	Session 1	Session 2	Session 3
Introduction captured attention			
Use of icebreaker			
Rate of delivery was appropriate for learners to remain engaged			
Good use of tools by teacher for engagement			
Good use of power points for engagement			
Timing of power point slides was appropriate			
Timing of asking learners to use tools was appropriate			
Teacher incorporated learner responses			
Sufficient variety was used to maintain attention			
Lesson required learner thought and participation			
Maintained learner attention			
Paused to allow learners time for feedback			
Conclusion captured attention			
What other methods could the teacher have used for engagement			
Ideas for improvement			

	Session 1			Session 2			Session 3		
Was there delay in learners responses	Beg	Mid	End	Beg	Mid	End	Beg	Mid	End
1.									
2.									
3.									
4.									
5.									
6.									
7.									
8.									
9.									
10.									
Ideas for improvement									

## **APPENDIX G – FLEX:ED STAFF INTERVIEW/FEEDBACK QUESTIONS**

### **ITERATION ONE**

#### **Handouts**

1/ Is there any additions/deletions/mistakes that you can see or any additional handouts we need? Any suggestions for improvements?

#### **Teacher Training**

2/ What are your thoughts on the training we currently give the teachers for the Virtual Classroom. ANY other ideas for improving our training?

#### **Learner information**

3/ Do you have any other suggestions for help or training our learners for the VC? Does the library do any training?

#### **Question for help desk staff.**

4/ What are the major calls for help about the VC from the teachers?

5/ What are the major calls for help that you get about the VC from the learners?

**6/ Any further comments?**

### **ITERATION TWO**

#### **Handouts**

1/ Are there any additions/deletions/mistakes that you can see or any additional handouts we need? Any suggestions for improvements?

#### **Teacher Training**

2/ What are your thoughts on the training we currently give the teachers for the Virtual Classroom. ANY other ideas for improving our training?

#### **Learner information**

3/ Do we have enough information in the learner help area for the VC? **Do you have any other suggestions for help or training our learners for the VC?**

#### **Questions for help desk staff ONLY or anyone who takes calls about the VC.**

4/ What are the major calls for help about the VC from the teachers?

5/ What are the major calls for help that you get about the VC from the learners?

**GENERAL Comments or other thoughts or ideas for improvement.**



6/ Have you had any comments from teachers or learners about headsets? Any requests for us to purchase them?

7/Does anyone have any thoughts on the learners multitasking (doing two tasks at one). Have you noticed this or had feedback from teachers? Do you think it is or could be a potential issue for our remote learners and/or teachers?

8/ Any OTHER comments. **Positives/negatives/other?**

## APPENDIX H – INVITATION TO PARTICIPATION LETTERS

### INFORMATION SHEET FOR CIT Teachers

**Research Title:** STOP (reading your emails) LOOK (at my slides) and LISTEN (to what I am saying)!

How can VET teachers discourage students multitasking while participating in a Virtual Classroom?

**Researchers Name:** Kerry Trabinger

**Telephone:** 62073313

**Email:** [Kerry.trabinger@cit.act.edu.au](mailto:Kerry.trabinger@cit.act.edu.au)

I am writing to ask you to participate in the exciting above-mentioned study at the Institute over the coming year. The projects aims to develop a set of strategies and guidelines for VET teachers to use when designing and delivering content to assist in minimising students' multitasking (task switching) when in a VC session. In order for this project to be successful, I am seeking input from CIT teachers who are intending to use the eLearn Virtual Classroom with their students in Semester 2 2011 OR Semester 1 2012.

Participation would involve the following:

- Entry and exit online survey (anonymous) 15 minute online survey x 2 = total **30 minutes**
- Allow researcher to observe teacher and students' participation via either live participation or by reviewing recordings of the VC sessions. No time required as this will be part of normal class hours
- Participate in one individual semi-structured interview (either face to face or via the Virtual Classroom). This may be recorded if permission is given for either audio or video or in the VC = approximately 20 minutes.
- Complete an eLearn blog journal = approximately one hour over the semester (this will be short dot point reflections).

All teachers who participate in this research study will be given additional assistance with one on one support in both designing and delivering content in the eLearn VC over the semester and priority access to Flex:Eds' wireless mics and usb webcam. You will also be given the chance to win a \$50 voucher to Dick Smith.

