A CUSTOMISED FRAMEWORK FOR EFFECTIVE PODCAST INTEGRATION IN A SOUTH AFRICAN HIGHER EDUCATION ENVIRONMENT

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ABSTRACT

Numerous studies have explored the potential of podcast integration in teaching and learning environments. This paper first presents and organises perspectives from literature in a conceptual framework for the effective integration of podcasting in higher education. An empirical study is then discussed in which the guidelines presented in the framework were evaluated for applicability in a selected course at a South African University of Technology. Since the results of the study revealed a number of aspects not accounted for in the conceptual framework, the framework was customised to make it more applicable for the particular higher education environment. The customised framework identifies four principles and a series of related guidelines for the effective integration of podcasts in a South African higher education teaching and learning environment. This framework can become a valuable resource for effective podcast integration in similar environments.

Keywords: Podcasting; higher education; technology integration; framework; South Africa.

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1. INTRODUCTION

Podcasting is a technique used to distribute audio files such as music or speech over the Internet. The files can then be listened to on mobile devices, such as audio players, mobile phones and smart tablets, or personal computers (Laing and Wootton 2007). Numerous studies have explored its potential integration into the teaching and learning environment as an educational content delivery platform (O'Donoghue, Hoskin and Bell 2008; Hubackova 2013; Turner 2015). Nevertheless, scholars agree that if podcasting is to be successfully integrated, more research needs to be conducted in order to develop best practices, directives and sound principles (Fernandez, Simo and Sallan 2009, 385). Given the diversity of the student population at South African higher education institutions – with regard to 'academic preparedness, social and language backgrounds' (Beylefeld, Hugo and Geyer 2008, 948), learning styles (Hay 2008, 981) and access to the Internet – it is also vital that more emphasis be placed on finding the best approach for integrating podcasts into teaching and learning environments in this particular context.

The discussion in this paper is guided by the following two questions:

- What are the key perspectives from literature on best practices for the effective integration of podcasting in higher education?
- How applicable are the directives from literature to the teaching and learning environment at a South African University of Technology?

In this article, the conceptual framework resulting from the review of literature aims to categorise and describe key concepts relevant to the study and map relationships among them (Rocco and Plathotnik 2009, 122). The emphasis falls on the educational use and, in particular, the *Why* and the *How* of the integration of podcasting as a technological tool in a higher educational context. The empirical study guided the researcher (the first author) in evaluating the principles and guidelines presented in the conceptual framework (also referred to as the 'preliminary' framework) to identify gaps or aspects not accounted for in it. The result is a customised framework which is regarded as more applicable to the South African higher education context of the study – and potentially to similar contexts.

2. CONCEPTUAL FRAMEWORK

The reflection on perspectives from literature in this section focuses on the educational uses of podcasting, including the effective integration of podcasting in teaching and learning. These perspectives support the drafting of a conceptual framework for the study.

2.1. Educational Use of Podcasting

Effective integration of podcasting in teaching and learning requires that technology is not utilised as an 'add-on' or 'stand-alone' tool, but as an indispensable constituent of the teaching and learning environment, with the main purpose of benefitting student learning (Saxena 2013). The provision of study material in an alternative delivery mode can benefit the learning situation (Abdous, Facer and Yen 2012, 44; Munns 2013, 42). With effective integration, podcasts can also become an indispensable tool in addressing situations that may potentially hinder effective teaching and learning. It is said that podcasting has taken audio to 'a higher level' because students now have the opportunity to access audio 'on the move', anywhere and anytime (Van Zanten, Somogyi and Curro 2012, 130). By integrating podcasting effectively, the effects of negative situations such as absenteeism, challenging studying conditions and long traveling distances to and from campuses, for example, can be countered by the use of podcasting. Additional learning material presented by means of podcasting can aid concept formation.

With the above goals in mind, podcasts are mostly utilised in educational settings to:

- Create audio archives of class lectures; and
- Deliver supplementary course material.

