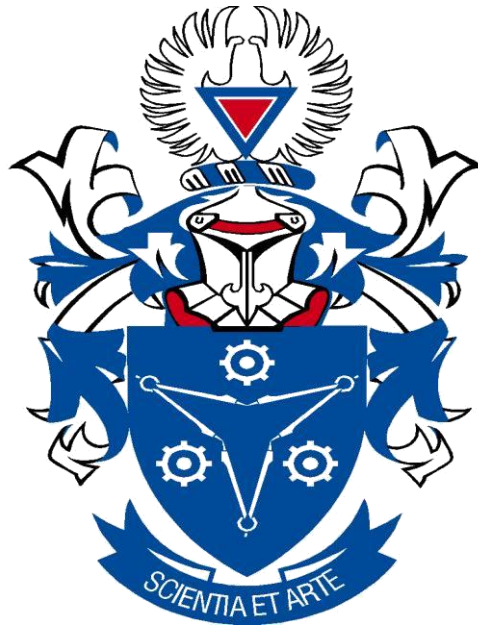




Vaal University of Technology

**The use of podcasting revision lectures in improving learners'
academic performance**

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MTech: Information Technology**

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Declaration

I, Mr M.E. Rankapola, put on publication this research dissertation titled “The use of podcasting in improving the learners” academic performance”. I take an oath that this dissertation contains original research work completed at Tshwane University of Technology in South Africa, Gauteng Province. All the information retrieved from the listed sources has been acknowledged by proper citations and list of references using shortened Harvard method. Screenshots were used with permission from the intellectual property owner Camtasia (www.techsmith.com). Furthermore, the author authenticates that this work was done by himself under the supervision of Dr. P Conradie. The primary objective of this book is to assess technology impact on academic achievements particularly focusing on podcasting. I earnestly hope that this dissertation will not only be placed on publication but rather should be used as widely as possible to bring to light and share good practices in academia that our students need to develop to their full potentials.

Abstract

The majority of research studies completed on podcasting technology focused on the acceptance of podcasting technology in the educational settings and the challenges that it poses for higher education institutions and instructors. Very little interest has been accorded to the effect that podcasting could have on the learners' academic performance. Utilizing a quasi-experimental non-equivalent group posttest, a wide used research method in the education discipline, the relationship between podcasting technology and academic performance, is investigated. The quasi-experimental was performed based on data collected over a period of 12 months, in which a non-random sample of 150 learners was taken from a population group of 350 management and entrepreneurship undergraduate learners at the Tshwane University of Technology. The sample was separated into two groups, namely the experimental group of 75 students, and the control group of 75 students. Both groups were offered the same subject by the same instructor. Control group learners are learners who have already completed the subject in the first semester before the podcasting technology was introduced in the subject. The experimental group learners are learners who have completed the subject through the support of podcasting technology. The assessment marks for four formal tests of the two groups were compared by means of a t-test to determine the effect of the intervention. The outcomes of the study showed an increase in the overall mean score of the experimental group in comparison to the mean score of the control group. The number of students obtaining distinctions also increased, compared to the control group. These considerations possibly indicate a positive relationship between the availability of podcast lectures and academic performance.

Keywords: Academic performance. e-learning, podcasting, revision lectures, quasi-experiment.

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Table of Contents

Chapter 1 : Introduction	1
1.1 Introduction and background	1
1.2 Purpose of the study	3
1.3 Significance of the study.....	3
1.4 Research problem statement	4
1.5 Research question	5
1.5.1 Secondary research questions	5
1.6 Research Methodology.....	6
1.6.1 Research paradigm	6
1.6.2 Research approach	6
1.6.3 Research design (Experimental)	6
1.6.4 Research participants	8
1.6.5 Research materials	8
1.6.6 Data collection	9
1.6.7 Research procedures	9
1.6.8. Data analysis	9
1.7 Research ethics	10
1.8 Scope and limitations of the study	10
1.9 Research outline	11
Chapter 2 : Literary review	12
2.1 Introduction to podcasting	12
2.2 Definition of podcasting	12
2.3 Review of podcast definitions	15
2.4 Pedagogical approaches in teaching-learning	16
2.4.1 Learning by listening	17
2.4.2 Discovery learning	17
2.4.3 Learning by doing	18
2.4.4 Learning through discussion and debate	18
2.4.5 Blended learning	18
2.5 Podcasting software	19

2.6	Possible podcasting benefits and implications for learning.....	23
2.7	Introduction and acceptance of podcasting in education	25
2.8	Podcasting in education	27
2.9	The effect of podcasting on learning	28
2.10	The effect of podcasting on lecture attendance	35
2.11	The effect of podcasting on the learners" academic performance	36
2.12	Issues arising from the review of literature	38
2.13	Conclusion	39
	Chapter 3 : Research Method	41
3.1	Introduction	41
3.2	Research design	42
3.2.1	Research Paradigm	42
3.2.2	Research Method	43
3.2.3	Participants	44
3.2.4	Data Collection	44
3.2.5	Research tools	44
3.2.6	Subject objectives covered by the lecture podcasts.....	46
3.3	Creating a podcast	50
3.3.1	Camtasia Recorder Setup.....	51
3.4	Research procedures	59
3.5	Internal and external validity	59
3.6	Conclusion	62
	Chapter 4 : Statistical Results	72
4.1	Introduction	72
4.2	Internal and external validation	72
4.3	Descriptive statistics	73
4.4	Quasi-experimental results	75
4.5	Questionnaire results.....	77
4.6	Interview results.....	80
4.4.	Conclusion	85
	Chapter 5 : Findings	86
5.1	Introduction	87
5.2	Research question	88
5.3	Secondary Objectives.....	89
5.4	Conclusion	90

Chapter 6: Practical contribution and future research	92
6.1 Introduction.....	93
6.2 Practical contributions	94
6.3 Suggestions for future research work	95
6.4 Summary	96
Reference list.....	98
Addendum A (Consent form)	105
Addendum B (Language editing).....	105
Addendum C (Questionnaire).....	105
Addendum D (Access to technology questionnaire).....	105
Addendum E (Techsmith approval).....	105

List of Acronyms

Acronym	Full word
e-learning	electronic learning
m-learning	mobile learning
PDA	Personal Digital Assistant
RSS	Really Simple Syndicate
LMS	Learning Management System
ITS	Integrated Tertiary Software
AVI	Audio Video Interleave
SPSS	Statistical Package for Social Sciences
TSCC	Techsmith Screen Capture Codec
XML	eXtensible Markup Language
HTM/HTML	Hypertext Markup Language
WAV	Waveform Audio File Format (extension .wav)
MPEG	Moving Picture Experts Group
MP3	MPEG-2 Audio Layer III

List of Figures

Figure 2.1: Juice podcast receiver	19
Figure 2.2: Creating a podcast.....	20
Figure 3.1: Camtasia window.....	46
Figure 3.2: Camtasia compact view	46
Figure 3.3: Camtasia recording	46
Figure 3.4: Camtasia screen resolution.....	47
Figure 3.5: Fixed region dimension.....	47
Figure 3.6: Set audio	47
Figure 3.7: Camtasia mouse clicks	48
Figure 3.8: Camtasia effects settings	48
Figure 3.9: Camtasia effect preferences	49
Figure 3.10: Camtasia audio configuration	49
Figure 3.11: Audio format	50
Figure 3.12: PCM format.....	50
Figure 3.13: File preferences	51
Figure 3.14: Program tab	52
Figure 3.15: Camtasia recorder	52
Figure 3.16: Autodesk inventor	53
Figure 3.17: Delete recording.....	53
Figure 3.18: Save a recording.....	54
Figure 3.19: Camtasia producer	54
Figure 3.20: Camtasia producer window.....	54
Figure 3.21: Camtasia editor	55
Figure 3.22: Camtasia editor	55
Figure 3.23: Storyboard	56
Figure 3.24: Inventor001.avi.....	56
Figure 3.25: Storyboard	57
Figure 3.26: Produce movie	57
Figure 3.27: Produce movie dialog box.....	58
Figure 4.1: Interview results – conceptual framework	85

List of Tables

Table 3.1: Subject Objectives.....	48
Table 4.1: Race frequency	64
Table 4.2: Age frequency.....	64
Table 4.3: Gender frequency.....	64
Table 4.4: T-test for test one	65
Table 4.5: T-test for test two.....	66
Table 4.6: T-test for test three.....	66
Table 4.7: T-test for test four	67
Table 4.8: Podcast accessibility.....	78
Table 4.9: Learning enhancement	79
Table 4.10: Effect of podcasting on academic performance	80
Table 4.11 Demographic information.....	81

Chapter 1 : Introduction

1.1 Introduction and background

The introduction of the internet in the early 1990s led to establishment of new learning paradigms notably, electronic learning (e-learning) and mobile learning (m-learning) in the academic sector. According to Jacob and Isaac (2008), e-learning is learning facilitated and supported through the use of information and communication technology and m-learning is the intersection between mobile computing (i.e. the application of small, portable and wireless computing and communication devices) and learning. Podcasting technology is a type of mobile learning in which a mobile device like a cell phone is used to listen to an audio podcast or watch a video podcast. Evans (2008) describes podcasting as a blend of two words, namely iPod, the popular digital music player from Apple, and broadcasting. According to Dale (2007), podcasting is an audio content delivery approach based on web syndication protocols such as an Really Simple Syndicate (RSS) feed and secondly, podcasting intends to distribute data to mobile devices such as iPods, Moving Picture Experts Group (MPEG)-2 audio layer III (MP3) players, Personal Digital Assistants (PDAs) and mobile phones. Mobile devices which may be used for m-learning include, digital media players, notably, iPods and MP3 players; smartphones such as Blackberry and iPhone as well as PDAs like palmtops and pocket Personal Computers (PCs).

Early research studies on podcasting technology investigated the pedagogical use of this technology in academia. Duke University is the first organization to discover the pedagogical use of iPods and podcasts (Duke 2005). Duke University distributed about 1600 Apple iPods to learners in an effort to encourage academics to record or

capture lectures and distribute the learning material to the learners (Duke 2005). Dupagne *et al.* (2009) reported that in the fall of 2005 and onwards, other universities, notably, Drexel University, Deaken University, Purdue University and Stanford University followed suit but with different approaches.

Latest research studies on podcasting, globally, discovered how this technology has affected teaching and learning in higher education. A greater research focus in this regard was on the acceptance of this technology into the academic arena and whether it can replace traditional teaching and learning mechanisms. Chan and Lee (2005) explored the potential use of podcasting to deliver mobile ubiquitous learning in higher education. Tekdal and Cebeci (2006) described the technical aspects on how lecture podcasts can be published online and distributed through RSS feeds. Dale (2007) proposed strategies for podcasting to support student learning. Lazzari (2008) studied the creative use of podcasting in higher education and its effect on the competitive agency. Fernandez *et al.* (2009) augmented this growing literature through the study on podcasting as a technological tool to facilitate good practice in higher education.

In accordance with these studies, podcasting research at higher education contextualized the existing body of knowledge in this field. Foko (2009) examined the use of mobile technologies in an attempt to enhance learning in the South African educational environment and the challenges of increasing digital divide. His study revealed the ubiquitous presence of mobile phones with advanced features such as MP3 players, e-mail system and Internet. Amongst other reasons cited, the biggest fear as to why universities and lecturers are reluctant to adopt podcasting technology is that they fear it could empty lecture halls. Maharaj (2010) probed into the impact of podcasting on learner-lecture attendance and found that podcasting did not negatively affect lecture attendance. In fact, a podcast lecture helped provide the necessary support in enhancing learning and improving understanding of the subject content.

Based on the above mentioned research studies both locally and globally, it is evident that very little attention has been accorded to the effect that podcasting technology could have on the learner's academic performance. Thus this study aims

to contribute in that regard by looking at the actual effect of podcasting technology on the learners' academic performance. This study will build on the work of

Dupagne *et al.* (2009) in which the effectiveness of using video podcast as a revision tool was addressed. Their findings attested that learners who watched the video podcast did not obtain higher pass rates than learners who did not watch the video podcast. In line with the study of Dupagne *et al.* (2009), this study will focus on audio lecture podcast and its actual effect on the learners' academic performance.

This study attempts to make a contribution to the body of knowledge by conducting a quasi-experimental non-equivalent group post-test study in which the relationship between podcasting and the learners' academic performance will be explored. The researcher's empirical observation of the learning setting at the Tshwane University of Technology motivated an investigation into podcasting technology.

1.2 Purpose of the study

The purpose of this study is to explore the effect of podcasting use on the learner's academic performance. The effect of revision lecture podcasts will be measured by analyzing the mean of marks obtained by students, the standard deviation of these marks and the pass rate and fail rate of the control group and experimental group. On this basis, a possible relationship between podcasting revision lectures (independent variable), the intervention, and the learners' academic performance (dependent variable) will be explored.

1.3 Significance of the study

This study endeavors to provide a possible solution to learning barriers that learners are confronted with at most of the South African higher education institutions. These include:

- Lecturers are not always available to assist learners with extra/revision lectures.
- Lecturer-learner time is restricted by timetables.

- Learners are unique individuals – but no individualized lecturing is provided.
- There is very limited time to do revision.
- Learning is confined within laboratories and classrooms (formal learning contexts).

These factors have a direct influence on the learners' academic performance. Podcasting technology may to some extent help eradicate some of these issues. However, the research focus of this study is to explore the relationship between podcasting and academic performance.

Academic institutions, learners and lecturers can benefit from this study, since an intervention is proposed that can increase the lecturer-learner contact time with minimal environmental constraints, similarly as formative auditory feedback. Learners will be able to listen to lecture podcasts at any time, any place and as many times as possible until the subject content is understood. Reciprocally, lecturers will be able to utilize the physical contact lecture time to solve problems and attend to more important issues of the contents instead of spending time on what is already understood by the learners. Constructive utilization of time is critical to ensuring that sufficient efforts and time are spent on more complex content that would strengthen the understanding of the subject matter and reciprocally improve the learners' academic performance.

1.4 Research problem statement

There is a necessity for higher education institutions in South Africa to vary lecturing and learning mechanisms in the quest to provide for the learners' unique learning needs in order to optimize lecturing and learning and improve academic accomplishment. It is decisive and necessary to provide constant and consistent learning support mechanisms whilst learners leave formal learning contexts. Foko (2009) noted that the ubiquitous presence of mobile phones in South African higher

education institutions is not optimized to address the needs of the learners. The author discovered that a mobile phone is a strong tool available to most learners in South Africa, poor and rich alike, and could be leveraged and utilized in the classroom to support other ICT tools and learning in general. This study is intended at elongating and examining how mobile devices could be beneficial to lecturers and learners alike by exploring the relationship between podcasting revision lectures and academic performance.

1.5 Research question

What is the impact of podcasting revision lectures on learners' academic performance?

1.5.1 Secondary research questions

- What is the recent body of knowledge regarding the use of podcasting in teaching and learning?
- What is the most appropriate pedagogical approach for podcasting revision lectures?
- What is the effect of ubiquitously accessible lectures on learning?
- How will podcasting technology benefit the learners through increased lecturer-learner contact time?
- How will podcasting technology accommodate diverse learning needs?
- What are the contributions that this study will make to the e-learning or m-learning field?

1.6 Research Methodology

1.6.1 Research paradigm

This study aligns itself with the positivist research paradigm. Positivist paradigm underscores the objectivist approach to studying social phenomena giving importance to research methods focusing on quantitative analysis such as surveys and experiments. According to Dash (2005), positivist paradigm embraces the fact that true knowledge is based on experience of senses and can be obtained by observation and experiment. The focus of this study is to conduct a quasi-experimental non-equivalent group post-test study, wherein answers or solutions to the problems that were identified through empirical observations will be investigated. The empirical observations that were made attested that the current teaching/lecturing and learning practices at the local higher education institutions do not address the learners' diverse needs thereby impeding on the academic performance.

1.6.2 Research approach

De Villiers (2005) postulates that identifying a study's research approach is the initial step in the research process. The quantitative research approach explains the phenomena by collecting numerical data that is analyzed using mathematically or statistically based methods. The current study will utilize a quantitative approach to collect numeric data to explore the possible cause (lecture podcasts) and effect (academic performance) relationship.

1.6.3 Research design (Experimental)

Quasi-experiments, a widely used educational research method, originated from the problems researchers faced in the field, namely it was not always possible to control all variables or randomly selected participants, as required for true experiments (Creswell 2012). Quasi-experiments thus differ mainly from true experiments based on the non-random assignment of participants to the experimental and control groups (McMillan & Schumacher 2001), thus predefine groups. This characteristic

results in quasi-experimental being a relative weak research design when casual inference is required. In an educational context, however, quasi-experiments are especially prevalent based on formal administrative groupings of students, which are not under the control of the researcher. This prevalence is evident in literature, with some prominent educational research studies that have implemented quasi-experimental designs.

Martínez-Caro and Campuzano-Bolarín (2011) analyzed the difference in student satisfaction between traditional and blended learning (b-learning) methods by utilizing a quasi-experimental non-equivalent group post-test design. Pre-existing class groups were utilized as the experimental and control groups, indicating that b-learning methods were more effective. Similarly, Chang and Tseng (2011) utilized a quasi-experimental non-equivalent group pre- and post-test to compare traditional versus web-based portfolio assessment for Project-Based Learning (PBL). The experimental group was exposed to web-based portfolio assessment with PBL, while the control group used conventional assessment with PBL. Results indicate that the web-based portfolio assessment was more effective, improving students' performance. Fitzpatrick and Meulemans (2011) employed a quasi-experimental non-equivalent group pre- and post-test design to measure the impact of librarian-led workshops on their performance. The control group of 81 learners only received an assignment and instructions, while the experimental group of 76 learners in addition received a librarian-led workshop. Performance increase of the experimental group was reported.

Shen *et al.* (2011) explored the impact of innovative teaching methods of b-learning with web-mediated Self-Regulated Learning (SRL) on student performance utilizing a quasi-experimental design. Again, positive results were reported regarding students in the experimental group compared to the control group. Stes *et al.* (2012) explored the influence on university teachers' instructional development on students' performance. Utilizing a quasi-experimental non-equivalent group pre- and post-test, 23 teachers were included in the experimental group which exposed them to improved instructional development measuring the impact thereof on their students. Similarly, 27 teachers were included in the control group with no additional

instructional development and measuring the impact thereof on their students. Students who were exposed to teachers who received improved instructional development performed significantly better. Quasi-experiments can thus be considered a generally accepted research design in the educational context.

It must, however, be recognized that some ethical concerns can be raised based on the premise that in general, the experimental group can receive an advantage above the control group. This aspect will be further addressed in the ethical section of this chapter.

1.6.4 Research participants

Babbie (2004) stated that in any research study, there must be a main body “who” and/or object “what” that is being studied. Therefore, the unit of analysis in this study the “who” will be the 150 undergraduate students enrolled for a management and entrepreneurship course in the faculty of management sciences at the Tshwane University of Technology and the “what” will be podcasting technology impact on academic performance.

1.6.5 Research materials

To produce a lecture podcast, the researcher will use a Sennheiser wireless presentation set, podcasting software (Camtasia) and a laptop running Windows XP Operating System (OS) to record the lectures. After recording and editing has been completed, the lectures will be uploaded on the university’s Learning Management System (LMS) called MyTutor (Blackboard). MyTutor is a three tier LMS based on blackboard. The three tiers are content management (includes folders, files of any format), interactive options (includes assessments and assignments) and communication (includes email, forum, chat). The learners will access the audio lectures on the university’s LMS and download to their MP3 or MP4 players to listen to at any time convenient to them.

1.6.6 Data collection

Published literature on podcasting technology will be used to guide the study. Quasi-experimental non-equivalent group post-test data in the form of four assessments (i.e. tests) will be collected and used for statistical analysis. A five likert scale questionnaire will be used to obtain information about the learners' experiences of lecture podcasts and finally a structured interview will be conducted with the instructor of the learners to collect data that can be used to improve the intervention.