This research only requires five teachers each semester. So please register your interest as soon as possible by emailing me on the above email address.

Information obtained as part of the study will be published. However, at no time will you be identified and any personal details that you provide, will remain confidential. Participation in the study is voluntary and you have the right to withdraw you consent at any time.

If you have any specific questions about the research please do not hesitate to contact me on the above number or email address. I look forward to hearing from you.

Warm Regards,

Kerry Trabinger

## INFORMATION SHEET FOR CIT Students

**Research Title:** STOP (reading your emails) LOOK (at my slides) and LISTEN (to what I am saying)!

How can VET teachers discourage students multitasking while participating in a Virtual Classroom?

**Researchers Name:** Kerry Trabinger

**Telephone:** 62073313

**Email:** [Kerry.trabinger@cit.act.edu.au](mailto:Kerry.trabinger@cit.act.edu.au)

I am writing to ask you to participate in the above-mentioned study at the Institute over the coming year. The projects aims to develop a set of strategies and guidelines for VET teachers to use when designing and delivering content to use to make their sessions more engaging and interactive for YOU.

In order for this project to be successful, I am seeking input from students who will be in classes that will be using the eLearn Virtual Classroom during **EITHER** Semester 2 2011 **OR** Semester 1 2012.

Participation would involve the following:

- Entry and exit survey (anonymous) 15 minute online survey x 2 = total **30 minutes**
- Allow researcher to observe your participation via either live participation or by reviewing recordings of the VC sessions. No time required as this will be part of normal class hours
- Online VC survey polls (anonymous) during each VC session.

All students who participate in his research study will be given additional support in using the eLearn VC. You will also be given the chance to win a double movie pass.

Information obtained as part of the study will be published. **However, at no time will you be identified and any personal details that you provide, will remain confidential.**

Participation in the study is voluntary and you have the right to withdraw you consent at any time.

If you have any specific questions about the research please do not hesitate to contact me on the above number or email address. I look forward to hearing from you.

Warm Regards  
Kerry Trabinger  
Educational Designer

# APPENDIX I – CONSENT FORMS

## Consent Form for CIT Teachers

Centre for Education Excellence  
Canberra Institute of Technology

### CONSENT FORM for CIT Teachers

**Research Title:** STOP (reading your emails) LOOK (at my slides) and LISTEN (to what I am saying)!

How can VET teachers discourage learners multitasking while participating in a Virtual Classroom.

**Researchers Name:** Kerry Trabinger

**Telephone:** 62073313

**Email:** [Kerry.trabinger@cit.act.edu.au](mailto:Kerry.trabinger@cit.act.edu.au)

I have read the Information Sheet, and the nature and purpose of the research have been explained to me. I understand and agree to take part. I understand that I can withdraw from the study now or in the future.

I understand my Virtual Classroom sessions may be recorded and stored in the eLearn archives and that only researchers directly involved in the study will have access to the archives.

I understand that I may be audio-taped during interviews. I understand the recording will be stored electronically in eLearn and that only researchers directly involved in the study will have access to these recordings.

I understand that while information gained during the study may be published, I will not be identified and my personal details will remain confidential. I confirm that I am over 18 years of age.

**Teachers Name:**

**Signed:**

**Date:**

I have explained the study to the participant and consider that he/she understands what is involved

**Researchers Name:**

**Signed:**

**Date:**

*Should you have any concern about the conduct of this research project, please contact the USQ Ethics Officer, Office of Research & Higher Degrees, University of Southern Queensland, West Street, Toowoomba QLD 4350, Telephone +61 7 4631 2690, email*

[ethics@usq.edu.au](mailto:ethics@usq.edu.au)

## Consent Form for CIT Learners

Centre for Education Excellence  
Canberra Institute of Technology

### CONSENT FORM for CIT Learners

**Research Title:** STOP (reading your emails) LOOK (at my slides) and LISTEN (to what I am saying)!

How can VET teachers discourage learners multitasking while participating in a Virtual Classroom.

