

The Use Of Podcasting Revision Lectures In Improving Learners' Academic Performance

Elias Rankapola

e-mail:
rankapolae@tut.ac.za

ABSTRACT

Research studies completed on podcasting technology to date concentrated 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. Resultantly, a quasi-experimental study was conducted. The study was completed over a period of 12 months, in which a stratified random sample of 150 learners was selected from a population group of 280 learners at the Tshwane University of Technology. The sample was divided into experimental and the control groups. The assessment marks for four tests of the two groups were compared to determine the effect of the intervention. The outcomes of the study showed a remarkable increase in the overall mean score of the experimental group in comparison to the mean score of the control group. The number of scores which are > 75% have increased significantly and pass rate has improved as compared to the control group scores. These are positive signals of enhanced academic performance. The study concluded that there is a strong correlation between the use of podcasting technology and the learners' academic performance.

Keywords: *Podcasting, Teaching, Learning, Academic Performance*

INTRODUCTION

INTRODUCTION AND BACKGROUND TO THE FIELD OF STUDY

The introduction of the internet in the early 1990s led to the establishment of new learning paradigms, notably e-learning and 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 i.e. *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 RSS feed and secondly, podcasting intends to distribute data to mobile devices such as iPods, MP3 players, 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 iPhones as well as Personal Digital Assistants (PDAs) like Palmtops and Pocket PCs.

Research studies on podcasting completed between 2005 and 2012 embarked on the acceptance of podcasting technology, and how it can be used in education, whilst other researchers focused on whether or not this technology would encourage learners to skip lectures. 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 (Really Simple Syndicate) 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. 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. Foko (2009) examined the use of mobile technologies in an attempt to enhance learning in the South African educational environment and address 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, internet, etc. is not optimized to assist learners. Dupagne *et al.*, (2009) conducted a study 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 a higher pass rate than learners who did not watch the video podcast.

The current study focused on the effect of audio podcasting use on the learners' academic performance.

PROBLEM STATEMENT

There is an unclouded necessity for higher education institutions in South Africa to vary lecturing and learning mechanisms in the quest to provide for the learner's 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 e.g. lecture rooms and laboratories in order to enhance learning and allow constructive utilization of time. As Foko (2009) has noted, the ubiquitous presence of mobile phones in South African higher education institutions is not optimized to address the needs of the learners.

SCOPE OF THE STUDY

The present study primarily attempted to measure the effect of podcasting lectures on the learners' academic performance. Academic performance refers to improvement or decline of test grades. The study was conducted in a theory based subject using audio lecture podcasts. In a preliminary study, most of the learners indicated that they own and have more access to MP3 players than MP4s and MPEGs. The measurements used in the study are only applicable to the subjects of the same nature (theoretical) like business administration, computing fundamentals and information systems, and not practically oriented subjects like accountancy, mathematics and programming, which would preferably require video lecture podcasts (vodcasts). The study focus is directed at determining whether or not the introduction of podcasting technology in the subject had a positive or negative effect. The study did not look at any other factors which might possibly distinguish the experimental group from the control group performance.

OBJECTIVES OF THE STUDY

PRIMARY OBJECTIVE:

To determine the effect of podcasting audio 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 evaluate the increased lecturer-learner contact time provided by the use of podcasting technology.
- To make recommendations and identify future research opportunities.

METHODOLOGY

RESEARCH PARADIGM

The study aligned itself with the positivist research paradigm. The positivist paradigm underscores the objectivist approach to studying social phenomena giving importance to research methods focusing on quantitative analyses 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 aim of this study is to conduct a quasi-experimental study wherein answers or solutions to the problems that were identified through empirical observations were 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.

RESEARCH APPROACH

De Villiers (2005), remarked that a research approach is the primary model utilized to put the study in process. Quantitative research approach explains the phenomena by collecting numerical data that is analyzed using mathematically or statistically based methods. The current study utilized a quantitative approach to collect numeric data (learners' test scores) to examine the cause (lecture podcasts) and possible effect (academic performance) relationship.