1.6.7 Research procedures

Lectures will be recorded before the face-to-face lecture takes place. The duration of the lecture is 60 minutes. According to the principles of good lecture podcast design, the maximum size of the lecture podcast should be limited to 5 – 10 min which is the normal size of an audio file (song). To comply with this principle, the audio lecture will be chunked into 10 minute episodes. The podcast lectures will be available for downloading by the experimental group learners. An information session will be conducted on the following aspects:

- The code of research ethics is explained to the learners.
- Informed consent form (Addendum A) is explained.
- Demonstrate how to access the lecture podcast.
- Demonstrate how to download and save a lecture podcast to a mobile phone.
- Demonstrate how to burn a lecture podcast to a CD.
- Demonstrate how to play a lecture podcast (playback and fast forward).

1.6.8. Data analysis

The researcher will use Statistical Package for Social Sciences (SPSS) software to analyze the data. The experimental group test's mean score, standard deviations, number of students success rate, number of students with distinctions will be analyzed. Additionally, t-tests will be calculated to establish if there is a statistical

significant difference between the experimental group and control group for all four semester assessments. The t-test explores the differences between two groups' means and to what level the data distribution overlaps (Creswell 2012).

1.7 Research ethics

Quasi-experiments with human subjects in education have an inherent ethical concern, based on the integral design of one group receiving a possible beneficial intervention, while the other group does not. However, based on practical consideration, as evident in educational literature, it is generally not possible to provide the same intervention to both the experimental group and the control group in an academic system. As stated in Creswell (2012), there exist circumstances of practical necessity which force researchers to use intact groups, situations which do not allow the forming of artificial groups. Not only is the creation of groups not always in the control of the researcher, but also the period of data collection. It is often necessary to compare data from different periods of time in determining whether an intervention had an impact, also evident in evaluation research. Additionally, in the educational context, it is possible to find lecturers that are inherently just better educators than their colleagues, utilizing progressive pedagogy and technologies in the classrooms. Possible bias based on lecturers' skill sets, quality of educational resources available, are systemic barriers, experience in education praxis. Additionally, to ensure that the study conforms to the ethical guidelines of the Tshwane University of Technology, informed consent was obtained from participants (Addendum A). This ensured that participants were informed of the possible advantages and disadvantages of participation, what participation entailed, before agreeing to partake.

1.8 Scope and limitations of the study

The present study primarily attempts to measure the effect of podcasting revision lectures on students' academic performance at the Tshwane University of Technology. Academic performance refers to improvement or decline of test grades. Essentially, this study intends to discover how podcasting technology can influence academic performance. Although a richer data set could have been obtained by

performing a survey or phenomenological study, measuring students' attitudes and perceptions towards podcasting, it was not the focus of this study. It is thus suggested that future research extends this study by obtaining attitude and perception data from participants.

1.9 Research outline

Chapter 1: Introduction

Chapter 2: Literary Review

Chapter 3: Research Method

Chapter 4: Statistical Results

Chapter 5: Findings

Chapter 6: Practical contribution and future research

Chapter 2 : Literary review

2.1 Introduction to podcasting

Podcasting technology was introduced in 2004. The word podcasting is a combination of the words iPod and broadcast. This type of technology has the capability of distributing multimedia files from the Internet to subscribers who can listen to (audio podcast) or view (video podcast) the files at their convenience (anywhere, anytime). Podcasts can be stored on a computer or a mobile device, such as an MP3 player. The RSS data format is used for automatic downloads and frequent updates of the content. Podcasting has rapidly attracted attention across the world and embraces opportunities for educational environments and the businesses, providing on-demand access to unlimited content. Nowadays people do not need to own an iPod in order to listen to a podcast. These types of audio files can be listened to through almost any portable media player.

The following section looks at the definition of podcasting by various researchers. Knowing or understanding what podcasting is, is key and foundational to construe the purpose of this study. This section will take the reader through the organized reviews of previous literature on definition of podcasting, pedagogical approaches to learning, podcasting software, possible podcasting benefits, podcasting in education, impact of podcasting on learning, impact of podcasting on lecture attendance and finally impact of podcasting on the academic performance.

2.2 Definition of podcasting

Podcasting emanates from casting which generally covers a diverse set of terms and specific uses like auto-casting, blog-casting, learn-casting, MMS podcasting, mobile-

cast, narrowcast, peer-casting, pod-streaming, photo-feed, sound-seeing tour, vod-casting, voice-cast, audio wiki-news and phone casting (Stead 2005). This study does not intend to describe all of these variations. All of these variations are ripe for research but for the purposes of this study the focus will be narrowed to Podcasting only.

The name podcast was coined in 2004 as highlighted in the introduction with the increased availability of portable audio and video players and particularly Apple's highly rated and best-selling portable audio and video iPod. Hence the term podcast is a blending of two words, namely "pod" which stands for a popular apple iPod and "cast" which stands for broadcasting. According to the Oxford dictionary, podcasting refers to a digital recording of a radio broadcast or similar program, made available on the Internet for downloading to a personal audio player. Podcasting can also be defined as a way of distributing multimedia files that is renowned for its ability to be downloaded automatically using software capable of reading RSS or Atom feeds.

According to this definition, podcasts are automatically downloaded as compared to the oxford dictionary definition which suggests that podcasts can be accessed manually and then downloaded to portable devices. The two definitions suggest that podcasting technology has a capability of being a push technology (automatic downloads) or pull technology (manual downloads). Gillmor (2005) defines podcasting as an intriguing way to distribute audio files and involves downloading an MP3 audio file to a digital device as well as listening to a program/a song, a lecture, a rant whatever-when you want to listen to it. The author relates podcasting to TiVo. TiVo is the hard-disk television recording service, for radio or any other kind of audio content.

Stead (2005) affirms the above definitions in his research study wherein he identified a range of m-learning strategies namely; Short Messaging Service (SMS) as a skills check, or for collecting feedback, audio-based learning (e.g. iPod, MP3 players, podcasting), Java quizzes to download to color screen phones, focused learning modules on a PDA, media collection using a camera phone, online publishing or

blogging using SMS, cameras, email and the web. Stead emphasizes that podcast should involve automatic downloading of files and update notifications.

Feinglos (2005) concurs with Stead's (2005) definitions of podcasting. He defines podcasting as a pre-recorded media file (typically in the MP3-format) that can be downloaded and transported to almost any player, or any computing platform. Podcasts are digital audio programs that can be subscribed to and downloaded by listeners via RSS. They can be accessed on a variety of digital audio devices, including a desktop computer. Leiserson (2005) and Jones (2005) corroborate these definitions as they established that podcasting refers to the automatic downloading of MP3 audio files to a computer and, in most cases subsequently to a mobile MP3 player. According to Leiserson (2005), simply posting recorded audio files on websites is not technically considered podcasting. The term podcasting indicates the use of RSS for automatic download of new files.

Hammersley (2004) defines podcast as a digital media data file which plays audio or audio and vision; with vision, the term „vodcast“ is occasionally used. A podcast is made available from a website; can be opened and downloaded (taken from the website offering it and placed on something of your own) and played on a computer; and/or is downloaded from a website to be played on a small portable player designed to play the sound and/or vision. Podcasting technology has become a popular medium for accessing and assimilating information by users (Bolliger *et al.* 2010). According to Bolliger *et al.* (2010), there are currently three types of podcasts being produced and used namely: audio-podcasts, enhanced podcasts and video podcasts. Audio-podcasts include audio only and require a relatively small storage space. Enhanced podcasts are a combination of audio and digital still images. Video podcasts or vodcasts include audio and video and require larger storage capabilities.

According to Lazzari (2008) podcasting is a way of distributing digital video and audio contents over the internet. The author pointed out that a characteristic of podcasting is its roaming style of culmination, which allows users to play podcasts even while travelling or doing something else. However, it is important to note that

podcasting technology does not utilize completely new technology to offer these capabilities (Feinglos 2005). RSS has been available since 2001. Podcasting combines a lot of pre-existing technologies such as blogs, RSS feeds and media files, and subsequently uses them in a single, unique package (Feinglos 2005). Subscribers choose from a feed channel, which means that files are automatically transferred from server to client.

Stead (2005) emphasizes that at its core, podcasting is an adaptable medium that allows the creator an absolute level of freedom and personal expression. The automatic delivery method is accomplished by simply providing a favorite media aggregation program with a podcast's RSS feed link. Feinglos (2005) pointed out that the simplicity of content pushing mechanism, combined with a podcast's capability to reach listeners on a private level, has enabled it to grow into such a popular and widespread phenomenon.

Essentially defined, podcasting is any audio/video content delivery approach based on web syndication protocols, namely RSS and Atom Feed (Feinglos 2005). Podcasting provides increased flexibility, user control, and portability, and allows for time-shifting and multitasking. By allowing subscription and notification, this eXtensible Markup Language (XML) based protocol shifts audio/video file handling from a static and manual mode to a dynamic and automated mode.

According to Walls *et al.* (2010), podcast refers to any automatically downloadable audio or audio/video file (commonly in MP3 format). Even though the primary use of podcasts has been for personal entertainment or information, there is a rapidly increasing interest in its potential value for more formal educational purposes.

2.3 Review of podcast definitions

At this point, there is a great proportion of similarities in the definition of podcasting by various researchers.

- Firstly, that podcast is digital (MP3 file).

- Secondly, that podcast may be in audio or video.
- Thirdly, that podcasts are downloadable from a website.

Most researchers believe that podcasts should involve RSS or Atom Feeds for automatic downloads and updates whereas a smaller number of researchers believe that podcasts can be accessed and downloaded manually. The researcher therefore establishes that podcasts may take either of the two forms described in the preceding line. Podcasts may be automatically downloaded or accessed manually by the learners. Due to limited technological resources, availability of necessary infrastructure and limited access to relevant technology, automatic podcast downloads would result in many challenges that may hamper the purpose of creating and distributing lecture podcasts. To counteract this situation, podcasts will be uploaded on the Learning Management System where the learners can download to their mobile devices manually.

It is essential to consider pedagogical approaches to learning in order to be able to identify the most appropriate pedagogical approach for podcasting lectures. This will provide necessary insight into how podcasting can be used in academia to produce good results and benefits.

2.4 Pedagogical approaches in teaching-learning

An all-encompassing definition of pedagogy involves considerations about the nature of knowledge; what is being taught; how it is taught, what is learning; and, how students and teachers learn. The term pedagogy encompasses these and other aspects of teaching and learning (Horsfall *et al.* 2011). Conventional pedagogies stress content and information, targeting recall and skill acquisition emanating primarily from positivist, factual, concrete, technical and rational forms of knowledge with individual behavioral, cognitive, and/or psychomotor skills outcomes (Hewitt 2009).

Bower (2008) contended that by considering the nexus between pedagogy and technologies under the pedagogy-first approach learners are better able to appreciate the relationship between educational principles and their implementation.

Educational literature suggests that every lecturer develops his own unique approach of lecturing and thus he/she uses a personal pedagogy (Boer 2004; Bourne *et al.* 1997; Jong *et al.* 1998). Noordink (2010) recognized the following academic approaches to learning and how they can be implemented in a digital environment like blackboard. They are:

- Learning by listening.
- Discovery learning (constructivism).
- Learning by doing (experiential pedagogy).
- Learning through discussion and debate (collaborative pedagogy).
- Blended learning.

2.4.1 Learning by listening

Learning by listening pedagogy is also known as the „learning by being told“ model designed by (Bourne *et al.* 1997). This pedagogy is a conventional form with lessons as the main activity. This way of teaching is cost-effective for the lecturer but hardly ever useful for the learner. It only succeeds when the instruction is very lively, but often the learners think that the lessons are tedious (Noordink 2010).

2.4.2 Discovery learning

Discovery pedagogy is related to searching for information to create a solution to a genuine problem (Bourne *et al.* 1997). Customarily, learners would go to the library, search for literature and find out solutions to solve an authentic problem but with the

use of the Internet, a lot of searching is done on the Web. According to Bourne *et al.* (1997), Web searches are often better than conventional library searching. Discovery learning is also referred to as constructivist type of learning (de Jong *et al.* 1998). A constructivist type of learning requires a multiplicity of perspectives so that learners will have a full range of options from which to construct their own knowledge.

2.4.3 Learning by doing

Learning by doing is a type of „hands-on experience“. It is a very practical form of learning (Noordink 2010). This type of learning is often adopted in science studies where learners gain their knowledge in laboratories. They practice their skills and test their knowledge in a practical setting.

2.4.4 Learning through discussion and debate

The efficiency of this type of learning is dependent largely on the context factors, namely the group size and the role of the instructor. The most efficient learning outcomes would be gained in a small class with an effective instructor. With the arrival of the internet, the discussions and debates are very popular because they are used in online environments. There is a lot of communication drawn from this type of learning, and this is very effective. Learners can use the conversation part to chat with each other using wikis, online-forums or social networks, and also share documents using blogs and wikis.

2.4.5 Blended learning

This pedagogy encompasses face-to-face contact and web technology as complementary and supplementary to each other. This type of learning is a new development in technology based and/or supported learning. It can be described as a method to devise programs that blend different types of delivery and learning methods that can be enabled and/or supported by technology with traditional teaching methods (de Boer 2004). Blended learning pedagogy is the flexible instructional method in which every lecturer and every learner can regulate his/her own way of teaching and learning. Podcasting technology is one type of a

technological tool which can be used in this pedagogy whereby lectures are recorded for revision purposes as complementary and supplemental to face-to-face sessions and not a substitute for them.

2.5 Podcasting software

There is a variety of software tools that can be used to create podcasts. Well known podcasting software include Juice Receiver, MT Podcast and Camtasia. Most of these software are available as freeware for trial purposes of up to six months.

Podcast concept is fundamentally an audio program that anyone can simply create using a microphone connected to a computer, and free recording software (Tavales & Skevoulis n.d.).

An RSS feed is an XML file that contains all the information about a particular podcast program and each episode of the program. RSS formats provide predefined web content or summaries of web content together with links to the full versions of the content, and other meta-data. This file is updated every time a new podcast is published. For example, Juice is a cross-platform podcast receiver which is freely available, and operates on the Windows, Macintosh, and Linux platforms. The following screenshot depicts a juice podcast receiver.

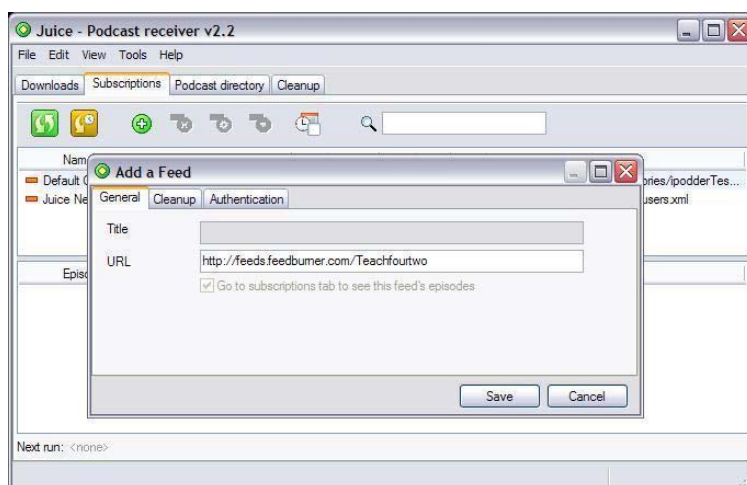


Figure 2.1: Juice podcast receiver

The Juice software is designed to automatically download new podcasts to a subscriber's computer as soon as the new podcasts are available. To configure this automation, one simply copies RSS feed to the Juice Subscriptions Manager, and the software handles the updates as seen in Figure 2.1

Any sound editing software, such as Audacity, which is available for free, can be used to create a podcast. Once the content is digitally recorded, it can then be easily edited and embellished by the creator of the podcast.

See Figure 2.2 below (adapted from Tavales & Skevoulis (n.d.))

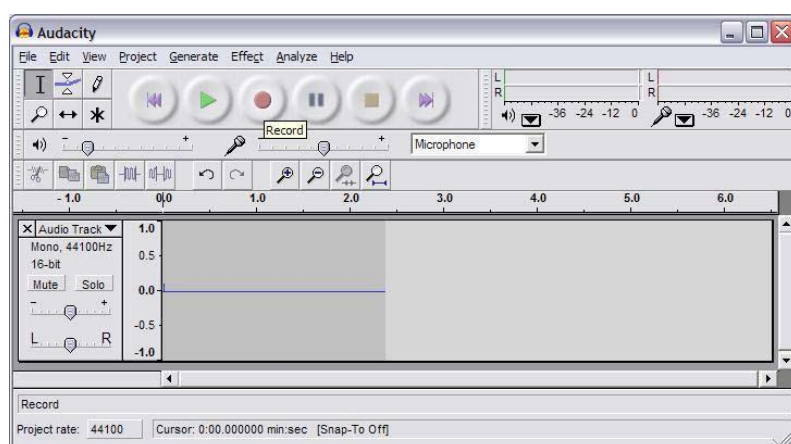


Figure 2.2: Creating a podcast

According to Campbell (2005), podcast publication is a component of a blog or is controlled around a blogging template. In order to publish the podcast, one has to upload the audio to the Web server that hosts the blog, then link to that digital content from somewhere within the blog entry, then the enclosure tag for the RSS feed is generated automatically.

It is of utmost importance to pay attention to all the factors influencing the quality of the podcast for it to serve the purpose it purports to achieve. Winder (2006) highlighted a few bottlenecks with regard to podcasting production. The author believes that the only dilemma with podcasting is that there are very few obstacles to entry. Also given the fact that anyone can record a podcast, the quality would inevitably vary. This refers not only to the quality of the content, but most importantly

to the quality of the audio recording itself. Even the most convincing contents become pointless if nobody can hear what is being said (Winder 2006). Quality and ease of compilation are major differentiators within the podcast sector.

Fitcher (2006) concurs with Winder (2006) that podcasts have a natural limitation of being a one way communication. Fitcher (2006) suggests that podcasts should be accompanied by a blog where listeners are encouraged to share comments and discuss the learning content. This researcher added that most podcast creators do not have training in writing for audio or radio journalism which may result in a down-home quality. The author thus poses the following questions with regard to podcasting production requirements:

- Is there enough bandwidth and server capacity to serve up audio files on demand?
- What do the Information and Communication Technology (ICT) policies say about the use of the computers in the company?
- Are the users permitted to synchronize MP3 players?
- Is the workplace environment conducive to recording and listening to podcasts?

These questions are critically important to ensure that podcasting practices in an institution are conducive and successful. In an attempt to respond to some of these questions posed in the preceding paragraph, podcasting tools like Profcast have been developed. Profcast can take a presentation (PowerPoint Slides) and convert it to a high-quality enhanced podcast live, as the presentation is underway. The researcher thus believes that the availability of this technology would minimize or eliminate the bottlenecks highlighted by Winder and Fitcher with regard to the quality of the recording. This ease of multimedia information archiving is envisaged to become the future of podcasting wherever lectures, presentations and demonstrations form an integral part of the workflow, whether in business or in education.

MT-Podcast is a modern distinctive online service that utilizes MagneticTime's MT1 technology to convert existing text documents into professional-quality podcasts (www.magnetictime.com). MT-Podcast eliminates the human element in terms of technical abilities altogether.

Conversions are enormously resourceful in that MT-Podcast will convert MS Word, Adobe PDF or plain text documents, which embraces the major office and institution bases. The fact that MT-Podcast completely eradicates the requirement for any technical knowledge on the part of the user by ensuring that the content of the index file associated with a podcast is managed by MagneticTime is great news for many instructors across the globe especially those with limited or no technical knowledge of podcasting technologies. With MT-Podcast, MP3 files, which are as much as four times smaller than the equivalent music MP3s, will enable podcast receivers to save them on their mobile devices. Arguably, a 25 minute podcast can be held in a file just 4MB in size.