2.1.1. Audio archives of class lectures

Students often have difficulty in keeping up with the pace of the lecturer in the classroom. They are often forced to listen, write and understand, under time limitations, what the lecturer is conveying (Wheeler 2007). Furthermore, students' ability to learn in the classroom is often hindered by elements such as the unruly behaviour of other students, fatigue, work load and the classroom environment itself (Collins 2000, 27). Consequently, podcasting may play a vital role in enhancing the learning process by offering students the opportunity to revisit class lectures without the distractions they may encounter in the classroom.

In addition, many students consider podcasts to be their preferred media format for lecture recordings. A study at the University of Michigan (Brittain, Glowacki, and Van Ittersum 2006) found that 66% of students preferred lectures in the format of audio only, which was also deemed more cost effective than video recordings. Similar studies at Duke University (Flanagan and Calandra 2005) and Kingston University (Edirisingha, Rizzi, and Nie 2007) revealed that students favoured podcasts because it granted them the opportunity to listen to learning content in their own time and at their own pace. Podcasts also provide students the opportunity to replay the recorded lecture as many times as they want to (Turner 2015, 166). Interestingly, students at Brunel University's Business School (Evans 2008, 491) remarked that 'podcasts are more effective revision tools than their textbooks' and even 'their own notes' when studying.

2.1.2 Supplementary course material

Another possibility of using podcasts is to deliver supplementary learning content to students. According to Williams (2007), students are faced with increasing workloads and the challenge of learning huge amounts of information in an incredibly short period of time. At Kingston University, Edirisingha et al. (2007) found that 53% of students believed that podcasts were a good supplement to learning material for courses and ultimately enhanced their performance. This confirms that students value supplementary information that can potentially benefit their learning experience. Although podcasts may offer many valuable opportunities for the learning environment, lecturers in Lane's study (2006, 6) voiced the concern that podcasts could lead to higher rates of absenteeism. Yet 79% of students in the study reported that podcasting did not impact their class attendance.

The literature thus suggests that effective podcast integration could significantly improve the learning experiences of students in particular (problematic) situations. But how can this integration be facilitated in the most effective way?

2.2. Effective Integration of Podcasting

Educational specialists globally have shown a special interest in the use of podcasting for educational purposes. As indicated in section 2.1, these purposes include the delivery of supplementary course material that may enhance students' ability to understand learning content in their own learning space. It is, however, also evident that there is still a significant 'gap' between the 'theories related to good practices' and 'empirical studies' based on podcasting (Fernandez et al. 2009, 385).

The main aim of the discussion is to consider perspectives on the principles and most appropriate guidelines to follow when integrating podcasts into a higher education teaching and learning environment. The steps identified by Laing and Wootton (2007, 8) for integrating podcasts into a curriculum, namely goal setting, selection of content, learning design, production, and integration, are used as a broad guideline in organising the discussion.

2.2.1. Goal setting

Podcasting has the potential to support students in achieving learning outcomes. In optimising this potential, Ng'ambi and Lombe (2012, 183) established in their study that students accessed and utilised podcasts more frequently when it was closely integrated with pedagogical objectives. For this reason Laing and Wootton (2007, 8) as well as O'Donoghue et al. (2008) suggest that lecturers must first of all consider the learning outcomes they would like to achieve with the podcast. Hay (2008, 989) provides a series of guidelines on how lecturers can link and enhance their learning outcomes through the use of podcasts. Her guidelines focus on the provision of a method, system or process

for the lecturer to revise previous learning material and on how to link it to new learning content. In this way, students can move from the known to the unknown. This movement from the known to the unknown is commonly referred to as deductive methodology. It is also apparent that Hay's (2008) guidelines hinge on the constructive alignment principle of Biggs and Tang (2007), which proposes that lecturers construct an appropriate learning environment to support the learning activities that produce the desired learning outcomes. It is evident that Biggs and Tang's notion of constructive alignment linked to podcasting may provide a means for lecturers to link learning outcomes with new learning content in an exciting and interactive learning environment.