**Researchers Name:** Kerry Trabinger

**Telephone:** 62073313

**Email:** [Kerry.trabinger@cit.act.edu.au](mailto:Kerry.trabinger@cit.act.edu.au)

I have read the Information Sheet, and the nature and purpose of the research have been explained to me. I understand and agree to take part. I understand that I can withdraw from the study now or in the future.

I understand my class Virtual Classroom session may be recorded and stored in the eLearn archives and that only researchers directly involved in the study will have access to the archives.

I understand that while information gained during the study may be published, I will not be identified and my personal details will remain confidential. I confirm that I am over 18 years of age.

**Teachers Name:**

**Signed:**

**Date:**

I have explained the study to the participant and consider that he/she understands what is involved

**Researchers Name:**

**Signed:**

**Date:**

*Should you have any concern about the conduct of this research project, please contact the USQ Ethics Officer, Office of Research & Higher Degrees, University of Southern Queensland, West Street, Toowoomba QLD 4350, Telephone +61 7 4631 2690, email [ethics@usq.edu.au](mailto:ethics@usq.edu.au)*

## Consent Form for CIT Learners U18

Centre for Education Excellence  
Canberra Institute of Technology

### CONSENT FORM for CIT Learners

**Research Title:** STOP (reading your emails) LOOK (at my slides) and LISTEN (to what I am saying)!

How can VET teachers discourage learners multitasking while participating in a Virtual Classroom.

**Researchers Name:** Kerry Trabinger

**Telephone:** 62073313

**Email:** [Kerry.trabinger@cit.act.edu.au](mailto:Kerry.trabinger@cit.act.edu.au)

I have read the Information Sheet, and the nature and purpose of the research have been explained to me. I understand and agree to take part. I understand that I can withdraw from the study now or in the future.

I understand my class Virtual Classroom session may be recorded and stored in the eLearn archives and that only researchers directly involved in the study will have access to the archives.

I understand that while information gained during the study may be published, I will not be identified and my personal details will remain confidential.

**Learners Name:**

**Signed:**

**Date:**

**The following section MUST be completed for all participants under 18**

**Portents /Guardian Name**

**Signed**

**Date**

I have explained the study to the participant and consider that he/she understands what is involved

**Researchers Name:**

**Signed:**

**Date:**

*Should you have any concern about the conduct of this research project, please contact the USQ Ethics Officer, Office of Research & Higher Degrees, University of Southern Queensland, West Street, Toowoomba QLD 4350, Telephone +61 7 4631 2690, email [ethics@usq.edu.au](mailto:ethics@usq.edu.au)*

## APPENDIX J – ADVANTAGES AND DISADVANTAGES

Case Study	Teacher – Advantages in Entry Survey
1	adds another level to the learner’s learning, allows more flexibility in my teaching, sessions [and] can be recorded as a resource.
2	train learners from a distance using interaction.
7	even though I feel there are a few obstacles that make it an effort to use the online environment I feel it will get better especially with the introduction of National Broadband network. I believe that the more practice you have with something the quicker it will become to use. I think that is wonderful that people are able to learn from remote locations. It enables me to keep in contact with my learners when they are studying an online course.
8	can be used at any time; session recorded; can be used from home.”
9	flexibility; once it is set up I can access learning materials while I am teaching face to face; VCs add variety to my teaching.
10	good facilitation

Case Study	Teacher – Advantages in Exit Survey
1	learners were more familiar with how to use a virtual class and the topic was a revision which allowed the learners to answer questions better.
2	Learners can “see and hear the trainer”
7	I personally like the online learning for its convenience and it means that people who are in isolated places can learn regardless of the physical isolation.
8	record of the class for other learners being unable to attend sessions and being up to date with the way of the future. Learners produced a better quality assignment as the instructions having been recorded; absent learners and those learners that need reinforcement found this lesson very beneficial and in turn made my job much easier not having to explain the assessment over and over again to absent learners
9	learners can access it anywhere providing they have a computer/internet access; I love how it adds variety to my teaching and the fact that I can archive my lessons for those learners who are absent or who wish to revise
10	can schedule extra sessions for struggling learners at convenient times; less tiring for me to deliver compared to face to face sessions (I was surprised by that); can archive the sessions so I do not have to repeat the explanations over and over to learners who missed the live session; adds flexibility and variety to course delivery. Learners can get extra help from a busy teacher; can access sessions from home; can catch on missed classes; and a different mode of delivery can be refreshing