Another well-known podcasting software is Camtasia (notes available from www.techsmith.com). Camtasia captures the action and sound from any part of the *Windows desktop* and saves it to a standard Audio Video Interleave (AVI) movie file or streaming video. Using a home or office computer, anyone can create quality (audio and video) movies with Camtasia. A 640 x 480 resolution movie with audio requires less than 1.5MB of disk space per recorded minute. The major components of Camtasia are:

- Camtasia Recorder
Captures cursor movements, menu selections, pop-up windows, layered windows, typing and everything else that is on the screen.
- Camtasia Producer
Camtasia's editor quickly edits, trims and joins AVI clips.

- Add Audio
Narrate your Camtasia screencam video while you record your movie, or, use
Dubit to add narration and sound effects to any AVI movie while you view it.
- Industry Standards
Camtasia supports the AVI format and standard video for windows audio and
video codecs.
- SnagIt
SnagIt delivers customized screen captures with the press of a hotkey. SnagIt
screen capture software captures images, text, and video from your Windows
desktop.

2.6 Possible podcasting benefits and implications for learning

Many educational institutions are hesitant to develop podcasting program initiatives of their own due to the fear that learners would deliberately skip lectures. Despite these fears, some educational institutions and faculties have begun to embrace this new medium and the benefits it provides, believing it to be the future of education. Podcasts are computer platform independent, quick, and cost-effective technology to use. Free or Open Source Software can create professional podcasts on an existing computer. Podcasts can be time efficient for lecturers, reducing the need to repeatedly utter the same material. Through lecture podcasts, learners would no longer have to anxiously write down notes but may use the time to expand their role in class discussions and general participation. As time goes by, more educational institutions seem to be adopting the new medium of podcasting.

However, listening to digital audio content won't replace reading, listening to live presentations, or the multitude of other ways learners take in information, but it can augment those methods (Maag 2006). The following are ways that podcasting can contribute to the learning process as outlined by Leiserson (2005):

- Assist auditory learners: Podcasting experts point out that the podcasting medium is ideal for learners who prefer to assimilate information orally.
- Provide another channel for material review: When content is presented orally, such as in university lectures, classroom-based training, or in-person presentations, podcasting can lessen learner worries that they missed key information in their note-taking because the audio files can be reviewed at their leisure for understanding or before testing.
- Assist non-native speakers: Learners who are not proficient in the language may inevitably struggle to keep up with lectures. Being able to review recordings of learning events as many times as possible for understanding can be of great benefit to those learners.
- Provide feedback to learners: End of the semester/year feedback or test feedback can be recorded to save time.
- Enable instructors to review training or lectures: Moreover, the benefit of recording lectures enables instructors to critically assess themselves as a method of improving their lecturing styles. Managers who want to review their personnel's instructions could subscribe to the specific podcast.
- Provide supplementary content or be part of a blended solution: When a full course is necessary, there may be occasions when supplementary material would be of assistance to learners. The material may be available for access on a voluntary basis, or it could be a required component of a classroom or online course in a blended solution. In any case, the RSS technology allows instructors to make the material easily accessible to learners and to alert them when new content is in the pipeline.

2.7 Introduction and acceptance of podcasting in education

The growing technology has significantly influenced systems of knowledge delivery and a detonation of e-learning has occurred in the past decade. An outgrowth of e-learning is m-learning which allows the learner to access knowledge in a mobile trend at their own convenience, utilizing technological resources such as in podcasting, a form of audio recording on one's personal hand held mobile computer (Vogt *et al.* 2010). M-Learning is described as different from eLearning, because it takes the learner away from a fixed point and recommends that a user would like to interact with educational content whilst away from a normal place of learning

Towards the end of 2004, a study was conducted at Duke University to promote "creative uses of technology in education" (Maag 2006). In the study, it was reported that learners were given iPods along with voice recorders, and were encouraged to submit proposals for academic iPod projects. In the report issued by the Center for Instructional Technology, the learners have reportedly used the iPods for a variety of tasks such as using the iPods as a course content dissemination tool, which means that individuals used the podcasting technology to access content such as lectures and songs. Secondly, learners used the iPods as a classroom recording tool to capture lectures, class discussions, guest speakers, and oral feedback. Lastly, the learners continually listened to their audio content available on their iPod, as a study support tool.

Podcasts have spread rapidly from the arena of hobbyists to academia, whereby numerous faculty members and campuses embraced the notion of digitally recording lectures and course material for download (Fichter 2006).

Lee *et al.* (2007) reported that audio has been abandoned and underused in the latest times. Currently, audio is experiencing revitalization because of the increase in portable audio players, broadband internet and software tools (Schlosser & Burmeister 2006). In educational settings, podcasting has captured the imagination of possibilities. However, Eash (2006) reminds us that the fact that podcast is a new

format, is therefore not reason enough to use it in a school library. Each poses the following questions with regard to using podcasts:

- Is a portable audio format the best for this task?
- How does the podcast support my goals?
- How does podcast support student learning?

These questions challenge every lecturer/educator who contemplates using podcast technology to filter as to what content is necessary to be podcasted and which one should not. Lee (2005) iterates Eash (2006) that the uniqueness aspect can manipulate lecturers in how they utilize new technologies and it is indispensable to think cautiously about whether or not this is in fact going to result in consequential learning. Lee further emphasizes that academic personnel need to make a cognizant effort to weigh up both new as well as existing technologies and how they are used from a pedagogical point of view, taking into cognizance the cognitive, affective and social factors that contribute to a successful learning experience (Lee 2005).

Most studies on podcasting technology revealed the critical importance of incorporating this medium in education whilst a few studies disapproved its use. Lau *et al.* (2010) believes that podcasting is relevant to education. For their part, the authors highlighted that podcasting is a powerful publishing platform which addresses different learning styles, is highly mobile, and can deliver content “just in time.” They further highlighted that there are many possibilities for which podcasting can be used in the classroom/lecture room.

- Firstly, the instructor may easily use his cell phone to create a podcast with daily homework assignments and other classroom information.

- Then the instructor could record his lecture for learners to download as a podcast. These podcasts are used by learners who are absent as well as by those who need extra reinforcement or want to review.
- Further, it was confirmed that the use of podcasts is an important tool for learners with visual impairments.

The remedial value of the podcast should not be discounted (Lee *et al.* 2007). Some people must hear information over and over again to absorb it. Therefore, a learner who is provided with a good podcast of a lecture can use the tool as frequently as they need to get a working grip on the material. In addition, dyslexic learners and even learners with other reading problems will benefit from the supplementary auditory reinforcement.

Lee *et al.* (2007) contends that podcasting can't replace reading and listening to live presentations but it can only augment these methods. The principal challenge facing podcasting in education is designing resources which can be adapted specifically for either the quicker learners or learners in need of additional support. Podcasting has the potential to augment learning by giving learners mobile access to course materials anytime, anywhere. In particular, integrating podcasting, electronic learning, and traditional face-to-face teaching into a blended learning environment can help create a push-pull educational exchange that increases student learning satisfaction (Lau *et al.* 2010).

2.8 Podcasting in education

Chan and Lee (2005) explored some of the possibilities for enhancing university teaching and learning. They particularly described a study involving an investigation into podcasting pre-class listening material as a strategy for addressing learners' preconceptions and anxiety to better prepare them for effective face-to-face learning. Their study yielded both positive and negative effects of podcasting use. Firstly, they found that learners were more likely to spare a few short minutes of their "wasted" time (e.g. while travelling to and from university or walking between classes) listening

to audio on their MP3 players than to read large amounts of text. Secondly, learners who fail to successfully complete their assigned pre-class reading may come to class feeling unprepared. This has a negative, compounding effect on their confidence and motivation. Hence it may be more beneficial to learners to simply channel their "learning appetites" by means of small, "bite sized" audio clips (Chan & Lee 2005).

Podcasting in education has proven to be interactive. Based on literature reviewed, podcasting enables instructors to provide additional instructions to learners and involve them in the class' interactive discussions. It is especially useful in that it caters for the learners with learning difficulties. With podcasting technology, education has embraced a powerful new instructional tool. Increasingly teachers are using podcasting in higher education to provide additional course content, to make a method of review and reinforcement available to learners, and to involve learners themselves in an interactive medium. Zhu *et al.* (2010) uphold the fact that podcasting has added value to academia. He mentioned that a number of faculty members at the University of Michigan are already capturing lectures and creating podcasts and screencasts as additional learning resources for learners. Other institutions, including Duke, Stanford, UC Berkeley, and University of Wisconsin-Madison, are also experimenting with offering podcasts to learners to provide supplementary learning material, to free up class time for active learning experiences, or to make learning material accessible to the general public.

2.9 The effect of podcasting on learning

Oliver (2005) established that podcasting contributes to student learning by augmenting student motivation and engagement. This perspective is corroborated by the findings of Fernandez *et al.* (2009) who suggested that podcasting contributes to learners' motivation. The authors noted that motivation was learners' most highlighted aspect of their podcasting use. Heilesen (2010:4) believes that podcasting has a positive impact on the academic environment. According to this researcher, podcasting opens up opportunities for a faculty to experiment with new forms of teaching while it provides learners with a new tool to use to supplement their study activities.

Lau *et al.* (2010) reported that podcasting has the potential to enhance learning by giving learners mobile access to course materials anytime, anywhere. In particular, integrating podcasting, electronic learning, and traditional face-to-face teaching into a blended learning environment can help create a push-pull educational exchange that increases student learning satisfaction.

Brotherton *et al.* (2004) informed us that the availability of lectures in podcast form may alter learners' learning behaviors as well as learners' prospect about the use of class time. Podcasting technology allows learners to take fewer or summary style notes in courses, therefore they have more time to process course material on the spot, which may direct them to ask more questions and crave for more interactivity during lecture time. Learners may, therefore, expect the format of lectures to shift from a process of information transfer mainly from lecturer to student to a more learner-centered and interactive approach. Consequently, instructors may need to devote more time to in-class activities that enables learners to practice skills, think critically about material, and apply what they've heard in the lecture to wrestle with real-world problems (McKenzie 2008).

A survey report of over 29,000 undergraduate learners at the University of Wisconsin-Madison conducted by Veeramani *et al.* (2008), reported several apparent benefits of podcasting technology, notably:

- A chance to make up a missed class.
- The handiness of watching lectures on demand.
- The possibility for accelerated retention of class materials.

Learners reported that they appreciate the flexibility of accessing podcasts anywhere and anytime and they like resources that are presented in a video or audio format, since this allows self-paced learning and multitasking (Fernandez *et al.* 2009).

Evans (2008) reported the findings of the study that was conducted at the university in the UK whereby learners claimed using podcasts more than their textbooks for revising the content. The conclusion that was drawn in this study indicated that podcasts are more resourceful than their own notes in assisting them to learn. Fernandez *et al.* (2009) reminded us that although learners may appreciate podcasts, this technology tool should not become a substitute for traditional learning resources but should instead complement traditional lecturing-learning mechanisms. In terms of *when* learners use podcasts, studies show that lecture podcasts (audio or video) are utilized primarily to prepare for examinations and review course material in order to gain a better perceptive on complex topics (Soong *et al.* 2006). Copley (2007) corroborates these findings when he studied the patterns when learners tend to access podcasts during a course of study. The study showed that learners habitually listen to podcasts shortly after a lecture has occurred and in the few days before an exam commences.

It should be highlighted that student use of podcasts may differ across disciplines or social backgrounds. A study at University of Michigan, for example, found that under-represented minority students were more likely to view podcasts, and learners in one engineering department accessed podcasts more than all of the other engineering majors combined (Pinder-Grover 2009).

Numerous disadvantages or limitations of using podcasting in education have been offered (Walls *et al.* 2010). If learners do not utilize or do not realize the advantages of the self-pacing multimedia distinctiveness of podcasting, then the resource becomes a more likely contributory factor to cognitive overload. The author emphasizes that educators/lecturers should be cautious in thinking that learners are ready for and conversant about podcasting technology, in spite of the podcasting type implemented. According to these researchers, one course incorporating this technology may be adequate to begin to transform learners' readiness levels.

Lazzari (2009) reported a study which involved a group of learners doing a course in multimedia communication and human-computer interaction. A detailed analysis based on the assessment of the effects on learner performance, on data from

learner satisfaction surveys, from interviews and from instructors' observations yielded positive feedback: In this report, it was established that full-time learners who were co-involved in lessons' podcasting outclassed colleagues of the previous years and accomplished higher levels of what is defined as competitive urgency (Lazzari 2009).

Lazzari (2008) noted that the presented literature on podcasting is typically surveys into users' acceptance of the originality rather than studies exploring its effect on the students' learning. Other studies tend to embark on the methodological aspects of the innovation, notably, audio or video quality and issues of bandwidth (Lazzari & Betella 2007). Yet there is a number of studies that provide an insight into some of the pertinent issues relating to podcasting used in higher education and its influence on the traditional lecture.

Chan and Lee (2007) reported a study in which podcasting was used to deliver supplementary material to distance learning learners in an Australian university. After a survey was completed, a small random sample of learners was selected for semi-structured interviews. Out of 18 respondents all learners reported downloading at least 8 of the 9 available podcasts, and 89% of them reported listening to three of the podcasts multiple times. Diverging from the literature claims, which suggest that learners can access and learn from the material on the go, the learners in the study preferred to listen to the podcasts using a computer at home during a dedicated study time.

Chan and Lee (2007) also noted that the majority of the interviewees' responses showed that learners did not multitask their listening of the podcasts with other tasks because they viewed it as a learning activity that formed part of formal, purposeful study efforts demanding undivided attention and concentration within a designated study location. Evans' (2008) study corroborated Chan and Lee's (2007) study wherein podcasts were explored by using a sample of 196 undergraduate business and management learners in a United Kingdom university. The study involved the use of three revision podcasts provided to the learners on completion of a course on information and communications technology prior to the examination.

Similar to Lee and Chan's (2007) study, learners listened to the podcasts on a PC rather than on a mobile device. In the light of these findings, Evans (2008) noted that podcasting can fill an important need's gap by granting learners an opportunity to continue the learning activities when it might not normally be possible. Nevertheless, podcasts did not appear to offer much in the way of facilitating multi-tasking, with most learners claiming that they did not undertake any other activities while listening to podcasts.

In line with the research conclusions by Chan and Lee (2007) and Evans (2008), Huntsberger and Stavitsky (2007) undertook a study in which they investigated the use of podcasting in a United States university. Their research aims were to explore learners' attitudes towards podcasting and how they used it. They investigated five course revision podcasts of 15 to 28 minutes long, providing chapter summaries and syntheses of course content at stages during the program. This research found that 87% of the respondents listened to all podcasts at least once and that 91% of the respondents accessed the podcasts "during their regular study sessions" rather than while engaged in some other activity. In light of these findings, the researcher noted that the instructor is confronted with dissimilar approaches:

- Re-strategize how to make the podcasts complement the readings without providing adequate detail to make the text seem obsolete.
- Or, view the podcasts as a substitute for the text.

Further literature in podcasting in higher education conducted by Fernandez *et al.* (2009) reported the benefits of podcasting used in higher education. The authors' study identified an important gap in theory and good practice in higher education and empirical studies about podcasting. The analysis described within the framework of principles for good practice in higher education, recommended some exciting issues in distance courses, notably:

- Podcasting as a complement to the traditional praxis, but not as a substitute for them.
- The traits of podcasting increase the thought of permanent contact between learners and lecturers, thereby increasing learners' motivation.
- The use of podcasting allows for a varied range of learner skills and learning approaches.

According to a study conducted by Willams and Fardon (2007) in which they investigated how and why learners used mobile media players to watch or listen to lecture recordings in an Australian university, the podcast lectures were found to be very helpful to the learners in terms of improved comprehension of the subject matter because learners could access the subject content "on the go". These findings correspond to the findings of Lee and Chan (2007) and Evans (2008).

Copley (2007) conducted a study into the use of complementary matter delivered through video and audio podcasts to 283 learners on undergraduate and postgraduate levels in science in the United Kingdom. Copley reported that learners tended to use the podcasts for revision purposes rather than as a replacement for the lecture. He further attested that learners preferred real physical contact lectures as opposed to lecture podcast. The study established that very few learners indicated that they used the podcasts in an m-learning context, reviewing their contents while doing other tasks.

Lazzari (2008) conducted a study into the use of podcasting to deliver supplemental podcasts to 47 learners enrolled for a course in multimedia communications at an Italian university. The research study analyzed learners' test scores, spread surveys and collected data from learner colloquia. The study concluded that learners had a positive view of the use of podcasting as part of their learning but found a significant preference for notes rather than using podcasts as a quick tool for revising.

Schlairet (2010:529) conducted a study in which podcasts of classroom lectures from selected courses across programs in a college of nursing were created and allied outcomes were explored using a Web-based program evaluation framework. In total, seventy post-graduate and graduate nursing learners participated in the study. Three learner groups were selected for inclusion based on faculty interest in podcasting: undergraduate learners in a nursing fundamentals course, second-degree learners in a nursing research course, and graduate learners also in a research course. The sample consisted of learners older than 18 years who were enrolled in the three courses. Participation in data collection was voluntary, although all learners had access to podcasts, and the study received institutional review board approval. The investigator initiated collaborative relationships across campus to develop skills and identify appropriate technology to support the project. Findings of this study suggested that nurse educators can influence learners' positive attitudes and technological skills with the least investment of money and no impact on class attendance, thus building first-rate podcasts that support learners' unique learning abilities and goals. The study also recommended that academic institutes should take into account specific learner characteristics and related needs when developing podcasts and in providing direction and support for learners who use these learning tools.

Evans (2008) study looked into the effectiveness of mobile learning in the form of podcasting, for teaching undergraduate learners in higher education. The statistical analysis of the outcomes of his study indicated that learners consider podcasts to be more effective revision tools than their textbooks and that they are more resourceful than their own notes. Learners also indicated that they are more receptive to the learning content in the form of a podcast than a traditional lecture or textbook. Evans' (2008) study recommends that the use of podcasts as a revision tool has apparent advantages as perceived by undergraduate learners in terms of the time they take to revise and how much they feel they can learn. According to the author, in spite of the advantages of flexibility in when, where and how it is used, podcasting technology appears to have major potential as a pioneering learning tool for adult learners in higher education.

Edirisingha (2010) reminded us that the use of podcasts in higher education is entrenched in the custom of using audio for teaching and learning. The author emphasized that audio has the didactic ability to power cognition through clarity of instructions, while influencing emotional aspects of learning by transmitting immediacy and a connection with the lecturer.

2.10 The effect of podcasting on lecture attendance

Podcasting as a growing didactic tool has been adopted by several universities and is being employed in the business and corporate worlds extensively. Podcasting is currently largely being tested and used at college and university level globally. Although some secondary schools and even lower levels of education are presently pursuing this new technology's use, research work on podcasting is more prevalent in higher education and training. Every new technology that is introduced into the classroom would inevitably yield disagreeing opinions, and podcasting technology in particular is no exception. Conceivably for the first time since the internet entered lecture rooms, this new technology (podcasting) could stamp out the need for the traditional classroom (physical contact sessions). It is this distress that has raised the fury of podcasting opponents in the field of education. Academics and universities fear that podcasted material will cause learners to skip lectures, thereby leaving professors and instructors with empty lecture rooms. According to the study completed by Zhu *et al.* (2010), there was no noticeable impact on learners' class attendance in relation to podcast lectures despite a general fear amongst instructors that learners will stop attending classes if they have access to a lecture podcast.

Survey studies at different institutions in the United States and the United Kingdom showed that access to lecture podcasts generally does not have an impact on the learners' decision to attend class. Bongey *et al.* (2006) completed a study in which the effect of podcasts on learner attendance, the learners' preferred use of podcasts, and the learners' perceptions of their academic impact were examined. The outcomes of the study indicated that the availability of the lecture podcasts did not cause a significant drop in lecture attendance. Similar to the research study

completed by Lazzari (2008), learners disclosed that podcasts assist them to understand the content better.