2.2.2. Selection of content

The planning phase is the most important component of a lecture. Lecturers need to ensure that they select the most appropriate content. O'Donoghue et al. (2008) emphasise that not all learning content or teaching approaches may be successfully transferred to a podcast, and therefore imply that lecturers need to zoom in on a specific area of the subject that is more compatible with a podcast. Laing and Wootton (2007, 8) suggest that lecturers should avoid including dense, complex material in a podcast if it could be better covered in a lecture.

There have been mixed reactions with regard to the length of podcasts. Chan and Lee (2005, 67) recorded three to five minute-podcasts because students did not have enough time between class lectures and during their daily commute to listen to a full class lecture. While Fernandez et al. (2009, 389) increased the length of their podcasts from 5 to 10 minutes based on a request from their students, Cebeci (2008) reported that students requested that the length of a podcast should be increased from 15 to 25 minutes. However, Van Zanten et al. (2012, 136) concluded in their study that students valued both the full recordings of class lectures as well as short, five minute summary podcasts, according to their different learning preferences. Correspondingly, Hew (2009, 342) emphasises that students are diverse and that factors such as students' needs and perceptions, as well as the subject matter, play a role in determining the length of podcasts. Consequently, it can be argued that the ideal length of podcasts will vary according to the needs of the students as well as the purpose for which the podcasts are recorded and will therefore differ according to contexts.

Overall it can be concluded that in order for lecturers to find the best strategy or approach to podcasting, they should consider student needs, student perceptions and the learning content to be covered.

2.2.3. Learning design

In order to design thoughtful pedagogies that create meaningful interaction for students, lecturers need to contextualise podcasts to ultimately enhance the learning potential of

their students. According to Lawlor and Donnelly (2010, 969), a carefully integrated and well-designed podcast has the potential to enhance students' learning experiences. However, they warn that the best person to design and integrate the podcast is the person lecturing the course since the podcast needs to be aligned with the lecturer's teaching style. Laing and Wootton (2007, 8) suggest that lecturers should listen to other podcasts and to the radio to gain ideas on how to design their content.

Obliviously the success of podcasts will only become evident in formative and summative assessments. Nevertheless, to assist students in better preparing themselves for lectures and assessments, the lecturer should demarcate how specific challenges can be solved and also elaborate on communication about discourses. However, care should be taken that the podcasts do not become too lengthy.

2.2.4. Production of podcasts

Producing a podcast is a simple process that does not require specialist knowledge. This production process entails recording audio files of learning content, editing and converting it to a compressed audio format (MP3) and then finally making it available to students to use at their convenience. In order to produce a podcast, lecturers need to acquire certain equipment, determine where they would like to distribute the podcasts and finally, decide how students can access them. O'Donoghue et al. (2008) point out that some lecturers may find recording equipment difficult to operate and may need technological support in this regard.

According to experienced podcasters (Gattis 2008; Gaden 2010), all that is needed to produce a podcast is:

- A recording device (e.g. a microphone connected to a computer, a portable MP3 digital voice recorder, or a mobile phone);
- A computer with voice recording and editing software; and
- Server space (e.g. a dedicated website or an existing course site on the institutional learning management system [LMS] from which students can easily access and download the podcast files).

Various researchers suggest that lecturers should not dictate or use a script when recording podcasts, but that they should rather be informal in their approach (Gaden 2010; Hubackova 2013, 311). Both Gaden (2010) and Hubackova (2013, 311) suggest that students learn better when instructional material is presented in a personal and informal way. If the lecturer speaks as if he/she is having a conversation with the students, it can help to stimulate the students' interest in the learning content. Furthermore, podcasts encourage learning since it can be regarded as a blend between entertainment, technology and learning. In addition, O'Donoghue et al. (2008) state that the production of podcasts should be approached in a consistent manner and thereby meeting the expectations of students as to when and where content will be available.

2.2.5. Integrating the podcast

In recent years, podcasting has become an increasingly important component of the higher education landscape. In many cases, podcasts' appeal is linked to their potential to enhance student engagement with learning content outside the traditional classroom (Allen 2009). Although podcasting has many advantages, lecturers should still anticipate how students will react to podcasts and what would be the best strategy for implementing them.