RESEARCH METHOD

The study employed a quasi-experimental method. A sample of 150 learners was selected from the population group of 280 learners. Stratified random sampling method was used to divide learners into control group (n=75) and experimental group (n=75). The control group learners consisted of learners who have completed the subject in the first semester before the introduction of the podcasting technology in the subject whereas the experimental group consisted of the learners who did the subject in the second semester through the assistance of podcasting technology. Learners' marks for four assessments were collected and compared according to the following percentage classifications: 0% - 39% (below average), 40% - 74% (average) and 75% - 100% (above average or distinction).

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 was “who”: the undergraduate learners enrolled for a management and entrepreneurship course in the faculty of management sciences at the Tshwane University of Technology and “what”: podcasting technology impact on academic performance.

RESEARCH MATERIALS

To produce a lecture podcast, the researcher used a sennheiser wireless presentation set, podcasting software (Camtasia) and a HP laptop running Windows XP OS to record the lectures. After recording and editing has been completed, the lectures were 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 accessed the audio lectures on the university’s LMS and downloaded to their MP3 or MP4 players to listen to at any time convenient to them (pull technology).

DATA COLLECTION INSTRUMENT

Published literature on podcasting technology was used to guide the study. Experiment data (test scores) was collected from the mark sheets where the test marks are recorded.

RESEARCH PROCEDURE

Lectures were recorded before the face to face lecture took 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 lectures were chunked in 10 minutes’ episodes. The podcast lectures were made available for downloading by the experimental group learners. An information session was conducted on the following aspects:

- The code of research ethics was explained to the learners.
- Informed consent form was explained.
- The researcher demonstrated how to access and download the lecture podcast.
- Demonstrated how to burn a lecture podcast to a CD.
- Demonstrate how to play a lecture podcast (playback and fast forward).

DISCUSSION OF TEST 2 RESULTS

The mean of the control group (38.6) and the experimental group (59.90) are significantly different ($p < 0.05$).

The control group mean (38.6) is the reflection of a large proportion of learners that failed test2 ($n=58$) as compared to a small number of learners that passed ($n=17$) and another small number ($n=8$) that obtained distinctions ($>75%$). The std. dev (21.08349) 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 test1 and test2 mean i.e. a 1% improvement from 37% to 38%. The reason for this mean improvement is largely dependent upon increased number of the 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 mean shows an improvement from 57.53333 in test1 to 59.90667 in test 2. A large proportion of learners ($n=53$) passed the test, a worrying number of learners ($n=21$) failed and only a small number of learners ($n=20$) obtained distinctions. The experimental group std. dev (22.90118) indicates that most of the learners ($n=33$) scored average marks in test2.

-> t test **test3**, by (id)

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Control	75	42.88	2.274652	19.69906	38.34766	47.41234
Experime	75	72.33333	1.909609	16.5377	68.52835	76.13831
combined	150	57.60667	1.909423	23.38556	53.83362	61.37971
diff		-29.45333	2.969957		-35.32233	-23.58433
diff = mean(Control) - mean(Experime)				t =	-9.9171	
Ho: diff = 0				degrees of freedom =	148	
Ha: diff < 0		Ha: diff != 0		Ha: diff > 0		
Pr(T < t) = 0.0000		Pr(T > t) = 0.0000		Pr(T > t) = 1.0000		

DISCUSSION OF TEST 3 RESULTS

The mean of the control group (42.88) and the experimental group (72.33) are significantly different ($p < 0.05$). The control group mean (42.88) shows an improvement in contrast to test1 and test 2 mean. The number of learners ($n=24$) that passed increased by 7 in contrast to test 2 and by 2 in contrast to test 1. However, the number of the learners ($n=51$) that failed is still alarming hence a std. dev. is 19.69906. The number of distinctions ($>75%$) declined by 2% in comparison with test 2. The experimental group mean (72.33333) has increased tremendously in contrast to test1 and test 2 mean. The number of learners ($n=72$) that passed is 72 out of which 32 are distinctions. The results of the experimental group test 3 are desirable because only 3 learners failed out of 75 learners. The std. dev. (16.5377) shows that the spread of the learners' scores in the experimental group ($n=32$) is much higher than the group mean (72.33333).