Hew (2009) also insist that the availability of podcasts does not influence learners to miss lectures. These findings correspond with a study conducted by Hove and Corcoran (2008) in which the effect of lecture presentation availability on class attendance and academic performance was explored. Similarly, Maharaj *et al.* (2010) conducted a study at a South African university in which they investigated the impact of podcasting technology on learner lecture attendance. Since the class discussions were also recorded as part of the podcast, learners were provided with a collection of discussions and the lecture content. The outcomes of this study indicated that learners were motivated to attend lectures and not to miss them.

In a parallel exercise of the same study Maharaj *et al.* (2010), the same process was used in the class. Audio recordings were made of all class discussions and debates on specific topics. Consequentially, learners' attendance percentage remained stable.

A pilot study completed by Holbrook and Dupont (2009) discovered one variation between the two courses with respect to absenteeism caused by podcasted lecture material. For their part, the authors reported the findings of the study wherein they studied profcasts and class attendance. They found that learners in the introductory program had adopted a tendency to miss more lectures because of the availability of podcasts than upper year learners.

2.11 The effect of podcasting on the learners' academic performance

Ouston *et al.* (2011) reported a study in which attempts to reveal and understand the relationship between learner perceptions of podcasting and academic performance were made. The outcomes of the study suggested that higher achieving learners viewed podcasts considerably less often than low achievers. According to the outcomes of this study, podcasting is more likely to benefit low achieving learners.

Nearly similar outcomes were obtained by Dupagne *et al.* (2009) in which the efficacy of using video podcast as a revision tool was addressed. The findings thereof proved that learners who watched the video podcast did not attain higher pass rate than learners who did not watch the video podcast.

Morris (2010) explored the use of podcasts of lectures with mobile assessments to evaluate the effect of podcasting on examination performance. The study reported that learners in the trial group who listened to podcasts of the lectures and completed mobile assessments performed drastically better in the summative assessment as compared to the formative assessment performance. These findings diverge from the findings of Morris (2010) and Ouston (2011) which suggest that podcasting made no significant difference in the learners' exam grades.

Bond *et al.* (2008) investigated podcasting and its relation to academic performance. Their research findings attested that 80% of the learners (research population) access the podcast and listen to podcasts for mainly revision purposes. Similar to Morris (2010), Bond *et al.* (2008) established a positive relationship between podcasting and the learner's academic performance. Cann (2007) opposes the research findings of Bond (2008), Morris (2010) and Ouston (2011) in his study titled Podcasting is Dead. Long Live Video! Cann (2007) investigated the use of podcasting in biology working with two associates consisting of 150 first years and 90 second year learners. According to Cann (2007), podcasting does not contain any intrinsic significance and is only important in as much as it assists the instructor and learners to realize their educational goals.

Bensalem *et al.* (2011) reported the findings of their pilot study in which ten anesthesiology residents participated in the study. Surprisingly, the mean scores with standard deviations indicated that no differences were noted between the mean educational tool scores for those who underwent podcasting training compared to those who had undergone traditional didactic training. This report divulge from all the findings reported in the literature thus far. This report suggests that conventional education is no different to technology based (podcasting) education.

Lazzari (2008:27) coincide with Ouston (2011), Morris (2010) and Bond *et al.* (2008). Lazzari (2008) reported the findings of the study in which he investigated the innovative use of podcasting in higher education and its cause on the competitive urgency. The results of the study based on the assessment of the effects on learner performance, on data from learner satisfaction surveys, from interviews and from instructors' observations provided encouraging results (Lazzari 2008). Full-time learners co-involved in lessons' podcasting outperformed colleagues of the previous years and achieved higher levels of what this researcher define as competitive urgency that led them to better understand the theoretical issues of the course and to more effective practical skills.

Hew (2009) reviewed the previous experimental studies on the use of audio podcast in higher educational settings. Findings showed that the majority of ordinary use of podcasting is limited to either instructors/lecturers distributing lecture podcasts or supplementary materials for learners to revise subject material at their own time and place. According to Hew (2009), most of the previous studies on podcasting was descriptive, and was conducted in higher education and traditional course settings. All the studies indicated that learners generally enjoy using podcast, and tend to listen to the podcasts at home using desktop computers, rather than on the move with a mobile device. Probably the main benefit of podcasting is that it allows learners to listen to specific material that they missed or did not understand multiple times. The availability of podcast does not appear to encourage learners to skip classes.

2.12 Issues arising from the review of literature

The discovery of the use of new and prevailing technologies in education is a continuing mission. The academic use of podcasting has been accompanied by various prospects, condemnation and worries:

- Firstly, podcasting was not created with education in mind until 2004 when the Duke University first explored the educational use of podcasts (Campbell 2005). Hence the use of podcasting in education is not wide spread, and much reported

use relates to research studies performed. Additionally, most of the research in this field is based on the fears that podcasting technology could contribute to learners deliberately skipping lectures. Mixed sentiments have been reported in the literature review about this issue. Bongey *et al.* (2006), Corcoran (2008), Lazzari (2008), Maharaj *et al.* (2010) and Hove and Corcoran (2008) found that podcasting supplemental lectures did not cause a decline in lecture attendance. It is clear from the literature review that podcasting has got less or absolutely nothing to do with the learner's lecture attendance. Studies that have been completed on podcasting impact on lecture attendance thus far, should help eradicate the fear that podcasting opponents have regarding the use of this technology in educational settings.

- Secondly, a number of studies have examined the impact of podcasting on learning. A large number of studies have proved that podcasting can influence learning in a positive way. Notably, Oliver (2005), Fernandez *et al.* (2009), Heilesen (2010) and Edirisingha (2010) found common ground that podcasting has a positive influence on learning.
- Thirdly, literature review on the effect of podcasting on the learners' academic performance ushered in conflicting reports. There is up to date very few studies completed in this regard. Researchers who explored this portion of podcasting reported different findings. This provides research opportunities to meticulously look into this area. Ouston (2011), Morris (2010), Bond *et al.* (2008) and Lazzari (2008) reported that podcasting does have a positive effect on the learners' academic performance while Cann (2007), Dupagne *et al.* (2009) and Bensalem *et al.* (2011) argue that podcasting technology does not have any positive effect on the learners' academic performance.

2.13 Conclusion

This chapter has presented a review of literature on podcasting technology since its inception in 2004. The topics covered in this chapter include definition of podcasting, podcasting software, possible podcasting benefits, introduction of

podcasting in education, podcasting in education, the effect of podcasting on learning, the effect of podcasting on lecture attendance, pedagogical approaches and the effect of podcasting on academic performance. In the next chapter, the focus will be on the research method used in the study.

Chapter 3 : Research Methodology

3.1 Introduction

There are two dominant approaches to research namely, quantitative approach and qualitative approach (Creswell 2012).

Quantitative approach means that the data is generated in quantitative form which can be subjected to thorough quantitative analysis in a formal and strict manner. Quantitative approach can be further categorised into inferential, experimental and simulation approaches to research. Inferential approach in research may be used to create a database from which to deduce descriptions or relations of populace. Commonly it implies survey research where a sample of population is examined to determine its characteristics, and it is then inferred that the population has similar characteristics. Experimental approach grants the researcher better control over the research setting and in this situation, variables are manipulated to scrutinize their effect on other variables. Simulation approach is characterized by the assembling of a simulated environment within which relevant information and data can be generated.

In contrast, qualitative approach embarks on personal evaluation of attitudes and behaviour. Research in this approach is based on the researcher's insights and impressions. Qualitative research approach uses either one or both of the following techniques: interviews, focus group interviews and projective techniques. The distinction between qualitative and quantitative approaches emanates from two diverse paradigms, each with its own, reciprocally ambiguous, philosophical presuppositions. Quantitative research presupposes objective truths and a single,

indisputable reality whilst qualitative research presupposes a world which is inherently subjective, with no indisputable reality (Paley 2000).

Similarly, McKereghan (1998) clearly defines quantitative research as being objective and qualitative research as being subjective. The author further postulates that quantitative research measures what it assumes to be a stagnant reality with the aim of developing universal laws. Qualitative research on the other hand is an examination of what is assumed to be a vibrant reality but it does not claim that what is revealed in the process is universal and, thus, replicable (McKereghan 1998).

In the light of the brief introduction on research approaches above, the current study employed a quantitative research approach. The nature of the problem that the current study seeks to address warranted experimentation and statistical analysis to be made in order to make an accurate and objective judgment about the phenomenon being studied (i.e. effect of podcasting on academic performance) in an attempt to answer the research questions of the study.

In the following sections, the research design, how to create a podcast, research procedure and internal and external validation will be considered.

3.2 Research design

3.2.1 Research Paradigm

This study employed the positivist research paradigm. Positivism as opposed to post-positivism means different things to different people (Schrag 1992). The current study argues that learners are unique individuals with different learning capabilities therefore require diversified learning mechanisms to achieve better learning outcomes. When a lecture is presented in a laboratory or lecture room, three factors emerge from the didactic discourse, namely audio, text and visual.

The instructor's voice (audio) is critical to capturing the learners attention. Furthermore, it is the instructor's voice that the audience or learners will be listening to for the greater part of the lecture duration explaining and discussing the content

(text). Text on its own may not be construed by the learners. They may read it or study it, but not understand it. The presence of an instructor or lecturer is therefore critical to facilitate understanding and assimilation of the learning content. The visual element encompasses the learners seeing or being able to view what (e.g. text, picture and diagram) is being explained by the instructor or lecturer. Visual factors would stimulate understanding of that which is being presented in the lecture room. If the lecturer explains different types of monitors, learners may understand and discern between types of monitors if the images of such monitors are shown (visual factor) to them.

With the aforementioned factors being brought to light, the researcher establishes that audio, although it is an integral part of a lecture, is also fundamental and critical because it dominates the didactic discourse. Therefore audio (podcast) makes up 80% to 90% of the didactic discourse which is actually the stimulus for the learners to understand the learning content, thereby improving their knowledge, augmenting their skills and ultimately uplifting their academic success. If the lecture is presented only once, learners become obliged to study text (in the form of notes or textbook) which often leads to lack of understanding thereby negatively impacting on the learning outcomes.

Leiserson (2005) enumerated possible podcasting benefits. Proponents of podcasting point out that the medium is perfect for learners who prefer to take in information aurally. In addition to this, it is apparent that audio would stimulate remembrance of that which was seen (visual) during a lecture presentation. As a result, audio should be drilled to foster understanding in the quest to improve understanding of the learning content; reciprocally attempting to improve the learning outcomes. In accordance with the positivist paradigm, learning mechanisms either in the form of text, audio or visual should be accorded meticulous attention in an attempt to improve the academic performance.

3.2.2 Research Method

This study implements a quasi-experimental non-equivalent group post-test research method. This method entails that non-random selected experimental and control

groups are compared, which is non-equivalent (not paired), and that measurement only takes place after the implementation of the intervention (Creswell 2012). This research method is widely used in educational research, especially evaluation research (Chang & Tseng 2011; Fitzpatrick & Meulemans 2011; Martínez-Caro & Campuzano-Bolarín 2011; Shen *et al.* 2011; Stes *et al.* 2012).

3.2.3 Participants

The participants in this study are undergraduate learners enrolled for a management and entrepreneurship diploma in the Faculty of Management Sciences at the Tshwane University of Technology, as well as the instructor in charge of these learners. A non-random sample of 150 learners was taken from the population group of 350 learners. The control group comprised of learners (n=75) who have completed the subject in the previous semester, before the podcasting technology was introduced in the classroom. The experimental group comprised of learners (n=75) who are currently doing the subject with the assistance of the podcasting technology. The number of students in each percentage category in the control group and the number of students in each percentage category in the experimental group will be used to measure the effect of the use of podcasting technology on the academic performance. The instructor of the learners will also play a critical role in this project. The instructor will assist in providing insight in relation to how podcasting was experienced in the subject as well as to how it could be made effective.

3.2.4 Data Collection

Previous literature was consulted to obtain information in the podcasting field. Important information that was obtained relates to research methods that were used and applied in podcasting technology studies. This assisted the research in the choice of the research method which was used in this study. The studies that were conducted in the podcasting field over the years which employed the experimental methods are from Lazzari (2008), Hew (2009), Morris (2010), Bond *et al.* (2008), Cann (2007), Dupagne *et al.* (2009) and Bensalem *et al.* (2011).

For the purposes of this study, the experimental data consisting of the control and experimental groups' mark sheets for the four assessments were obtained. The data (i.e. marks) were entered on the SPSS package to analyse it. Analysis entailed working out the mean score per assessment, frequency of pass rate and fail rate, standard deviations and t-test values.

A 5 point likert scale questionnaire was developed in accordance with the objectives set for the study and distributed to the experimental group learners (n=75) in order to obtain data regarding their podcast activities/experience. The questionnaire consisted of 4 categories measuring the following aspects: (a) podcast accessibility, (b) learning enhancement, (c) effect of lecture podcast on academic performance and lastly (d) presenting the demographic data of the learners.

A face-to-face semi-structured interview was conducted with the instructor of the learners in order to obtain qualitative and complementary data with regard to experiences relating to the use of lecture podcasts in the subject. The primary advantage of semi-structured interviews is that they provide much more detailed information than what is available through other data collection methods, such as surveys. Responses to questions were written down during the interview. There are different methods that may be used to analyse qualitative data namely thematic analysis, grounded theory, discourse analysis, etc. Thematic analysis method was used to analyse the responses collected from the interview (see end of the responses). A conceptual framework was thus created to report the findings of the interview.

Triangulation is a method used by researchers to determine validity of a particular study (Guion 2002). Triangulation assists the researcher to become aware of various facets of the study that may warrant attention (Stake 2005). Guion has described the following types of triangulation: (i) theory triangulation, (ii) data triangulation, (iii) investigator triangulation and (v) methodology triangulation.

- (i) *Data triangulation* refers to gathering data through several sampling strategies, so that slices of data at different times and social situations, as well as on a variety of people, are gathered.
- (ii) *Investigator triangulation* refers to the use of more than one researcher in the field to gather and interpret data.
- (iii) *Theoretical triangulation* refers to the use of more than one theoretical position in interpreting data.
- (iv) *Methodological triangulation* refers to the use of more than one method for gathering data.

In this study, data triangulation was used in the form of experimental data, interviews, questionnaires and literature study. In an attempt to enhance confidence in the ensuing findings, the experimental and literature data was further supported by questionnaire and interview data.

3.2.5 Research tools

Podcasting software called Camtasia was installed on a laptop running windows XP OS. Once installed, Camtasia becomes “add on” software in MS PowerPoint.

Basically, Camtasia records voice (audio) from the PowerPoint slides as they are being presented in class. The software also has a capability of recording video from the PowerPoint slides but this was not to be explored in this study. The laptop had an on-board speaker but the external wireless microphone was used to ensure that quality sound was produced. Camtasia makes provision for the following file formats: MP3, MP4, MPEG, Waveform Audio File Format (WAV) and Hypertext Markup Language (HTML). For the purpose of this study, recorded lectures were saved in MP3 format which is the file format most learners indicated that their mobile phones are compatible with. The audio files were indexed according to a slide title and

ranged from 300 KB to 500 KB which is about 4 minutes to 7 minutes playing time per PowerPoint slide. Typically, a presentation of 10 slides would be converted into an MP3 file of 3 MB at minimum and 5 MB at maximum which is the size that can be handled by a mobile phone. A mobile phone with a memory card is an added advantage because it can store even multiple files (lecture podcasts) of the mentioned capacities.

Blackboard (MyTutor) is the Learning Management System used at Tshwane University of Technology which was used to upload the MP3 lecture podcasts. All learners that are registered for the subject ADM200T at the University automatically subscribe to MyTutor. A MyTutor account is created using a learner's reference number or learner number. Therefore, once the MP3 lecture podcasts are uploaded on the subject code (ADM200T), all the learners who are registered for this subject code will have access to the lecture podcast. Learners can access this lecture podcasts on any computer connected to the internet and then download and save the MP3 files to their mobile phones to listen to at any time anywhere.

3.2.6 Subject Objectives covered by podcasts

The following table shows the subject objectives and assessment questions that were addressed by the lecture podcasts. The lecture podcasts were accessed and downloaded from the following url:

http://mytutor.tut.ac.za/webapps/portal/frameset.jsp?url=%2Fwebapps%2Fblackboard%2Fexecute%2Flauncher%3Ftype%3DCourse%26id%3D_4054_1%26url%3D

Table 3.1

Podcast #	Lecture podcast	Lesson specific objective (s) addressed	Assessment Question (s) addressed
1	 Entrepreneur and Entrepreneurship	- Define the concept entrepreneur - Explain the concept entrepreneurship	- What is an entrepreneur? - Enumerate the traits of entrepreneurship.
2	 Challenges of entrepreneurship	Identify the challenges of entrepreneurship	What are the challenges that entrepreneurship is confronted with in the context of S.A.
3	 Creative process	Improve the creative process	Mention and explain the techniques that may be used to improve the creative process
4	 Forms of ownership	Describe various forms of business ownership	- Name and explain forms of ownership - Give advantages and disadvantages of each form of ownership
5	 Franchising	Explain the concept franchising 47	- What is franchising? - Explain franchising with reference to practical example of your own

			choice.
6	 Feasibility analysis	• Conduct a feasibility analysis	• Explain and describe feasibility analysis of a business venture.
7	 Strategies for e-commerce	• Identify strategies for e-commerce	• List 10 strategies for successful e-commerce practices
8	 Myths about e-commerce	• Identify myths about e-commerce	• What are the myths that you know about e-commerce? List 8.
9	 Locating the business	• Identify factors to consider when locating a business	• List 10 determinants to be taken into account when deciding on business location.
10	 Business analysis	• Conduct proper business analysis using best practices	• Use a business analysis methodology that you are familiar with to analyse an existing business
11	 Contracts	• Describe different types of contracts	• Mention and explain types of contracts.
12	 Obligations	• Explain the term obligation in the context of business management	• What are the obligations of the creditor and the debtor in a contract

			agreement
13	 Requirements of a valid contract	Describe factors that influence the validity of a contract	What are the requirements for a valid contract? Briefly discuss.
14	 Misinterpretation	- Define the term misinterpretation - Mention the types of misinterpretation	- What is misinterpretation? - List types of misinterpretation and the remedies available at the disposal of the injured party.
15	 Terminating an offer	List ways of termination an offer	Mention 6 ways of terminating an offer.
16	 Forms of delivery	Understand forms of delivery	Discuss forms of delivery for both movable and immovable properties
17	 Risk	Understand the risk concept	Discuss the passing of risk rule where the risk does not pass to the purchaser, but remains with the seller
18	 Consensus	Explain consensus	What are the factors that influence consensus?

19	 The nature of <i>emptio vendito contractus</i>	Understand the concept, the nature of <i>emptio vendito contractus</i>	Briefly discuss the nature of <i>emptio vendito contractus</i>
20	 Business plan	Write a solid business plan	Prepare a business plan based on your own business idea. Incorporate all the important elements of a solid business plan into your plan.

3.3 Creating a podcast

From all the podcasting software that was reviewed, Camtasia was preferable and thus used to produce the lecture podcasts due to simplicity and the amount of options it provides users with. Guidelines on how to set up and use Camtasia for audio/video recording is provided next.

3.3.1 Camtasia Recorder Setup

Standard View.

- What you see when you first open Camtasia (Figure 3.1).



Figure 3.1: Camtasia window

Change to Compact View.

- Takes up less screen area (Figure 3.2 and Figure 3.3).



Figure 3.2: Camtasia compact view



Figure 3.3: Camtasia recording

Set Capture input to a fixed region.

- Set to 640 x 480. Determines size of movie capture window.
- Typical screen resolution for a 17 inch monitor is 1024 x 768 (Figure 3.4 and Figure 3.5).