Keeping this in mind, Laing and Wootton (2007, 8) suggest that lecturers should not present podcasts as optional resources but rather embed them in their course. Guertin, Bodek, and Zappe (2007, 139) further suggest that lecturers should hold regular information sessions on the use of podcasts. These sessions can help to avoid confusion and unfamiliarity when downloading and using podcasts, and enhance the benefits for the learning environment. One of the main criticisms against podcasts is that they only appeal to auditory learners – those who 'learn best via listening rather than reading' (Ralph, Head, and Lightfoot 2010, 15). Vatovec and Balser (2009, 22) suggest that lecturers can avoid this potential point of criticism by supplementing podcasts with text based transcripts to support visual learners.

The accessibility of podcasts is another issue that needs to be considered. Edirisingha et al. (2007, 90) argue that students are more likely to access podcasts via an LMS than a subscription feed. Gattis (2008, 6) proposes the LMS as a vantage point because podcasts are centrally located there along with other learning content and therefore easily accessible. Furthermore, students are familiar with navigating the LMS and therefore likelier to locate and download podcasts. Despite their familiarity with the general working of the LMS, some students may still need additional technical support to download the podcasts (O'Donoghue et al. 2008).

Podcasts therefore show potential for enhancing student engagement with learning content beyond the traditional classroom. However, lecturers need to first consider what would be the best approach for integrating podcasts into a course curriculum. Several factors such as student accessibility and learning styles, information sessions and supplementary resources have to be taken into account before implementation.

2.3. Conceptual framework for the effective integration of podcasts

The above discussion presents several illuminating perspectives on designing, producing and incorporating podcasts in teaching and learning in higher education. The authors organised the various perspectives into a format that they believed would represent their conceptualisation of the effective integration of podcasts in the context of the study. The resulting conceptual framework is presented in Table 1.

Table 1: Conceptual framework for the effective integration of podcasts

Principles	Guidelines for effective podcast integration
1. Thoughtful and thorough planning	1.1 Be clear on the learning objectives that you would like to achieve with the aid of podcasts (Laing and Wootton 2007, 8; O'Donoghue et al. 2008). 1.2 Determine how podcasts can contribute to achieving your learning outcomes of the specific subject matter (Ng'ambi and Lombe 2012, 183; Hubackova 2013, 312). 1.3 Keep in mind that not all learning content may be compatible with podcasts (O'Donoghue et al. 2008). 1.4 Determine if lecturers require technical assistance to operate podcasting equipment (O'Donoghue et al. 2008).
2. Regular interaction with students	2.1 Frequently remind students that the podcasts are available by consistently referring to the podcast content during class sessions (Rahimi and Katal 2012, 1160). 2.2 Motivate students to access the podcasts (Chabolla and Leh 2009).
3. Selection and designing of content for maximum impact	3.1 Listen to other podcasts to gain ideas on how to design content (Laing and Wootton 2007, 8). 3.2 Record content in a personal and informal way (Gaden 2010; Hubackova 2013, 311). 3.3 Select the most appropriate content that can be utilised with podcasts (O'Donoghue et al. 2008; Ng'ambi and Lombe 2012, 183). 3.4 Recall and integrate previously learned content or knowledge (Hay 2008, 989). 3.5 Record lectures in MP3 format. This will significantly reduce the size of the audio file (Gattis 2008, 6). 3.6 Consider students' needs and preferences as well as subject matter when deciding on the length of the podcasts (Hew 2009, 342).
4. Ensuring effective distribution of podcasts	4.1 Distribute podcasts via the LMS to ensure student accessibility, convenience and familiarity (Ng'ambi and Lombe 2012, 185). 4.2 Record and distribute podcasts in a consistent and timeous manner (Tsagkias, Larson and De Rijke 2010, 379). 4.3 Arrange for technical support to assist students in downloading the podcasts (O'Donoghue et al. 2008).