<b>Case Study</b>	<b>Teachers – Disadvantages and Barriers in Entry Survey</b>
<b>1</b>	having to choose your virtual class material very carefully, as a virtual class should only be for a limited time (30-40 minutes), and this can restrict what you want to present. predominantly my learners do not want to buy the headsets and I think they will not turn up but wait until the recording comes out. Also no pressure to interact and [they] can whizz through it as fast or slow as they want. Some learners will have technical problems.
<b>2</b>	bandwidth; connection issues; getting microphones; and headphones to work.”
<b>7</b>	It takes a lot of effort to set up with the learners beforehand and to make sure they have as much help as possible; CIT infrastructure is inconsistent. If I am going to run a session I do not know if the computer will function properly which is what happened today when I ran a session. Having a reliable computer to run a session, when running a session, you need to think differently to how you will actively engage the learners online, time to set this up is limited, I find I spend a lot of my personal time organising what I am going to present
<b>8</b>	the really personal touch is missing or if you have lost the attention of learners, not all learners perhaps are prepared to participate, and this may not suit the learner’s learning style.
<b>9</b>	that the VC was very slow, the barriers for learners were headsets.
<b>10</b>	lack of face to face contact with learners, lack of passive feedback

<b>Case study</b>	<b>Teacher – Disadvantages and Barriers in Exit Survey</b>
<b>1</b>	the biggest problem I think is that the learner cohort that I have either want face to face teaching, are not that accomplished with using the computer, or do not want to spend the money on headphones
<b>2</b>	broadband problems and limited interaction, equipment issues were potential barriers
<b>7</b>	my learners have very little IT skills and lack confidence to troubleshoot if they have any problems. They weren't happy about purchasing a headset. They wanted to borrow the head sets. People’s mindset of using IT to their advantage of learning. If learners are in a position to travel to the Institute then they prefer the face to face classes and I have several learners that have English as their second language and I have worked hard to encourage them to be a part of the classroom discussions. When we did the online sessions they did not speak at all. Makes it difficult to have spontaneous discussions. There were learners who did not speak using the VC.
<b>8</b>	the inability to really connect with each learner; and it is very difficult not fully grasping the personalities of each learner. the main barriers as “costs to learners and not equitable for all.”
<b>9</b>	mainly technical problems with the occasional microphone not working. At least all the learners can participate with the text function.
<b>10</b>	limited learner feedback, so I can't be sure if the learners are understanding; can't use physical movement to explain concepts, may be not so good for kinaesthetic learners; not able to give non-verbal feedback; less confident learners may be unwilling to ask questions or say they do not understand for fear of appearing stupid, especially as the session is being recorded, the main hurdle is just getting to try it. Next time I use VCs I'll do a whole class session in a lab at the start of the semester



<b>Case Study</b>	<b>Learner – Advantages in Entry Survey</b>
<b>1</b>	flexibility (three learners), do not have to come to class, easier to concentrate, can access from home.
<b>2</b>	hopefully having more time to chat and not waiting,” the ability to “participate wherever I am,” and able to see other’s reactions.
<b>7</b>	if sick, can still ‘attend’ class; can request teacher to move along with the lesson if it is starting to lag; it can be used at various venues
<b>8</b>	completed AFTER having participated in an Introduction to using the VC session – flexibility (three learners); interactive (three learners); easy to understand to listen to people’s voice; being able to join the class from home (two learners); enjoyable; It is easier to READ what everyone is saying rather than trying to listen to them speak all at once; the recording; accessible for sick learners and teachers.
<b>9</b>	can be done from home (5 learners), it’s modern and simple, it also allows away from classroom learning; learners who are convalescing at home or have carer’s duties are able to participate whilst staying at home. People interested in learning about a subject are able to connect long distance; you get to have an interactive learning session; being able to work more often and still ask questions directly; easily accessed; space, better awareness of technology, easier learning space; easy access no travel time; diversity; being able to use different research methods; more opportunities to study
<b>10</b>	N/A