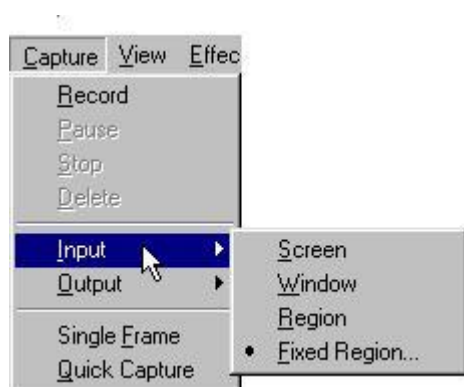


Figure 3.4: Camtasia screen resolution

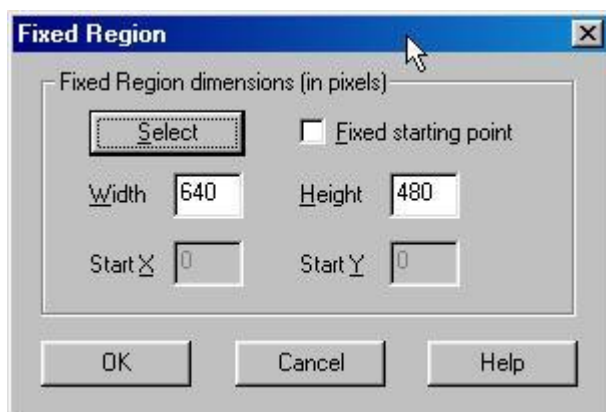


Figure 3.5: Fixed region dimension

Set Audio to be recorded “on the fly”.

- Can also include cursor and keyboard sounds. Reinforces need for user to click mouse buttons, use keyboard (Figure 3.6).

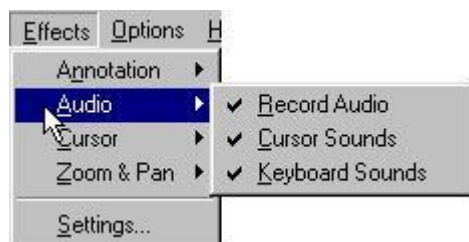


Figure 3.6: Set audio

Set Mouse clicks to be visible as well as audible (Figure 3.7).

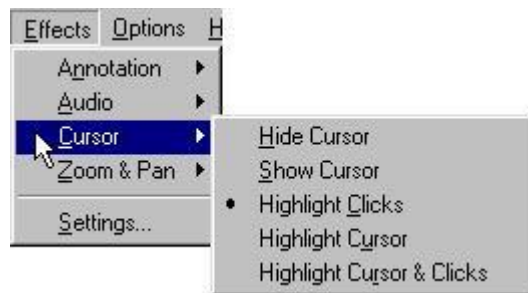


Figure 3.7: Camtasia mouse clicks

Adjust Highlight Mouse Clicks to be small (unobtrusive, yet visible) colored circles (Figure 3.8).

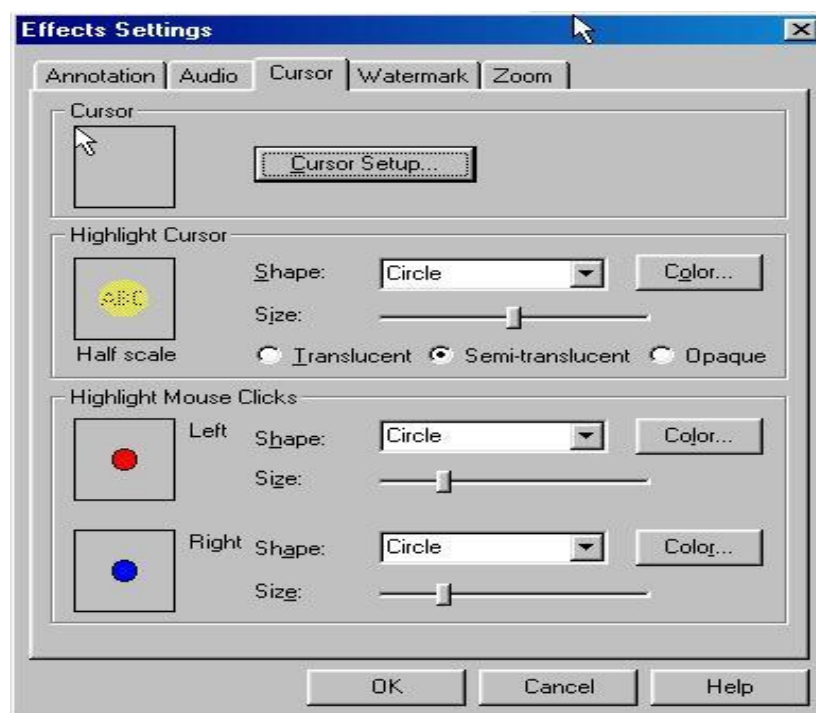


Figure 3.8: Camtasia effects settings

Choose Options Pulldown menu > Preferences (Figure 3.9).



Figure 3.9: Camtasia effect preferences

Preferences Dialog Box.

AVI Tab (Figure 3.10).

- Leave Video Options set to Auto Configure.
 - Ensures that TechSmith Screen Capture Codec (TSCC) is used. TSCC codec provides exact video renderings coupled with excellent compression ratios and performance.
 - Downside – TSCC codec must be installed on computer where movie is being viewed.

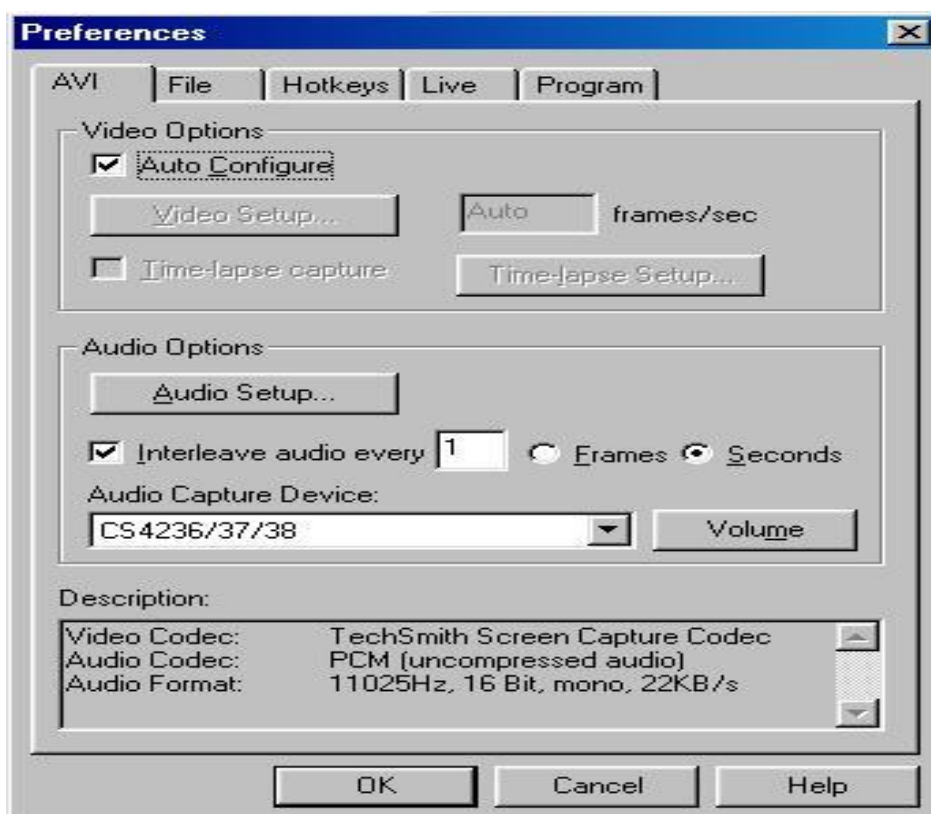


Figure 3.10: Camtasia audio configuration

Audio Options (Figure 3.11 and Figure 3.12).

- Based on trial and error, have found that the audio settings shown below produce good quality sound and small file size.
- PCM format – uncompressed audio.
- File size proportional to KB/s.
- Have found that increasing bit size from 8 to 16 significantly reduces background noise.

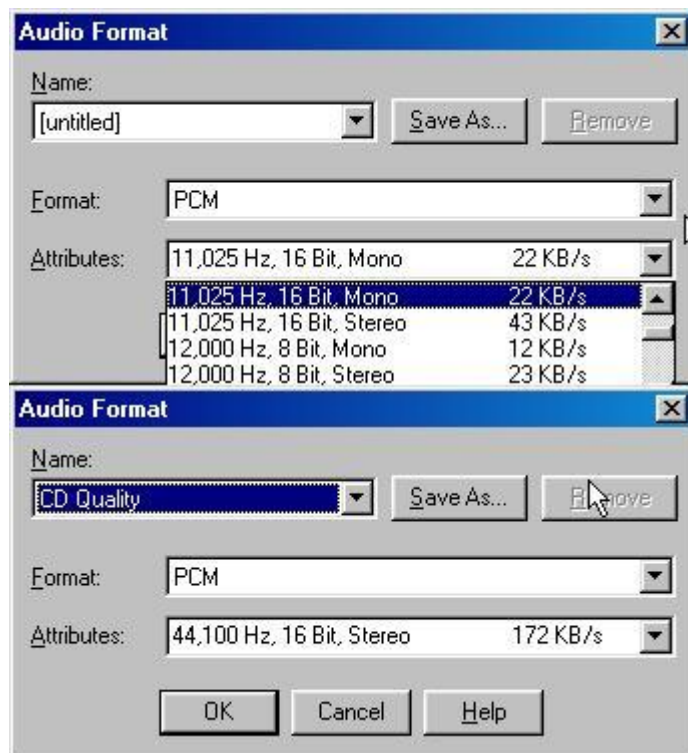


Figure 3.11: Audio format

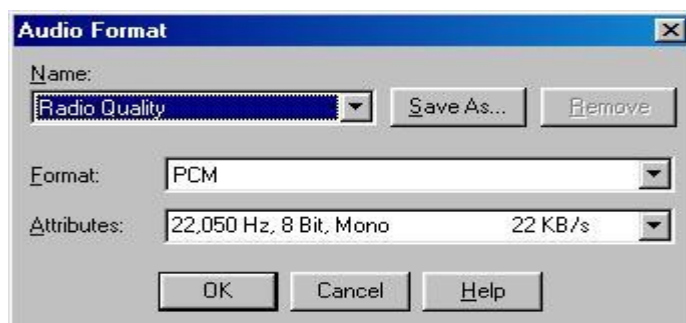


Figure 3.12: PCM format

File Tab (Figure 3.13).

- Designate an output folder and a file name prefix. All saved video clips will be saved to this folder with the designated Prefix.

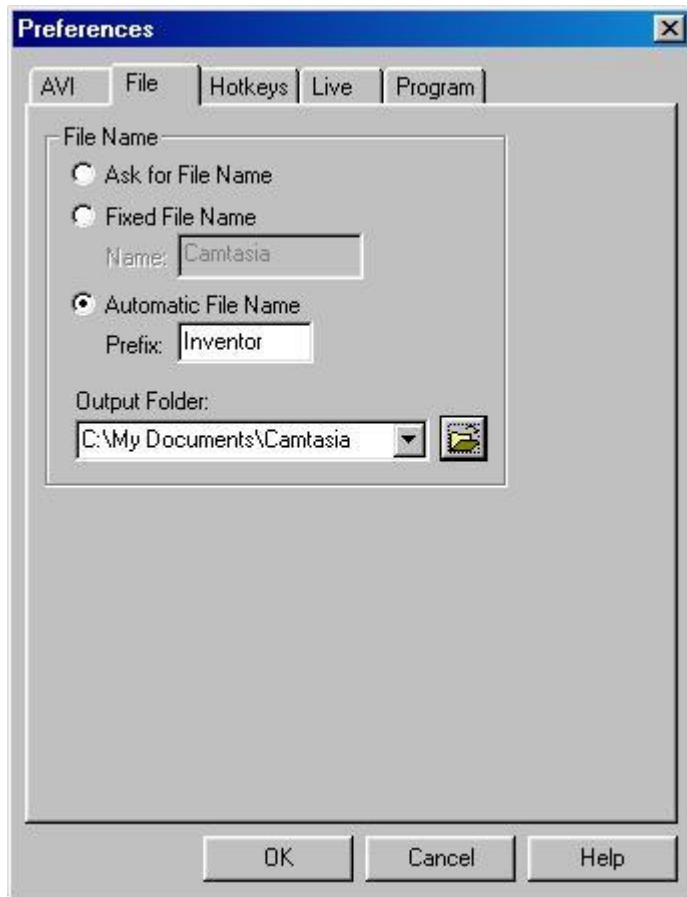


Figure 3.13: File preferences

Program Tab (Figure 3.14).

- On program options tab, use the following Capture Options
 - Pause before starting capture ON – allows you to arrange and position windows and capture rectangle before starting capture
 - Boost priority during capture ON – gives Camtasia a higher processor priority
 - Hide capture rectangle ON – otherwise the capture rectangle blinks annoyingly
 - Play movie after saving file OFF – not necessary

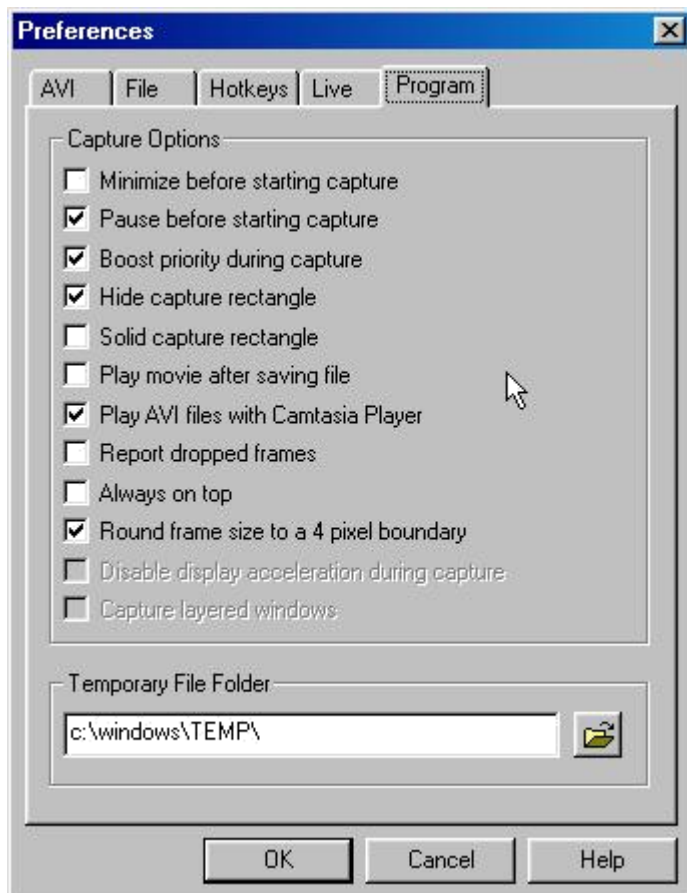


Figure 3.14: Program tab

Camtasia recording (Figure 3.15). Launch application you wish to record from. Hit Capture button (or F9 hot key) to go into recording mode

- Since “Pause before starting capture” is on, recording does not start immediately. Capture rectangle is visible



Figure 3.15: Camtasia recorder

- Resize application to fit a 640 x 480 capture rectangle

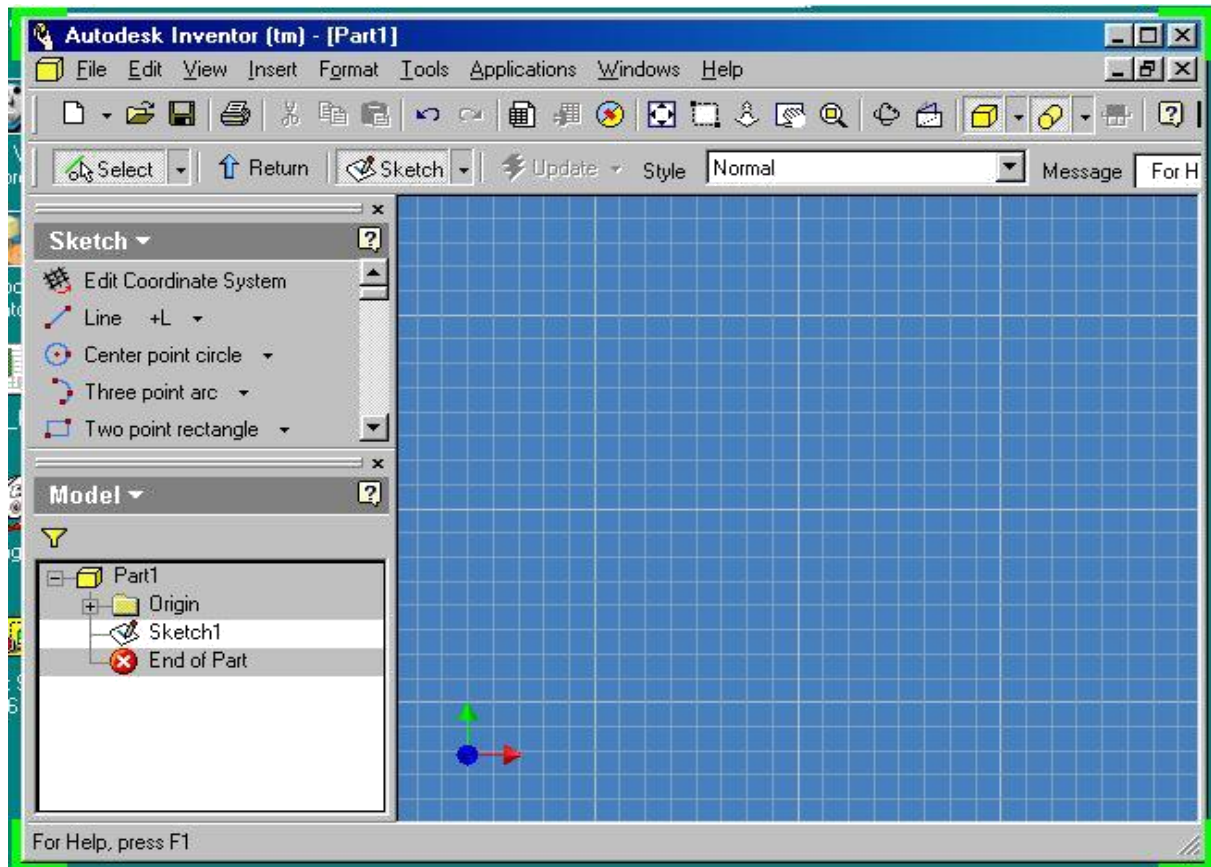


Figure 3.16: Autodesk inventor

When ready, hit F9 (or Record button) to start recording.

If you want to discard what you have recorded, hit the Delete button (Figure 3.17).

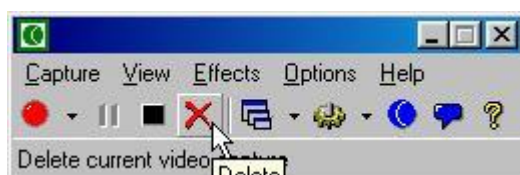


Figure 3.17: Delete recording

If you want to pause the recording at any time, hit the F9 key

If you want to save what you have recorded, hit the Stop recording button (or the Stop hot key – default is F10) (Figure 3.18).



Figure 3.18: Save a recording

Once you have saved a recording, hit the Camtasia Producer button (Figure 3.19).



Figure 3.19: Camtasia producer

Camtasia Producer opens (Figure 3.20).