The framework depicted in Table 1 consists of four guiding principles and a set of guidelines for the effective realisation of each principle. The authors believe that the identification of podcasting 'principles' from the literature adds more value to this research than offering mere descriptive steps of the podcasting process. In their conceptualisation the authors also regard the setting of outcomes (or objectives) as part of a thorough planning process and not as a separate step or principle. Similarly, the production process is seen as part of effective planning and not as a separate

principle. In contrast to the steps and principles identified by the authors in the literature reviewed, regular interaction with students is regarded as a very important principle for the effective integration of podcasts. This will increase the student-centredness of the integration process.

But how applicable is this conceptual framework for the effective integration of podcasts in a South African higher education environment? What adaptations (if any) are needed? What aspects have not been accounted for? In order to address questions like these, the researcher undertook an empirical study guided by the principles and guidelines suggested in the conceptual (or preliminary) framework.

3. RESEARCH DESIGN AND METHODOLOGY

A case study was regarded as the most appropriate design for this project, because the intention was to gain a deep understanding of the unique nature of the particular context, setting, participants and time period. McMillan and Schumacher (2006, 316) state that in a case study the researcher seeks to fully understand a single phenomenon in depth, regardless of the number of sites or participants for the study. A major advantage of using a case study design is that it 'permits a researcher to reveal the way [in which] a multiplicity of factors have interacted to produce the unique character of the entity that is the subject of the research' (Thomas 2003, 35). Thomas (2003, 35), however, also warns that the outcomes of one case study cannot be generalised to other people, events or institutions with similar case studies. In this case study, the researcher aimed to explore the applicability of a preliminary framework for the effective integration of podcasts (see Table 1) by using it as a conceptual guide for podcast integration in the Personnel Management I course at a South African University of Technology.

The population selected for this study was 88 first year Human Resource Management students who were registered for the Personnel Management I course. These students were selected because their lecturer agreed to assist the researcher (an instructional designer at the selected institution) in conducting the study. This required that she would collaborate with the researcher to incorporate podcasting in her lecturing. The selected students therefore had first-hand experience of the phenomenon (podcasting) being studied (McMillan and Schumacher 2006, 119). The study sample consisted of 58 students who attended a non-compulsory podcast training session at the beginning of the year.

Data was collected by means of a questionnaire, focus group discussions, and an individual interview with the lecturer involved. The questionnaire was completed by 49 of the 58 training attendees (84.5%). In the case of the focus group discussions, 12 students were purposefully selected from the 58 training attendees with maximum variation in mind. Participants thus represented different age, gender and population groups. Throughout the study, the researcher adhered to the ethical principles of consent,

anonymity and confidentiality, and no-harm to subjects/participants (Drew, Hardman and Hosp 2008, 79; Walliman 2011, 43).

The questionnaire comprised both open-ended and close-ended questions, and was guided by principles and guidelines in the conceptual framework. While keeping the framework in mind, the researcher incorporated an adapted version of an existing questionnaire by Brittain et al. (2006). Questions were designed mainly to determine the student's perceptions of podcasts and also to probe a number of assumptions that were found to be consistent in the literature review.

The researcher conducted three focus group discussions at the end of the academic year. The focus groups consisted of four participants each. A focus group discussion was deemed the most appropriate interview strategy for this research study because it allowed exploration of students' thoughts, ideas, perceptions and feelings regarding podcasts, and not just their behaviour (Greef 2005, 286). Furthermore, focus group discussions provide a unique, socially enhanced platform that encourages students to share their ideas and disclose information regarding their learning experiences with podcasts that they may have forgotten (McMillan and Schumacher 2006, 360).

Numeric data from the eight close-ended questionnaire questions was primarily analysed through descriptive statistics. To understand the narrative data collected, a content analysis approach was used to identify key concepts, similarities and differences within the raw data provided by the open-ended questions in the questionnaire, focus group interviews, and lecturer interview (Nieuwenhuis 2007, 101).