<b>Case Study</b>	<b>Learner – Advantages in Exit Survey</b>
<b>1</b>	more flexibility (3 learners); ability to work from home; can still attend when unable to come in; ability to access the class while ill; more encouragement for communication between classmates; the ability to participate in the class from different location
<b>2</b>	communication is easier and faster when not typing; contact with the teacher/facilitator from the webcam; visually appealing to view the teacher. I feel it can be a good experience and should perhaps be used more often as it is so convenient and practical and can save time and money for learners, great idea
<b>7</b>	nice to use new technology; if you cannot make it to class or prefer to learn via VC reduces travelling; I think it is great when the subjects are simple and can be done this way; it saves a lot of time and money, particularly of those with families, responsibilities, etc.
<b>8</b>	engagement from everybody; class from home is fantastic; great; I did not have to go to class; the ability to do the lessons from the comfort of your own home.
<b>9</b>	more personalized tuition or extra tuition; revision; I can do it from home; the ability for people who do distance ed. to see thing through the USB microscope; access; didn’t have to go to class; the teacher can actually go through things and SHOW you how to do them.
<b>10</b>	

<b>Case Study</b>	<b>Learner Disadvantages in Entry Survey</b>
<b>1</b>	less face to face time with teacher (four learners);possible distractions while using it (three learners); bring back face to face teaching and no online learning; we pay money to get taught by teachers, not computers; as much as I love the idea, people learn better face to face and knowledge gained is more without distractions; spending money on headphones; technical difficulties
<b>2</b>	laggy Internet (and minimal Internet, for those of us in Gungahlin) is likely to distort this session,” and some expressed confusion: “no idea – too confusing to me, I barely know how to turn on the computer, this is very difficult for me.
<b>7</b>	unable to chat face to face; unable to show work in progress; not very social – no face to face contact unless you use a webcam; it won't work if there are technology (computer) problems. I think online lessons are stupid; I do not see a difference between an online classroom and an actual one, face to face lessons are better; I enjoyed the VC experience totally, I would like to do even more subjects this way, I had no problems with it, it was good.
<b>8</b>	no face to face (two learners); I can't get the visual cues from the teacher. It's a bit jolted in voice recognition; could be distracted easily (three learners); although it was entertaining – people being silly with it; unable to answer the questions fast enough; motivation/concentration; less personal, unable for teacher to get a feeling for the class's momentum.
<b>9</b>	it may not be as effective as having the actual teacher in the room (5 learners) you have the chance to multitask; not being able to have hands on experience; social issues and lack of true classroom format; you can't get as much help from the teacher; not as much interaction; not always having a view of what is happening. less personal. Body language. Often, after something has been explained, learners are still unclear about the subject. The instructor can see from body language (averting of the eyes etc.) that it needs to be explained again. People seldom ask for information to be repeated if it has been stated several times as it can be quite embarrassing, having an instructor that can see those subtle signs of insecurity is vital to make sure learners do not fall behind; I think technology has given us great tools for learning, I do not feel however, that replacing in the room instructors with webcams and instructors from elsewhere is the way to go. Humans are still animals. Animals that need to socialise and engage the senses to learn, something that cannot be fully achieved through a computer screen.
<b>10</b>	N/A

<b>Case study</b>	<b>Learner Disadvantages in Exit Survey</b>
<b>1</b>	can be slightly chaotic at times; harder to understand things you are having a problem with; easy to lose focus; no face to face time with teacher; lack of person to person contact and attention.
<b>2</b>	if you had an old computer I think the VC would not run properly; typing can be misinterpreted or taken the wrong way; it was hard not having everyone using the same format to communicate i.e. webcam, whiteboard, chat; set up time is lengthy and overruns session time; decreased ability to attend the class with the constant dropping out.
<b>7</b>	a little isolating; I prefer face to face teaching; less personal; some things may be misunderstood.
<b>8</b>	no face to face with teacher; if the class is pre-recorded it is hard to ask questions then and there; did lots of other things so missed some parts of it; not engaging or interactive; you can easily get distracted.
<b>9</b>	the setting of a classroom as being at home can be distracting; people do not pay attention; distractions from other learners who see it as free time; sound problems; people might not go to class as often.
<b>10</b>	N/A