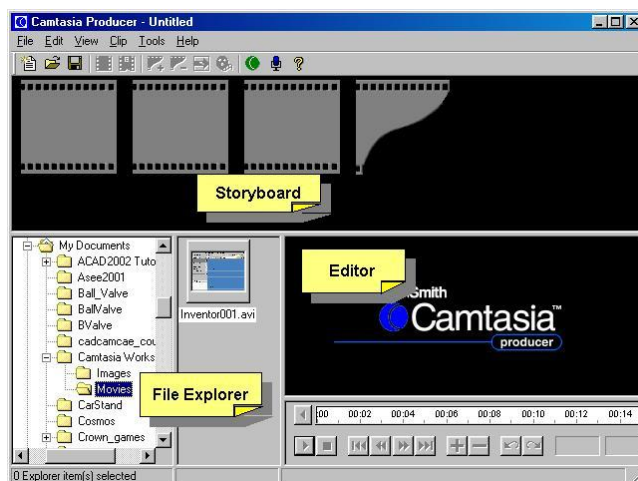


Figure 3.20: Camtasia producer window

Use the File Explorer to navigate to the folder (specified in Camtasia Recorder) where movie files are saved. Drag the movie file to the editor for review (Figure 3.21).

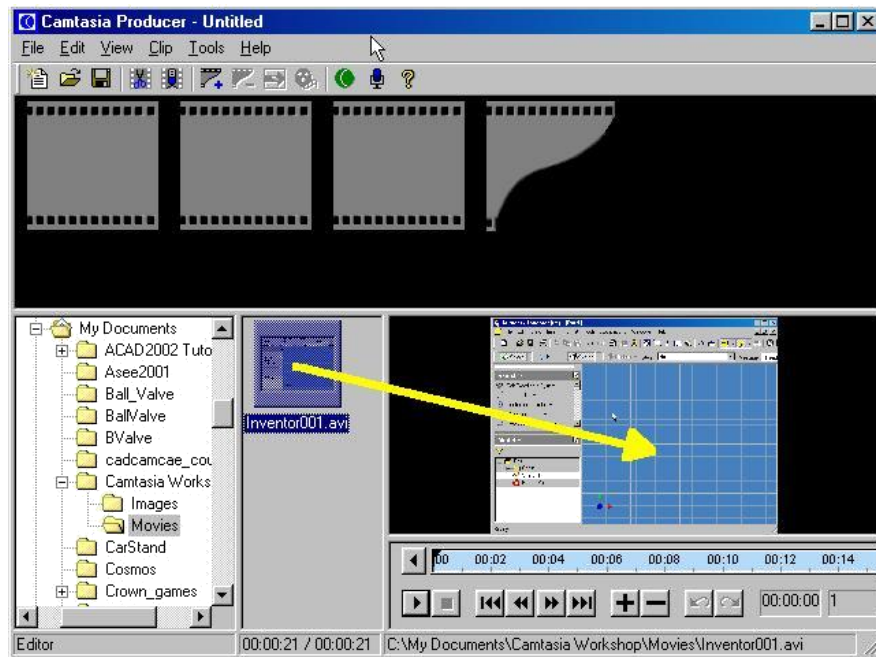


Figure 3.21: Camtasia editor

Use the Timeline Editor Toolbar to play and, if necessary, edit the movie (Figure 3.22).

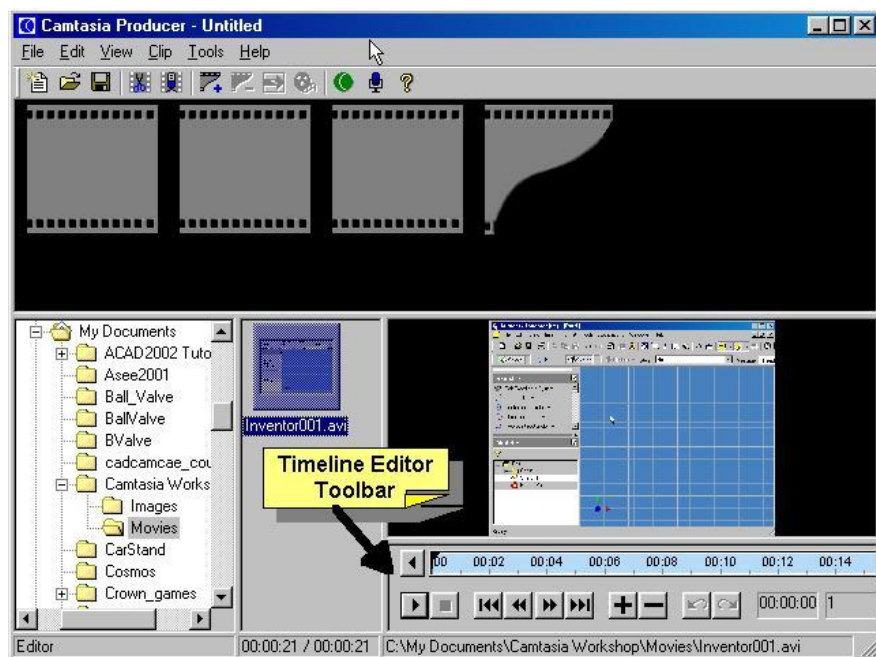


Figure 3.22: Camtasia editor

Drag the completed (edited) movie clip to the Storyboard (Figure 3.23).

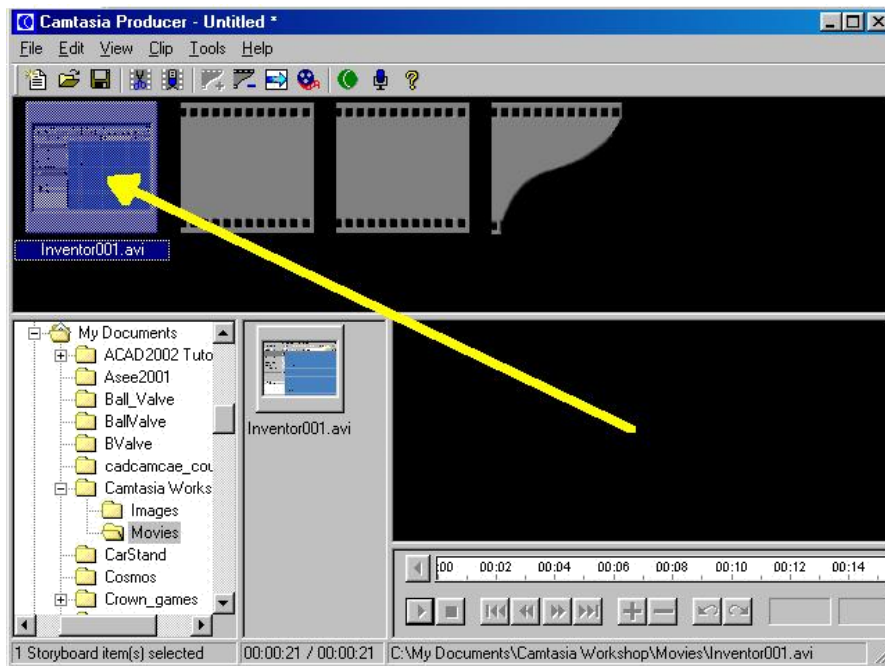


Figure 3.23: Storyboard

Return to Camtasia Recorder to do more recording (Figure 3.24).

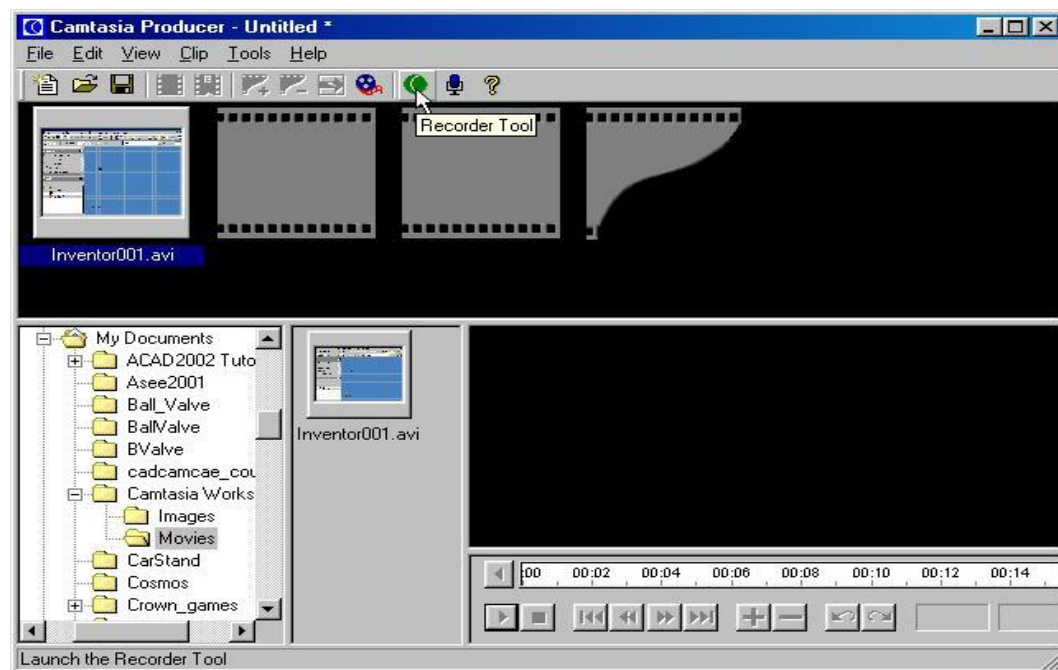


Figure 3.24: Inventor001.avi

Repeat as necessary, adding completed movie segments to the Storyboard (Figure 3.25).

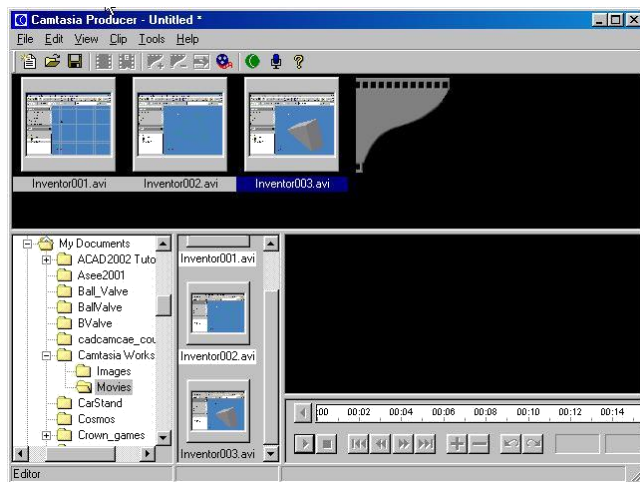


Figure 3.25: Storyboard

Once you have a completed set of video clips, choose File > Produce Movie (Figure 3.26).



Figure 3.26: Produce movie

The Produce Movie Dialog Box opens (Figure 3.27).

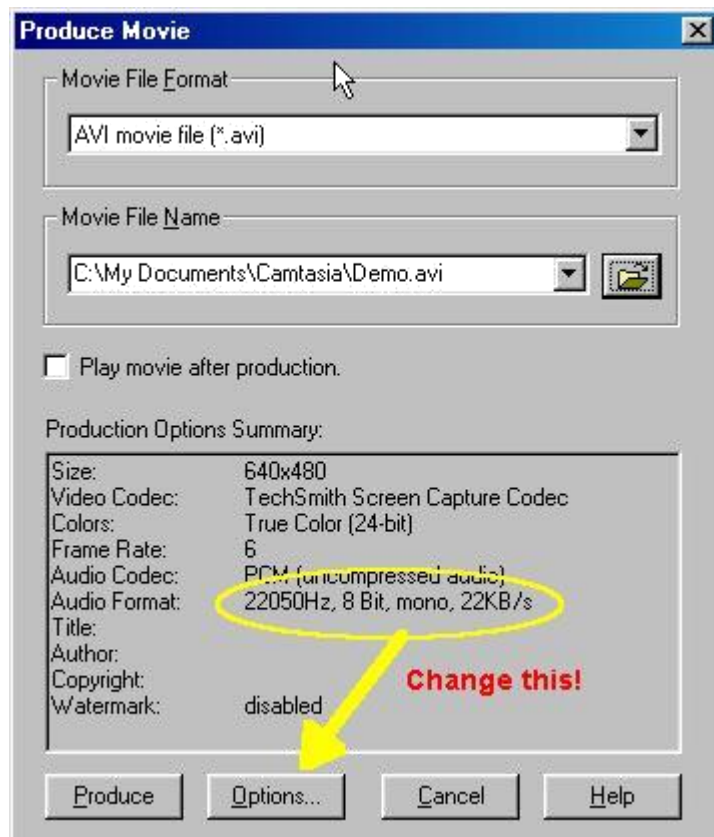


Figure 3.27: Produce movie dialog box

Select a file name for the movie.

- This is a bit cumbersome. The first time you save a complete movie, you need to locate the folder where you want to save it. Each time you save another movie, you need to edit the name from the drop-down list.

You may also need to modify the audio format options in Camtasia Producer, otherwise they may be changed from what they were recorded in Camtasia Recorder. To do this, click on the Options ... Button. Select the Avi Tab, Audio.

Setup..., then specify the same attributes used in Camtasia Recorder. When you are ready, select the Produce button. A dialog box appears indicating that the Storyboard is being rendered. Once this closes, the job is done. You should be able to view the movie with any media player, though the Camtasia Player or the Windows Media Player work best.

3.4 Research procedures

Lectures were recorded in a relaxed and controlled environment from the comfort of the instructor's home prior to lecture presentation in a lecture room (face-to-face lecture). The reason for this was to give the instructor an ample opportunity to plan and freely present lectures without possible interruptions that might arise if the recording is done during the live lecture presentation. This arrangement was also done to ensure that the instructor is at ease and records only information that is of utmost importance to the learners so that the editing of the audio files will be minimal.

Recorded lectures were indexed and chunked in episodes of up to a maximum of 7 minutes each. After the chunking was done, through the assistance of the instructor the episodes were indexed to give learners independence of choosing what they would like to listen to and understand instead of having to listen to the whole lecture podcast. In the light of these results, the audio lectures (lecture podcasts) were uploaded on MyTutor (Blackboard) in MP3 and WAV format. Learners who preferred to listen to the lecture on CD were advised to burn the files to a CD once downloaded from MyTutor. The CDRWs were provided by the researcher. A total of 20 lecture podcasts have been published on MyTutor over a period of a semester (six months). All 20 lecture podcasts have reportedly been accessed by all experimental learners participating in the study. This fact was confirmed by the instructor in charge of these learners.

The lecture podcasts covered the following assessment objectives (see question papers attached – annexure ?)

3.5 Internal and external validity

Although different types of quasi-experiments can be identified, this research implemented a non-equivalent group post-test design. The term non-equivalent is used based on the non-random assignment of participants to unrelated (non-paired) experimental and control groups. This non-random assignment results in a threat to internal validity, since difference in group results may be linked to differences in the

group and not the intervention performed. In a quasi-experimental design, threats to internal validity may threaten the conclusion(s) reached, for example, by indicating a possible cause-and-effect relationship, even if one is not present. Additionally, specific threats to internal validity of quasi-experimental design can relate to participants, intervention and procedure, discussed next.

Regarding participants, specific threats include history, maturation, regression, selection and mortality (Creswell 2012:314). The researcher endeavored to limit these threats in the study.

- History refers to the possibility of events occurring between the pre- and post-test (low risk).
- Maturation refers to the development of the participant during the quasi-experiment (low risk).
- Regression refers to the occurrence that scores regress towards the mean over time (low risk).
- Selection refers to selective selection participants, a problem if selection of participants is not random (high risk).
- Mortality refers to participants leaving the study (low risk).

The next group of threats to internal validity relates to the intervention performed. These include diffusion of treatment, compensatory equalization, compensatory rivalry and resentful demoralization.

- Diffusion of treatment relates to possible communication between the experimental group and the control group (medium risk).
- Compensatory equalization refers to providing the same intervention to both the experimental and control groups to provide for equalization. This was not possible based on administrative constraints (high risk).

- Compensatory rivalry refers to the control group doing their best to improve more than the experimental group (high risk).
- Resentful demoralization refers to the control group becoming demoralized based on the fact that they are not receiving the same treatment as the experimental group (high risk).

It is important to note that this phenomenon is a general experience in education. One lecturer will do more for students, be a better mentor or coach, than for example another lecturer. Although inherently a concern regarding fairness, it is a systemic occurrence.

The final threats to internal validity relate to the procedure of quasi-experiments, namely testing and instrumentation.

- Testing refers to participants getting to know the test during pre-test and thus become better with the post-test based on their knowing of the measurement performed (low risk).
- Instrumentation refers to the change of the measurement instrument during the pre-test and the post-test (low risk).

Ultimately, the intervention performed was in the form of audio (only) podcast lectures. The subject in which the intervention was performed is a theoretical subject. This implies that the intervention can only be extended to other theoretically oriented subjects like Business Analysis, Computing Fundamentals, Business Information Systems etc. The practical subjects e.g. Mathematics, Accounting, Programming etc. would require the use of video podcast.

External validity relates to threats affecting the generalization of results obtained. These include interaction of selection and treatment, interaction of setting and treatment and interaction of history and treatment.

- Interaction of selection and treatment refers to the inability of generalizing beyond the current groups in the quasi-experiment (high risk).
- Interaction of setting and treatment refers to the inability to generalize beyond the setting of the quasi-experiment (high risk).
- Interaction of history and treatment refers to the inability to generalize over time in a quasi-experiment (high risk).

In Chapter 4, those aspects identified as medium and high risks for internal and external validation are further discussed.

3.6 Conclusion

In this chapter, the research approach used in this study was explained. The population and the sample were described, materials as well as procedures that were followed in the study were outlined. The next chapter will focus on the results obtained.

Chapter 4 : Statistical Results

4.1 Introduction

In this chapter, an overview of the results obtained will be provided. Firstly, internal and external validation performed in the study will be highlighted. Then a summary of the study population will be provided in the form of descriptive statistics. Finally, the quasi-experimental results will be discussed.

4.2 Internal and external validation

Specific threats identified as medium and high risk (refer Chapter 3) in internal and external validity of quasi-experimental design were considered during the research process. This includes that participants are not selected randomly, which can impact results obtained. It is possible that the experimental group was academically more advanced than the control group. In addition, if we consider the intervention performed, namely podcasts, it is possible that communication occurred between the experimental and control group. Since the control group data was obtained in one semester and the experimental group data obtained in the next semester, this risk was reduced because even if there was communication between the two groups the control group data was already collected. Compensatory rivalry is inherent in academic institutions, especially when performance is compared. Again, since data collection of experimental and control group occurred in two separate semesters, this risk was limited. Similarly, resentful demoralization was limited, based on the time difference in data collection between experimental and control groups.

External validation risks include the inability of generalization beyond the experimental and control groups, the setting of the quasi-experiment and time. Results are thus to a great extent limited to the students of the Tshwane University

of Technology. However, it is possible to repeat this study at another institution at a different time, thereby improving the justification of a possible cause-and-effect relationship between the use of podcasting and academic performance.

4.3 Descriptive statistics

In total, a maximum of 150 students participated in the study, namely a maximum of 75 students in the experimental group and a maximum of 75 students in the control group. In Table 4.1, the total race incidence of the participating students is provided.

Table 4.1: Race frequency

Race	Number	Percentage
African	74	49%
Colored	32	21%
Indian	18	12%
White	26	17%

In Table 4.2, the total age distribution, based on the categories 15-20 years, 20-25 years, 25-30 years and 30-35 years, is depicted.

Table 4.2: Age frequency

Age	Number	Percentage
15-20	84	56%
20-25	34	23%
25-30	22	15%
30-35	10	7%

In Table 4.3, the total gender distribution is presented.

Table 4.3: Gender frequency

Gender	Number	Percentage
Male	94	67%
Female	46	33%

The majority of students were thus African males in the age group of 15-20 years.

4.3 Quasi-experimental results

The quasi-experiment was performed over a period of 12 months, first for the control group and then the experimental group. Four assessments performed by the control group and experimental group served as measurement occurrences used to calculate whether there was a significant difference between the control group and the experimental group. For test one, the mean of the control groups was $M=37.89$, with the mean of the experimental group $M=57.53$, presented in Table 4.4.