In order to enhance validity and reliability in the study, the questionnaire was assessed by the instructional designer at the institutional Centre for e-Learning and Educational Technology to ensure that it adequately measured what it had to measure before it was distributed (Creswell 2009, 190). Furthermore, feedback from the pilot study suggested that some questions were unclear and ambiguous. These questions were rephrased and adapted. The researcher also used verbatim accounts of conversations and direct quotes from documents and interviews to clarify participants' responses (Leedy and Ormrod 2005, 100). Additionally, direct quotes were used in reporting to make the findings and results of the study more concrete (Lazar, Feng and Hochheiser 2010). A precise audit trail was recorded with accurate descriptions of events and data resulting from the study (Onwuegbuzie and Leech 2007, 240). This audit trail consisted of audio recordings of interviews, completed questionnaires (for both the pilot and main study), field notes, a training manual, a training attendance register, findings and interpretations, and final reports.

4. FINDINGS OF THE STUDY

The findings of the study are presented according to the four principles for effective integration of podcasts in the conceptual framework (Table 1). Additional points of discussion include preferred listening locations, download problems, recommendations

for future use, and additional feedback. Since the aim of the empirical investigation was to test the applicability of this framework, the discussion will mostly focus on findings that point to possible shortcomings in the preliminary framework.

4.1. Principle 1: Thoughtful and Thorough Planning

The lecturer was presented with various options as to how she could implement podcasts in order to achieve the learning outcomes of the selected course. However, due to her lack of familiarity with the concept of podcasts, she decided to record her class lectures as a supplementary and reinforcement tool. Accessing and listening to the podcasts would therefore not be compulsory for students. Due to the lecturer's unfamiliarity with the LMS, the researcher was responsible for uploading the podcasts.

4.2. Principle 2: Regular Interaction with Students

The lecturer, during a lecture, introduced the idea of podcasting and invited students to attend a training session on how to access and download podcasts from the LMS. The researcher believed that it was necessary to provide training because these students were inexperienced first years who were not familiar with accessing and downloading podcasts from the LMS. The attendance register revealed that 58 of the 88 students (65.9%) attended the training session. The lecturer indicated that a single training session would suffice.

In the questionnaire (completed by 49 of the 58 training attendees), students were asked to share their initial thoughts when they first heard that the Personnel Management I lectures would be made available as podcasts. According to the summarised data from the questionnaire, four themes emerged (inductively): Happiness and excitement (69%), curiosity (14%), gratitude (4%) and no interest (4%). These responses could serve as an indication that the majority of the students liked the idea of having access to their Personnel Management I lectures as podcasts. The students appreciated the lecturer's extra efforts to ensure that they understood the learning content. However, some students indicated that although they attended the training session they still did not fully understand what podcasts were.

4.3. Principle 3: Selection and Designing of Content for Maximum Impact

In order to simplify the recording of podcasts, the lecturer used an MP3 recorder with a microphone to record her entire class lecture as a podcast. The podcasts were uploaded as supplementary tools with no additional transcripts. During the recording of podcasts, the lecturer consistently recalled previously learned content. The duration of the podcasts was approximately 35 minutes each.

Although the questionnaire data indicated that the use of podcasts as a medium of instruction motivated the students to learn, a sizeable number of students (38%) reported negative aspects regarding the podcast lecture material. Their aversion to the podcasts can be linked to the following six themes:

- Poor audio quality;
- Accessibility to computers in the lab;
- External noise barriers;
- Length of the podcasts;
- Download problems; and
- Conflict with preferred learning styles.

4.4. Principle 4: Ensuring Effective Distribution of Podcasts

In order to enhance student accessibility and familiarity, podcasts were distributed via the LMS. On the day that students attended training, hand-outs describing steps to download podcasts were distributed. New podcasts were uploaded consistently on a weekly basis.

4.5. Preferred Listening Locations

Students were asked to indicate where they primarily listened to the podcast lecture material. The majority of the respondents (57%) accessed the podcasts in the computer labs on campus. Another 38% indicated that they mostly listened to the podcasts at home, while a small number (5%) indicated that they preferred listening to the podcasts while travelling.

4.6. Problems Experienced in Downloading Podcasts

The majority of the respondents (75%) indicated that they did not experience trouble with downloading the podcasts. Four students (8.16%) indicated that they had never tried to download any of the podcasts. Those students who did have trouble to download the podcasts (16%) indicated that their problems were mostly related to 'Internet connectivity', 'inability to download the podcast to their memory stick' and the inability to 'download the podcast to a mobile phone'.