-> t test **test4**, by (id)

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
Control	75	41.6222	2.434512	21.08349	33.74913	43.45087
Experime	75	62.916679	2.644401	22.90118	54.63758	65.17575

combined	150	49.25333	1.992473	24.40271	45.31618	53.19049
-----+-----						
diff		-21.30667	3.594399		-28.40964	-14.20369
-----+-----						
diff = mean(Control) - mean(Experime)					t =	-5.9277
Ho: diff = 0					degrees of freedom =	148
	Ha: diff < 0		Ha: diff != 0		Ha: diff > 0	
Pr(T < t) = 0.0000		Pr(T > t) = 0.0000		Pr(T > t) = 1.0000		

DISCUSSION OF TEST4 RESULTS

The mean of the control group (41.62) and the experimental group (62.91) are considerably different (p<0.05).

The control group mean (41.6222) is the reflection of a large proportion of learners that failed test 4 (n=56) as compared to a small number of learners that passed (n=19) and another small number (n=5) that obtained distinctions (>75%). The std. dev. (21.08349) symbolized that the spread of the learners' scores (n=56) in the control group is below the pass mark of 50%. The experimental group mean shows a decline of 10% from 72.3333 in test 3 to 62.91669 in test 4. This is due to the fact that a large proportion of learners (n=62) passed the test at average scores ranging between 50% and 69%. A small number of the learners (n=13) failed and only a small number of learners (n=20) obtained distinctions. The experimental group std. dev. (22.90118) indicates that most of the learners (n=62) scored average marks in test 4.

FINDINGS

Primary objective

A two-sample t-test was performed using Stata V12 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. All the four tests indicated that there was a significant difference in the two groups' mean. The pass rate and the number of test scores that are >75% have also improved as compared to the control group performance. Therefore the study has attested that there is a remarkable correlation relationship between the intervention that was made in the form of podcasting revision lectures and the learners' academic performance.

SECONDARY OBJECTIVES

Objective 1: 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 attention was given on the impact of podcasting on academic performance. Recent research reports (Fernandes 2009; Lau 2010; Walls 2010; Lazzari 2009; Evans 2008 and Edrisingha 2010) acknowledged and corroborated empirically the use of podcasting in education and the positive effect that podcasting technology has on learning. 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 (Zhu 2010; Bongey 2006; Lazzari 2008; Hew 2009; Hove 2008 and Maharaj 2010) indicated that podcasting did not lead to a decline in lecture attendance. Very few studies (Ousten 2011; Dupagne 2009; Morris 2010 and Bensalem 2011) explored the impact of podcasting on academic performance. These researchers reported conflicting findings on the effect of podcasting on academic performance. Notably, Bensalem (2011) & Dupagne (2009) reported "no difference" between learners who viewed or listened to podcasts and those who did not. Morris (2010); Ouston (2011)

and Bond (2008) reported positive results with regard to the use of lecture podcasts. This study affirms the findings of Ouston (2011) and Bond (2008) in that the findings of the study signified a strong correlation relationship between podcasting technology and the learners' academic performance.

Objective 2: Blended learning pedagogy is the most appropriate pedagogy to podcast revision lectures. This pedagogy encompasses face-to-face contact and web technology as complementary 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 blends different kinds of delivery and learning methods that can be enabled and/or supported by technology with traditional teaching methods (de Boer 2004). The blended learning approach is the favourite 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. As witnessed in the current study, learners listened to a lecture podcast prior the face to face session and were also able to revisit the lecture podcasts after the face to face session and use the podcasts to prepare for the assessments as well.

Objective 3: Since the lectures were recorded prior to the presentation in the lecture room, 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 attended 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 therefore 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 i.e. mobile virtual classroom and traditional face to face lectures. This fact is evident in the positive change of performance in the four assessments that were used in the study.

Objective 4: The quasi-experimental study outcomes exhibited that there is a noteworthy correlation 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 suggested that podcasting use yielded neither positive nor negative results. Contrary to Dupagne *et al.* (2009), the present study reported positive as well as minimally negative effects.

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 (learning outcomes).

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 content 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 time and space to record only the important parts of the lesson content and discard the unnecessary content. *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 e.g. 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. It is crucial that the lecture podcast is made available in the format that is compatible with the learners' mobile devices or PCs.
- 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 in a null effect. Podcasting is expected to provide constant learner support at anytime, anywhere.
- Indexing the episodes was one of the successful 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 deemed 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 but 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, 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 positive results that are expected.
- Finally, the researcher recommends that instructors or lecturers as well as institutions should take responsibility for 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).

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 in 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 IS theory in the podcasting field.

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