Table 4.4: T-test for test one

Test one	n	M	Std.Err	Std.Dev.
Control	75	37.89	2.48	21.5
Experimental	75	57.53	2.24	19.47
t=-5.861 (p<0.05)				

The mean of the control group ($M=37.89$) is the consequence of a high number of learners ($n=53$) that failed test one, as compared to only a low number ($n=22$) that passed. Only five learners in the control group obtained distinctions. The standard deviation of 21.5 indicates that the spread of most of the learners' scores in the control group are below 50% pass mark. The mean of the experimental group ($M=57.53$) shows an improvement difference of 20% from the control group. The number of learners that passed test one ($n=56$) had a positive effect on the experimental group mean ($M=57.53$). A small number of learners ($n=18$) failed test one, while a relative high number ($n=14$) obtained distinctions in the experimental group. The standard deviation of 19.47 indicates that the mean of $M=57.53$ of the control group is not largely influenced by the number of distinctions, but reflects the overall group performance wherein a large proportion of the learners' scores spread is between 59% and 60%. The t-test, with $t=-5.861$ and $p<0.05$, confirmed that there was a statistical significant difference between the experimental group and the control group.

For the second test, the mean of the control group was $M=38.6$ and the experimental group $M=59.9$, presented in Table 4.5.

Table 4.5: T-test for test two

Test two	n	M	Std.Err	Std.Dev.
Control	75	38.6	2.43	21
Experimental	75	59.9	2.64	22.9
t=-5.927 (p<0.05)				

The control group mean ($M=38.6$) is the reflection of a large proportion of learners that failed test two ($n=58$), as compared to a small number of learners that passed ($n=17$), and another small number ($n=8$) that obtained distinctions. The standard deviation of 21.08 denotes that the spread of the learners' scores ($n=58$) in the control group is below the pass mark of 50%. However, there is a noticeable improvement in the control group test two mean, namely a 1% improvement from 37% to 38%. The reason for this mean improvement is largely dependent upon an increased number of distinctions (from 5 to 8 learners). Nonetheless, the number of the learners that failed is still alarming and increased from 53 to 58. The experimental group's mean shows an improvement from $M=57.53$ in test one to $M=59.9$ in test two. A large proportion of learners ($n=53$) passed test two, a worrying number of learners ($n=21$) failed, and only a small number of learners ($n=20$) obtained distinctions. The experimental group standard deviation of 22.9 indicates that most of the learners ($n=33$) scored average marks in test two. The t-test, with $t=-5.929$ and $p<0.05$, confirmed that there was a statistical significant difference between the experimental group and the control group.

In the third test, the mean of the control group was $M=2.88$ and the experimental group was $M=72.33$, presented in Table 5.6.

Table 4.6: T-test for test three

Test three	n	M	Std.Err	Std.Dev.
Control	75	42.88	2.27	19.69
Experimental	75	72.33	1.9	16.53
t=-9.917 (p<0.05)				

The control group mean (M=42.88) shows an improvement in contrast to test one and test two mean. The number of learners (n=24) that passed increased by 7 in contrast to test two and by 2 in contrast to test one. However, the number of the learners (n=51) that failed is still alarming. The number of distinctions declined by 2% in comparison to test two. The experimental group mean (M=72.33) shows a marked increase compared to test one and test two. The number of learners that passed was 72, including 32 with distinctions. The results of the experimental group test three are desirable, since only 3 learners failed out of 75 learners. The t-test, with $t=-9.917$ and $p<0.05$, confirmed that there again was a statistical significant difference between the experimental group and the control group.

In test four, the mean for the control group was M=41.62 and the experimental group M=62.91, shown in Table 4.7.

Table 4.7: T-test for test four

Test four	n	M	Std.Err	Std.Dev.
Control	75	41.62	2.43	21.08
Experimental	75	62.91	2.64	22.9
t=-5.927 (p<0.05)				

The control group mean (M=41.62) is again a reflection of a large proportion of learners that failed test4 (n=56), as compared to a small number of learners that passed (n=19) and another small number (n=5) that obtained distinctions. The standard deviation of 21.08 symbolizes that the spread of the learners' scores (n=56) in the control group is below the pass mark of 50%. The experimental group's mean shows a decline of 10% from M=72.33 in test three to M=62.91 in test four. Again, a statistically significant t-value, $t=-5.927$ and $p<0.05$, confirmed that there was a statistically significant difference between the experimental group and the control group.

4.4 QUESTIONNAIRE RESULTS

Only 72 questionnaires were analyzed. One questionnaire was not returned and the other two were not fully completed. The tables below present the questionnaire results per category.

Table 4.8

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
(A) Podcast Accessibility					
I accessed the lecture podcasts from home or internet café	34	9	0	15	14
I accessed the lecture podcasts at the university premises (computer lab)	10	13	3	6	40
It was easy to locate the link and download the lecture podcasts on blackboard (MyTutor)	0	2	0	23	47
I downloaded all 20 lecture podcasts	0	0	0	21	51
I downloaded only my favourite topics	41	22	0	4	5
I listened to the lecture podcasts on a desktop	11	41	0	8	12
I listened to the lecture podcast on a mobile device	2	6	0	15	49
I was able to listen to a lecture podcast on any topic at any time convenient to me	2	3	7	33	27

40% of the learners indicated that they were able to connect to internet at home whilst 60% of the learners could not access the lecture podcast from home. 64% of the learners relied on the university's infrastructure to access and download the lecture podcasts while 32% indicated that they had alternatives to access and download the lecture podcasts. 4% of the learners opted neutral. 97% of the learners agreed that it was easy to locate and download the lecture podcasts and only 3% disagreed. A 100% of the learners agreed that they have downloaded all 20 lecture podcasts. A mere 13% of the learners agreed that they only listened to their favorite topics while 87% disagreed. 89% of the learners listened to a lecture podcast on a mobile device and 11% used a desktop. 83% of the learners indicated that they were able to access learning material at any time and 7% disagreed. 10% of the learners were neutral.

Table 4.9

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
(B) Learning Enhancement:					
It was difficult to understand a lecture delivered in the form of a podcast	2	0	0	22	48
The lecture podcast stimulated my desire for learning	3	0	10	21	38
I listened to the lecture podcast more regularly than I would have studied from the textbook	0	0	8	15	49
The lecture podcasts aroused my interest in the subject	1	2	8	9	52
The lecture podcast helped me to understand the face-to-face lecture better	0	0	11	19	42
I listened to a lecture podcast to revise difficult concepts in a public setting (e.g. in transport, on the move)	6	4	0	43	19
I prepared for the assessments by listening to a lecture podcast	0	0	0	38	34

I prepared for the assessments by studying from a textbook	48	16	0	3	5
I prepared for the assessments by using both the textbook and the lecture podcasts	8	3	0	53	8

97% of the learners indicated that they understood lecture podcasts content and only 3% disagreed. 82% of the learners agreed that lecture podcasts improved their desire for learning while only 4% disagreed and 14% opted neutral. An overwhelming 89% of the learners agreed that the use of lecture podcasts enabled them to study more regularly than they normally would have and only 11% were neutral on this item. 85% of the learners agreed that they developed interest in the subject because of the technology intervention and 11% chose the neutral option while 4% disagreed. 85% of the learners agreed that the audio lectures strengthened their understanding of the face-to-face lectures and 15% of the learners chose the neutral option. 86% of the learners agreed that they listened to a lecture podcast in a public setting e.g. on the move. This could not have been possible with the use of textbook or notes. However, 14% has disagreed. A 100% of the learners agreed to have used lecture podcasts to prepare for the formal assessments. 11% agreed to have used a textbook to prepare for the assessments. 85% of the learners used the lecture podcasts and textbooks to prepare for the formal assessments

Table 4.10

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
(C) Effect of podcasting use on academic performance:					
Using lecture podcasts helped me improve my test scores	1	10	3	14	44
My academic performance did not change	45	19	0	3	5
My academic performance has dropped	55	12	5	0	0

My academic performance has improved without the use of lecture podcasts	53	16	0	3	0
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80% of the learners agreed that using lecture podcasts helped them improve their test scores and 15% disagreed whilst 5% opted for neutral. 11% of the learners agreed that their academic performance did not change while 89% agreed that their performance did change. 93% of the learners disagreed that their academic performance dropped and 7% opted neutral. 96% of the learners disagreed that their academic performance would have improved without the use of lecture podcasts while only 4% agreed.

Table 4.11

(D) Demographic Information:					
Ethnicity	African 41	Coloured 11	Indian 3	White 18	Other 0
Age	20-24 39	25-29 11	30-34 14	35-40 8	41-45 0
Gender	Male 48	Female 24			

The sample (experimental group) distribution was as follows; 56% were Africans, 15% were Coloured, 4% were Indians and 25% were White. The age distribution was as follows; 20-24 (54%), 25-29 (15%), 30-34 (19%), 35-40 (11%). The gender representation was as follows: male = 67% and female = 33%.

4.5 INTERVIEW RESULTS

The following table presents interview responses from the instructor of the learners:

Table 4.12

(1) How would you describe podcasting experience in your subject? Well, at first I thought it was going to double my workload but as we went along, I realized how this project has lightened my workload. How did it make your workload lighter? (a) I did not have to revise everything with my students before they wrote formal assessments like I used to do previously. (b) Most of my students come to class prepared unlike before
(2) Would you say that the use of podcasting has benefited your learners? Students have many positives to claim from this intervention. As much as my work has been made easier, students too found it easy to use podcasting technology for their own benefit. I have witnessed under-performing students improving not only their test scores but also becoming actively involved in class discussions. Since students have access to recorded lectures, they only need me to assist with more complex concepts but most of the time are able to assist themselves by just locating the correct topic on the LMS and listen to a lecture.
(3) Many instructors are scared to introduce podcasting in their subjects because they believe that learners will be motivated to skip lectures. Do you share the same sentiment? In my case there has been no noticeable reduction in attendance. I personally do not think that this intervention would cause students to stop attending lectures. My

students in fact showed more interest in classroom discussions based on the lecture podcasts.

(4) Would you abolish your face-to-face lectures and consider strictly using lecture podcasts in your subject? Why?

I would not do that. I think physical contact sessions are still important. The use of the technology is fine and students and I enjoy it but I think stopping physical classes will not do justice to the students. I would rather continue with both online method and physical sessions.

(5) Are you satisfied that the lecture podcasts addressed your lessons' objectives fully?

Yes, I was able to record everything that I wanted my students to access.

(6) Would you say that the use of lecture podcasts had an effect on your learners' test scores?

Definitely, the performance has improved significantly.

Can you elaborate on that?

If I compare the previous semesters' performance and this semester – there is a difference. I am happy with the positive change that I see in the subject.

Don't you think that this semester's tests were easier than last semester's?

No, the assessment is based on the same content and the test composition is the same.

Did you ask exactly the same questions as in the previous semester?

Like I said, the tests are based on the same content. We did not change the textbook. The only difference is that we asked some of the questions differently.

Can you elaborate? Give me an example.

What happens is that if we asked multiple choice questions on a particular section (e.g. contractual obligations of parties involved in an agreement) in the first semester, we change that question to be a true or false question in the second semester or a multiple answer question or jumbled sentence type of question etc.

(7) Suggestions (if any) to improve on future lecture podcast content delivery?

Nothing from my side, thank you

Interview data analysis (thematic)

Open and relational coding was used in the creation of categories. Based on the interview questions and responses above, the following categories were generated: (i) central theme was lecture podcasts (ii) the four categories are learning enhancement, academic performance, workload and lecture attendance. These themes were coined from the interview responses by the instructor.

The first category, learning enhancement was generated because the instructor mentioned that there were learners who became actively involved in class discussions and that the availability of lecture podcast meant that learners can learn without the instructor's physical presence. The second category, academic performance was generated on the basis of the response by the instructor that there was improvement in the grade marks as compared to the previous semesters. The third category, workload, was generated based on the first question response by the instructor that the use of lecture podcast has to a certain extent reduced his workload. He initially thought that it was going to double his workload but on the contrary his workload was reduced because he does not need to revise everything with his students. The last category, lecture attendance, was generated based on the question as to whether the availability of lecture material in the form of lecture podcast would encourage learners to skip classes or not.

The following relations and conclusions were established on the basis of the above categories:

- a) Lecture podcast is associated with learning enhancement (independent learning)
- b) Enhanced learning causes improved academic performance (improved test

scores)

c) Lecture podcast does not lead to reduced lecture attendance (lecture podcasts support face-to-face contact sessions)

d) Lecture podcast is associated with reduced instructor workload (revision is done through lecture podcasts)

The following conceptual framework reports the findings of the interview:

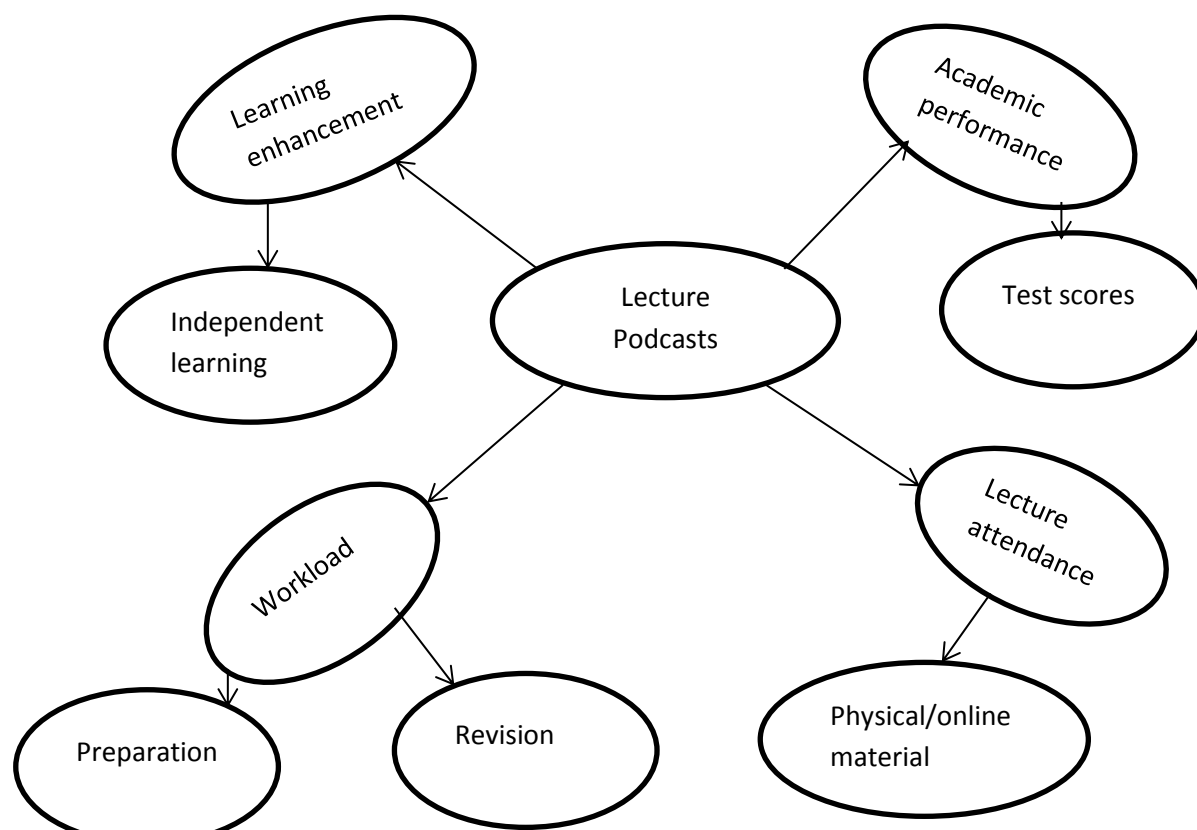


Figure 4.1

4.6. Conclusion

In this chapter, the results obtained regarding four assessments performed with the experimental and control groups were highlighted. Additionally, descriptive statistics were performed regarding the study's population. In the next chapter, the results with regard to identified research questions will be highlighted.

Chapter 5 : Findings

5.1 Introduction

This section reports the research findings per research question of the study.

5.2 Research question

- **What is the impact of podcasting revision lectures on learners' academic performance?**

A two sample t-tests were performed using SPSS statistical software to compare the mean of the control group and the experimental group. The t-test was done on four assessments of each group over a 12 month period. All the four tests indicated that there was a significant difference in the two groups' mean. Therefore the study has provided an indication that there is possibly a correlation relationship between the use of podcasts and learners' academic performance.

The questionnaire results supported the experimental data. A large proportion of the learners (100%) indicated that they were able to access the lecture podcasts from different locations e.g. home, school, internet café, etc. 97% of the learners concurred that the use of lecture podcasts has enhanced their learning experience. 80% of the learners confirmed that their academic performance was improved as a result of using podcasts.

The structured interview responses have enabled the researcher to conceptualize a framework that explicitly depicts how podcasting can be used to improve academic performance. The conceptual framework suggests that the following relationships exist and that they have an effect on the learners' academic performance:

- a) Lecture podcast is associated with learning enhancement (independent learning)
- b) Enhanced learning causes improved academic performance (improved test scores)

- c) Lecture podcast does not lead to reduced lecture attendance (lecture podcasts support face-to-face contact sessions)
- d) Lecture podcast is associated with reduced instructor workload (revision is done through lecture podcasts)

5.3 Secondary Objectives

- **What is the recent body of knowledge regarding the use of podcasting in teaching and learning?**

Research in podcasting revolved around the following headings, Podcasting in education, the impact of podcasting on learning, the impact of podcasting on lecture attendance and less emphasis on the impact of podcasting on academic performance. Recent research reports acknowledged and corroborated empirically the use of podcasting in education and the positive effect that podcasting technology has on learning (Evans 2008; Edrissingha 2010; Fernandes 2009; Lau 2010;

Lazzari 2009; Walls 2010). The reluctance and in some instances the hesitancy to adopt podcasting technology by some academics and institutions lies in the fear that learners would skip face-to-face lectures. Recent reports indicated that podcasting did not lead to a decline in lecture attendance (Bongey 2006; Hew 2009; Hove 2008; Lazzari 2008; Maharaj 2010; Zhu 2010). Very few studies explored the impact of podcasting on academic performance (Bensalem 2011; Dupagne 2009; Morris 2010; Ousten 2011). These researchers reported conflicting findings on the effect of podcasting on academic performance. Notably, Bensalem (2011) and Dupagne (2009) reported “no difference” between learners who viewed or listened to podcasts and those who did not. Morris (2010), Ousten (2011) and Bond (2008) reported positive results with regard to the use of lecture podcasts. This study affirms the findings of Ousten (2011) and Bond (2008) in that the findings of the study signified a correlation relationship between podcasting technology and the learners’ academic performance.

- **What is the most appropriate pedagogical approach for podcasting revision lectures?**

This objective was addressed in the literature study. Blended learning pedagogy is the most appropriate pedagogy to podcast revision lectures. This pedagogy encompasses face-to-face contact and web technology as complement and supplemental to each other. It is a new development in technology based and/or supported learning. It can be defined as a way to design courses that blend different kinds of delivery and learning methods that can be enabled and/or supported by technology with traditional teaching methods (de Boer 2004:1). The blended learning approach is the favorite because it combines different teaching approaches and learning styles. It is a flexible approach in which every teacher and every learner can regulate his/her own way of teaching and learning.

- **What is the effect of ubiquitously accessible lectures on learning?**

Lecture recordings were made available to learners on the university's LMS in MP3 format and WAV format which the learners indicated as preference and compatible with their mobile phones. CDRs were provided to those learners who indicated that they would like to listen to the lecture podcasts on CDs. All learners in the experimental group (n=75) reported that they have been able to access the lecture podcasts and successfully downloaded it to mobile phones and external storage media. Therefore, learners have been accorded independence to decide on when and wherever they can attend a lecture (listen to lecture podcast).