During the focus group discussions, participants cited download difficulties and lack of the required accessories to listen to podcasts (headphones) as the two major factors which hampered their podcast access. It became apparent that the single training session (regarded as sufficient by the lecturer) was inadequate. Guertin et al. (2007, 139) suggest that regular training sessions on the use of podcasts can alleviate confusion and aid students in any difficulties that they may encounter.

The lack of accessories such as headphones indicates that the computer labs are not fully equipped to cater for the utilisation of podcasts. This suggests that before the implementation of podcasts, all stakeholders should be consulted to ensure that the necessary resources and support are available to students. In this regard, students can also be encouraged to utilise their own headphones.

4.7. Recommendations for Future Use

Students were asked to make recommendations for the future use of podcast lecture material. The majority of the respondents (74%) did not have any suggestions. The other respondents suggested improvements such as extra training opportunities, more interaction between students and lecturers, and additional notes for those who prefer not to learn by means of podcasting. In this regard, one student remarked: 'The only thing I can say is that I would prefer if our lecturer could send us notes on the LMS, because for others podcasts does not work as when we study with our notes'. Three students (6.1%) indicated that they would like to have more training on downloading the podcasts; one student commented: 'Show us how to download it'.

This request revealed that although most students were satisfied with the podcast lecture material, there is definitely room for improvement in the form of written transcripts and more frequent training sessions.

4.8. Additional feedback from students

The lecturer was asked to elaborate on the informal feedback she received from students about the podcasts. She responded as follows:

> When I asked them about the podcasts after the first semester, they said that it was positive for them and it helped them with the preparation for exams because as they listened to the podcasts they went through the book together with what I was doing in the podcast and it helped them to use more than just their visual senses and they could use auditory senses as well.

Overall, the feedback received from students was positive. Clearly students used the podcasts as a revision tool for examination purposes. Although the lecturer indicated that students used podcasts in conjunction with their textbooks, there undoubtedly exists a need to investigate the use of podcasts in conjunction with other learning mediums, such as PowerPoint presentations.

5. DISCUSSION OF FINDINGS

Although most students were satisfied with the podcast integration in the selected course, a few students did highlight considerable problems that cannot be overlooked. An important finding of this study was that most students accessed the podcasts on campus.

It was, however, discovered that many of the computer labs were ill-equipped for listening to podcasts. Furthermore, computer laboratory assistants were not informed of students' intention to listen to podcasts. This indicates that all stakeholders who have an impact on students' listening preferences of podcasts should be consulted and informed of the lecturer's decision to podcast prior to implementation. It was established that students would have appreciated a dedicated assistant to help them download podcasts. Since resource constraints are likely to prevent the appointment of dedicated 'podcast assistants', it is therefore proposed that existing computer laboratory assistants and computer helpdesk staff receive sufficient training to assist students who experience podcast download or listening problems both on and off campus. Furthermore, a single training session (as requested by the lecturer) was insufficient and more frequent training sessions need to be conducted to ensure familiarity and avoid confusion. Podcasting can cater for more diverse learning styles, if the lecture audio is integrated with slide show presentations and transcripts.

As a result of the aspects highlighted in the study, the authors felt it necessary to customise the preliminary framework (see Table 1) to make it more relevant to their own teaching and learning environment (see Table 2). The extensions are presented in italicised format in Table 2.

Table 2: Customised framework for the effective integration of podcasts in a South African Higher Education teaching and learning environment

Principles	Guidelines/Strategies for effective podcast integration
1. Thoughtful and thorough planning	1.1 Determine how podcasts can contribute to achieving the learning outcomes of the specific subject matter. 1.2 Keep in mind that not all learning content may be compatible with podcasts. 1.3 Inform all relevant stakeholders to ensure that appropriate resources and support are available for the successful integration of podcasts. 1.4 Become familiar with the technology – learn how to create and distribute your own podcasts.
2. Regular interaction *and consultation* with students	2.1 Consult students on their needs and perceptions of utilising podcasts in their learning environment before integrating podcasts into the course. 2.2 Frequently remind students that the podcasts are available, by consistently referring to the podcast content during class sessions. 2.3 Motivate students to access the podcasts. 2.4 *Monitor and evaluate the effectiveness of the podcast integration on a regular basis*.