- **How will podcasting technology benefit the learners through increased lecturer-learner contact time?**

Since the lectures were recorded prior to presentation in the class, learners were granted an opportunity to interact with a lecture before, during and after a lecture presentation. Learners were encouraged to listen to the lecture podcast before they attend a face-to-face lecture session. After a face-to-face lecture session had taken place, learners were advised to revisit the lecture podcast to foster understanding of the subject matter. A face-to-face lecture session was only attended for questions (by learners) and answers (by the instructor). In consequence, the podcast

technology has increased the lecturer-learner contact time in two ways, namely mobile virtual classroom and traditional face-to-face lectures.

- **How will podcasting technology accommodate diverse learning needs?**

Similar to Leiserson (2005), lecture podcasts have contributed positively to accommodating different types of learners simultaneously, which is not possible in a traditional face-to-face environment. Podcasting technology accommodated different learners by:

- Assisting auditory learners: Proponents of podcasting point out that the medium is perfect for learners who prefer to take in information aurally (Leiserson 2005).
- Providing another channel for material review: Listeners with other types of learning styles benefited from podcasts in that the audio files can be reviewed at their leisure for understanding or before testing.
- Assisting non-native speakers: Learners who aren't yet proficient in the English language may struggle to keep up with lectures or presentations. Being able to review recordings of those events as many times as necessary for understanding was of great benefit.
- Enabling instructor to review training or lectures: Through podcasting the instructor was able to critique himself as a method of improving his lecturing styles with an intention to cater for diverse learning needs.
- Providing supplementary content as part of a blended learning solution: The material could be available for access on a voluntary basis, or it could be a required component of a classroom or online course in a blended solution.
- **What are the contributions that this study will make in the e-learning or m-learning field?**

This objective is addressed in the next chapter.

5.4 Conclusion

This chapter presented the findings as guided by the primary and secondary research questions, specified in Chapter 1. The next chapter will present the practical contributions of the study and suggest future research that can be performed.

Chapter 6 : Practical contribution and future research

6.1 Introduction

This chapter presents the practical contributions of the present study, suggestions for future research work and the summary of study.

6.2 Practical contributions

The quasi-experimental results show that there is a possible relationship between podcasting technology and academic performance. The findings of this study diverge from those of Dupagne *et al.* (2009) in which the effectiveness of using video podcast as a revision tool was addressed. Their findings attested that learners who viewed the video podcast did not achieve higher pass rates than learners who did not view the video podcast. Although Dupagne *et al.* (2009) used a video podcast instead of audio podcast (which was used in the current study) their findings basically suggest that podcasting use did not yield neither positive nor negative results. Contrary to Dupagne *et al.* (2009), the present study reports a possible positive relationship between podcast availability and student performance.

The questionnaire results also positively indicate that the intervention had a possible positive effect on learning enhancement and academic performance. The intervention proved not to have any negative impact on lecture attendance.

The conceptual framework may be used as a blueprint for future similar studies that can be used to evaluate possible technology impact (podcasting) on learning and academic performance.

As such, based on the findings and conclusions of this study, the researcher recommends that podcasting should be incorporated into blended teaching and

learning environments in the quest to provide constant learner support anytime anywhere and Increase lecturer-learner contact time and accommodate diverse learners with various learning needs consequently improving the learners' academic performance.

Justifiably, the researcher proposes that the following suggestions should be taken into account when institutions or instructors decide to introduce or use podcasting in their teaching and learning practices:

- Lecture podcast should not be used to substitute a traditional face-to-face lecture but rather be used to supplement and complement it. This is exactly how lecture podcasts have been utilized in this study.
- Make lecture podcasts available to learners before the face-to-face lecture sessions take place. This practice would not cause learners to skip lectures. There is massive evidence in the literature to corroborate this fact. The rationale here is that when learners attend the face-to-face lecture session, they will already be informed about the new contents and instead of being passive recipients of information and knowledge they would become actively involved in the learning event by questioning and looking for solutions to problems encountered while they were listening to a lecture podcast.
- Record lectures in a private and relaxed environment. This will allow the instructor sufficient space to record only the important parts of the lesson content and discard the unnecessary contents. If lectures were to be recorded during a face-to-face presentation, potentially there could have been disturbances which somehow could have tampered with the quality of the recording. For example, a learner asking an awkward question or a lecturer being irritated by the learner will affect the direction of a lesson and eventually the recording thereof.
- When deciding on which podcasting software to use, check available file types.
- Conduct a preliminary research into what technologies are available or accessible to learners. This exercise will help to ensure that audio or video production is made available in formats and file types compatible with the learners' mobile

devices or desktops; otherwise the whole podcasting project will result into null effect. Podcasting is expected to provide constant learner support at any time anywhere.

- Indexing the episodes was one of the success and interesting factors in this study. With Camtasia, it was possible to index each episode according to the slide title. This practice has helped the learners to listen to only what they deem important instead of being obliged to listen to the whole lecture podcast. Rationally, this practice has also fulfilled one of the objectives of this study that was stated as follows: Cater for diverse learning needs. Below average learners would want to listen to the whole lecture podcast more than once whilst average learners would prefer to listen to it only once. The above average learners would prefer to navigate to a particular slide in the presentation and not listen to the whole presentation.
 - Keep the podcasts as short as possible. One presentation should at least be kept at a maximum size of 3 MB. Learners' mobile devices have a limited storage capacity.
 - Decide on pull-technology or push-technology based on available technology infrastructure. In this study, a pull-technology was used because the population studied did not meet the requirements for a push-technology model. The researcher recommends push-technology if the infrastructure permits because it will save the learners the stress of seeking updates from the LMS, and downloading and storing the podcast episodes to their mobile devices.
 - Do not assume that learners and to a certain extent even instructors, are conversant with new technologies. Take time to train the instructors on how to produce a lecture podcast and learners on how to access and listen to a lecture podcast. Learners and instructors are not as ready as we think they are in terms of using affordable and available technologies at their disposal. This practice can only yield the positive results that are expected.
- Finally, the researcher recommends that instructors or lecturers as well as institutions should take responsibility in keeping up to speed with technological

advancements and how those technologies could be leveraged to enhance teaching and learning practices to improve learning outcomes (academic performance).

6.3 Suggestions for future research work

In the process of conducting the present study, the following issues were identified as challenges which can be converted into research opportunities:

- A new model or framework for podcasting lectures. Existing podcasting models are only applicable to specific contexts. Availability of technology infrastructure is critical to choosing a suitable model for podcasting lectures.
- Absence of collaboration and interaction between learners when listening to lecture podcasts isolates the learner and this can potentially culminate into misunderstanding and failure. There is a need for ideas as to how lecture podcasts can be utilized in a much more interactive and collaborative manner.
- Evaluation of podcasting lectures before the face-to-face lecture session and during lecture sessions.
- Identification, application and validation of the relevant information systems theory in the podcasting field.
- Psychological, social and behavioral factors that are present in a face-to-face lecture seemed to be absent when lectures were recorded prior to the face-to-face lecture sessions. For example, lectures were recorded by the instructor in a private space. This has affected the instructor's enthusiasm, tempo and dedication that he would have normally displayed in a face-to-face environment.

Finally, performing similar studies in other diverse higher educational institutions will assist in validating the possible cause-and-effect relationship between the availability of podcast lectures and improve academic performance.

6.4 Summary

The use of disruptive innovations like podcasts, video lectures, tablets and virtual learning environment in higher education institutions are becoming more prevalent. It is undeniable that we are entering a period of change in higher education. We need to educate more with less. By utilizing disruptive innovations like podcasts, it is possible to provide a similar or even better educational experience to the student. It is with this vision that we should encourage educators to perform “research” in their own classroom, introducing new technologies, and measuring their impact on academic performance. In this process of growth, some students will be first to experience an innovation, possible to the disadvantage of others. However, this is a systemic problem, with a selected few educators inherently being more progressive educators, constantly endeavoring to improve their teaching practice by innovativeness and reflectiveness.

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Addendum A (Consent form)



Tshwane University
of Technology

We empower people

FACULTY OF INFORMATION AND
COMMUNICATION TECHNOLOGY

INFORMATION LEAFLET AND INFORMED CONSENT

PROJECT TITLE: THE USE OF PODCASTING IN IMPROVING THE LEARNERS' ACADEMIC PERFORMANCE

Primary investigator: Mr Elias Rankapola

Dear Potential research participant,

You are invited to participate in a research study that forms part of my academic career. This information leaflet will help you to decide if you would like to participate. Before you agree to take part, you should fully understand what is involved. You should not agree to take part unless you are completely satisfied with all aspects of the study.

WHAT IS THE STUDY ALL ABOUT?

The introduction of internet in the early 1990s led to establishment of new learning paradigms notably, e-learning and m-learning in the academic sector. *e-Learning* is learning facilitated and supported through the use of information and communication technology and *m-learning* is the intersection between mobile computing (i.e. the application of small, portable and wireless computing and communication devices) and learning. Podcasting Technology is a type of mobile learning in which a mobile device like a cell phone is used to listen to an audio podcast or watch a video podcast. Previous research studies on podcasting technology investigated the pedagogical use of this technology. Latest global research studies on podcasting technology, discovered how this technology has affected teaching and learning in higher education. The current study aims to explore the relationship between the use of podcasting technology and academic performance.

The objectives that will drive the study are stated as follows:

Primary Objective:

- ❖ To measure the effect of podcasting revision lectures on the learners' academic performance

Secondary Objectives:

- ❖ To assess the most recent body of knowledge regarding the use of podcasting in teaching and learning
- ❖ To identify the most appropriate pedagogical approaches for podcasting revision lectures
- ❖ To determine the effect of learning material accessibility at anytime and anyplace.
- ❖ To evaluate the increased Lecturer-Learner contact time provided by the use of podcasting technology
- ❖ To establish whether podcasting provides diverse learning needs
- ❖ To make recommendations and identify future research opportunities

WHAT WILL YOU BE REQUIRED TO DO IN THE STUDY?

- 1) The research participants will be required to attend a session on how to download lecture podcast from the blackboard system. On completion of the project, the research participants will be required to complete a questionnaire
- 2) You will only attend one session for the maximum of 20 minutes. The questionnaire will be completed only once. You should be able to complete the questionnaire in 10 minutes.
- 3) You will be able to download the lecture podcasts anywhere at any time if you have internet access. Alternatively, download the podcasts on the university premises and listen to them anywhere at any time convenient to you. You will also be required to complete a questionnaire in the lecturer room and submit it on the same day.
- 4) Research participants should be registered students at TUT. If you are not registered, you will not be able to access and download the lecture podcasts.
- 5) If you decide to take part in the study, you will be required to do the following:
 - To sign this informed consent form

- To complete a questionnaire. You will be asked questions on your experience and opinion in using podcasting technology.
- You will be required to download and listen to about 20 lecture podcasts for a period of 6 months
- Your test scores will be used anonymously to determine the effect of podcasting use on the academic performance

ARE THERE ANY CONDITIONS THAT MAY EXCLUDE YOU FROM THE STUDY?

You will not be eligible to participate in this study if you are not a registered student for the subject CODE (ADM200T). The lecture podcasts will be distributed through MyTutor and only registered students can access them.

CAN ANY OF THE STUDY PROCEDURES RESULT IN PERSONAL RISK, DISCOMFORT OR INCONVENIENCE?

There is absolutely no known risk that may emerge from the study. You are therefore assured that neither you nor your family will suffer any adverse effects from taking part in this study.

Questionnaires: The last section of the questionnaire will require your ethnic group and age group. This data is only needed for research purposes and will in no way be used against you.

Downloading of lecture podcasts: You need basic knowledge to operate a PC and use MyTutor platform. If you feel uncomfortable about accessing and downloading lecture podcasts, please feel free to consult the researcher or your lecturer for assistance.

WHAT ARE THE POTENTIAL BENEFITS THAT MAY COME FROM THE STUDY?

The benefits of participating in this study are:

- You will make a contribution towards establishing a relationship between podcasting technology and academic performance
- You will access an electronic lecture which you can use for revision purposes
- You can listen to an electronic lecturer as many times as you need until you understand a particular topic in your subject

Upon completion of this study, an informed proposal will be made about how podcasting technology can be incorporated into the classroom to improve academic performance.

WILL YOU RECEIVE ANY FINANCIAL COMPENSATION OR INCENTIVE FOR PARTICIPATING IN THE STUDY?

Please note that you **will not** be paid to participate in the study. However, you may receive a compact disk with lecture podcasts if you can't access them from MyTutor.

WHAT ARE YOUR RIGHTS AS A PARTICIPANT IN THIS STUDY?

Your participation in this study is entirely voluntary. You have the right to withdraw at any stage without any penalty or future disadvantage whatsoever. You don't even have to provide the reason/s for your decision. Your withdrawal will in no way influence your academic conduct, year mark or relationship with the lecturer. Note that you are not waiving any legal claims, rights or remedies because of your participation in this research study.

HOW WILL CONFIDENTIALITY AND ANONYMITY BE ENSURED IN THE STUDY?

Confidentiality of data will be maintained - in other words your identity will only be known to the researcher. I will remove/mask all identifying data on transcriptions and final report documents (e.g. thesis and journal articles). Thus, your identity will not be revealed during or after the study, even when the study is published or used in any format. Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law.

IS THE RESEARCHER QUALIFIED TO CARRY OUT THE STUDY?

The researcher is an adequately trained and qualified researcher in the study fields covered by this research project, specifically in educational technology.

HAS THE STUDY RECEIVED ETHICAL APPROVAL?

Not Yet. The Faculty Higher Degrees Committee and the Research Ethics Committee of the Tshwane University of Technology have not yet approved the formal study proposal.

WHO CAN YOU CONTACT FOR ADDITIONAL INFORMATION REGARDING THE STUDY?

The primary investigator, Mr ME Rankapola, can be contacted during office hours at Tel (012) 382-6312, or on cellular phone at 0721853481 after hours. Should you have any questions regarding the ethical aspects of the study, you can contact the chairperson of the TUT Research Ethics Committee, Dr WA Hoffmann, during office hours at Tel (012) 382-6265/46, E-mail hoffmannwa@tut.ac.za. Alternatively, you can report any serious unethical behaviour at the University's Toll Free Hotline 0800 21 23 41.

DECLARATION: CONFLICT OF INTEREST

There *is no conflict of interest* issues which may subjectively influence data collection, data analysis and/or publication of the results of this study. The researcher intends to present the results of the study at a conference for possible publication in an accredited journal not known to the researcher at this stage.

A FINAL WORD

Your co-operation and participation in the study will be greatly appreciated. Please sign the informed consent below if you agree to participate in the study. In such a case, you will receive a copy of the signed informed consent from the researcher.

CONSENT

I hereby confirm that I have been adequately informed by the researcher about the nature, conduct, benefits and risks of the study. I have also received, read and understood the above written information. I am aware that the results of the study will be anonymously processed into a research report. I understand that my participation is voluntary and that I may, at any stage, without prejudice, withdraw my consent and participation in the study. I had sufficient opportunity to ask questions and of my own free will declare myself prepared to participate in the study.

Research participant's name: _____ (Please print)

Research participant's signature: _____

Date: _____

Researcher's name: ME RANKAPOLA (Please print)

Researcher's signature: _____

Date: _____

VERBAL CONSENT

(Applicable when participants cannot read or write)

I hereby declare that I have read and explained the contents of the information sheet to the research participant. The nature and purpose of the study were explained, as well as the possible risks and benefits of the study. The research participant has clearly indicated that he/she is aware of the right to withdraw from the study at any time, for any reason and without jeopardizing his/her relationship with the research team. I hereby certify that the research participant has verbally agreed to participate in this study.

Research participant's name: _____ (Please print)

Researcher's name: ME RANKAPOLA (Please print)

Researcher's signature: _____

Date: _____

Addendum B (Language editing)



Vaal University of Technology

MEMORANDUM

TO WHOM IT MAY CONCERN

FROM: CS van Wyk

SUBJECT: Language Editing

DATE: 13 March 2015

The following dissertation was received and language edited on the above date:

Candidate : ME Rankopola

Student number : 211128937

Qualification : MTech ICT

Title : The use of podcasting revision lectures in improving learners' academic performance

A handwritten signature in black ink, appearing to read 'CS van Wyk'.

CS van Wyk
016 950 6644
083 264 3185
SATI 1002439

Addendum C (Questionnaire)

Mr ME Rankapola
412/31 Phase 4
Renstown
0407

18 April 2014

Dear Student

I, Mr ME Rankapola is undertaking a research project to explore the effect of the use of podcasting technology in the classroom. The primary objective that this research aims to achieve is to determine the effect of using lecture podcast on the learners' academic performance. To this end, I kindly request that you complete the following short questionnaire regarding your experiences on the use of podcasting technology in your subject. It should take no longer than 10 minutes of your time to complete.

Although your response is of the utmost importance to me, your participation in this survey is entirely voluntary. Please do not enter your name or contact details on the questionnaire. It remains anonymous. Information provided by you remains confidential and will be reported in summary format only.

Kindly return the completed questionnaire by putting it in a post box (communication box) in building 30-330 on or before 18 April 2014.

Should you have any queries or comments regarding this survey, you are welcome to contact me telephonically at 012 382 6312 or e-mail me at rankapolae@tut.ac.za.

Yours sincerely

ME Rankapola
Primary researcher

Research Title: The use of podcasting revision lectures in improving the learners' academic performance

This questionnaire should take you 5 to 10 minutes to complete.

Please mark an appropriate option with an X.

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
(A) Podcast Accessibility					
I accessed the lecture podcasts from home	1	2	3	4	5
I accessed the lecture podcasts at the university premises	1	2	3	4	5
It was easy to locate and download the lecture podcasts from blackboard (MyTutor)	1	2	3	4	5
I downloaded all 20 lecture podcasts	1	2	3	4	5
I downloaded only my favourite topics only	1	2	3	4	5
I listened to the lecture podcasts on a desktop	1	2	3	4	5
I listened to the lecture podcast on a mobile device	1	2	3	4	5
I was able to listen to a lecture podcast on any topic at any time convenient to me	1	2	3	4	5
(B) Learning Enhancement:					
It was difficult to understand a lecture delivered in the form of a podcast	1	2	3	4	5
The lecture podcast stimulated my desire for learning	1	2	3	4	5
I listened to the lecture podcast more regularly than I would have studied from the textbook	1	2	3	4	5

The lecture podcasts aroused my interest in the subject	1	2	3	4	5
The lecture podcast helped me to understand the face to face lecture better	1	2	3	4	5
I listened to a lecture podcast to revise difficult concepts in a public setting (e.g. library, in transport, on the move)	1	2	3	4	5
I prepared for the assessments by listening to a lecture podcast	1	2	3	4	5
I prepared for the assessments by studying from a textbook	1	2	3	4	5
I prepared for the assessments by using both the textbook and the lecture podcasts	1	2	3	4	5
(C) Effect of podcasting use on academic performance:					
Using lecture podcasts helped me improve my test scores	1	2	3	4	5
My academic performance did not change	1	2	3	4	5
My academic performance has dropped	1	2	3	4	5
My academic performance has improved without the use of lecture podcasts	1	2	3	4	5
(D) Demographic Information:					
Nationality	African	Coloured	Indian	White	Other
Age	20-24	25-29	30-34	35-40	41-45
Gender	Male	Female			
Thank you for your participation in this study. Your responses are highly valued and you are completely assured of anonymity and confidentiality of your personal information. Kindly return the questionnaire as specified in the cover letter above					

Addendum D

(Access to technology questionnaire)

Name: _____

Course: _____ Year: _____

Mobile Phone Make & Model: _____

Access to Technology Types of Technology	Access exclusively for my own use	Access anytime but shared with others	Limited or inconvenient access	No access	Not sure
DVD player & TV					
Desktop PC with DVD Rom					
Laptop With DVD Rom					
Tablet					
PDA or Pocket PC					
Dedicated MP3 player					
Mobile Phone					
Mobile Phone with camera					
Mobile Phone with MP3 player					
Mobile Phone with 3G video access					
Memory stick					
Web cam					
Broadband internet access					
Wireless (3G) internet access					

Addendum E (Techsmith Approval)