3. Selection and designing of content for maximum impact	3.1 Listen to other podcasts to gain ideas on how to design and *present* content. 3.2 Select the most appropriate content that can be utilised with podcasts. 3.3 *Add written notes or slide show presentations to complement podcasts – this will ultimately cater for most learning styles.* 3.4 Record podcasts in MP3 format to reduce the size of the audio file. 3.5 Consider students' needs and preferences as well as subject matter when deciding on the length of the podcasts.
4. Ensuring effective distribution of podcasts	4.1 Distribute podcasts via the institutional LMS to ensure student accessibility, convenience and familiarity. 4.2 Record and distribute podcasts in a consistent and timeous manner. 4.3 *Create a culture of student readiness by continuously referring to the podcasts.* 4.4 *Hold regular and compulsory consultation sessions with students on the process of downloading podcasts to avoid any confusion or unfamiliarity.* 4.5 *Create training opportunities for students who are struggling to download podcasts.* 4.6 *Ensure that clear training documentation and manuals on how to download podcasts are readily available.* 4.7 *Train existing computer laboratory assistants and helpdesk staff to assist students with technical difficulties they may encounter.* 4.8 Ensure that students have the necessary resources, such as headphones, to listen to podcasts in lab settings.

Although the extension of the framework relates to all four principles included in the preliminary conceptual framework, almost all the additions were necessitated by the context of the study. During the planning stage, lecturers should ensure that appropriate assistance and resources will be available to students when they want to download and listen to the podcasts (see 1.3). Lecturers should also become more familiar with podcasting technology (see 1.4) and integrate podcasts with other learning materials to ensure that they accommodate various learning styles (see 3.3). Furthermore, lecturers should create a culture of student readiness by continuously referring to the podcasts during their interactions with students (see 4.3). The customised framework also places increased emphasis on the needs of students – especially with regard to training, support and resources (see 2.1 and 4.3–4.8). Prior knowledge regarding the types of mobile 'podcast-listening' devices to which students have access could also help to create a more customised podcasting experience for students. The valuable insights gained in the study also emphasise the need for actively involving students in the regular monitoring and evaluating of the effectiveness of the integration and its impact (see 2.4).

Although the study revealed valuable insights into students' preferences and use of podcasts, there are other areas – such as student created podcasts and the impact they may have on teaching and learning – that require further investigation. Since the customised framework only focuses on the integration of audio podcasts, it would be interesting to evaluate its applicability in teaching and learning contexts that make use of video podcasts (or vodcasts). Consequently, further research is required to establish the relevancy of the framework when podcasts are combined with other digital pedagogies such as the flipped classroom approach. Although the study was valuable in establishing a framework for podcast integration, it was limited to a small sample of first year students at a University of Technology who had no prior experience with podcasts. Therefore broader studies need to be undertaken in various other teaching and learning settings. Further research is also needed to determine how the customised framework can be adapted or expanded to form part of an institutional teaching and learning policy which makes adequate provision for quality assurance measures and describing the role of instructional designers and/or teaching and learning managers in more detail.

6. CONCLUSION

This study indicated that the students at the selected South African University of Technology have specific needs with regard to downloading and listening to podcasts. Based on the results of the study, the researchers suggest a customised version of the preliminary conceptual framework for the effective integration of podcasts in a particular African higher education teaching and learning environment. The customised framework may, however, also be generalised successfully to similar higher education environments.

By adhering to the principles and guidelines set out in the customised framework, educators can potentially ensure that podcasting becomes an integral part of their students' learning experience. This could optimally assist students in achieving the stated learning outcomes of a course. The authors believe that the results of this study – the customised framework in particular – can become a valuable resource for other studies on the effective educational use of podcasts in higher education.

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