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INVESTIGATING THE USE OF PODCASTS IN AN OPEN, DISTANCE AND E-LEARNING ENVIRONMENT

ABSTRACT

In a world where the podcast stands out as one of the important support technologies for online learning, lecturers face great challenges in delivering podcasts qualitatively and productively. The introduction of technology into distance teaching and learning has often failed to meet the expected outcomes, and the educational landscape contains evidence of students who have been unable to benefit from this particular innovation (Dede, 2008). The increasing importance of the podcast as a support technology for online learning has led to intense discussions about how to preserve and enhance its use for all kinds of expected student knowledge. Therefore, this paper aimed to explore the types of podcasts that lecturers at an open, distance and e-learning (ODeL) institution use for teaching and learning. The focus was to explore the practices of the lecturers in the use of podcasts for teaching and learning in an ODeL institution.

From 200 participants, a total of 431 podcast scripts (generated during staff development sessions) from different modules, departments and subjects at an ODeL institution were collected for data use. The number of podcasts per purpose or type was tallied and recorded in a table. Results provided readers with a snapshot of how an ODeL institution uses podcasts for teaching and learning, the gaps in the effective use of podcasts were discussed and recommendations were provided for a better and future use of podcasts for teaching and learning. The paper offers guidance to better utilisation of podcasts in ODeL environments in higher education institutions.

Keywords: *Higher education; open distance and e-learning (ODeL); quality; podcasts; support technology; teaching and learning.*

1. INTRODUCTION AND BACKGROUND

Technology has advanced from being used primarily as an instructional delivery medium to an integral part of the learning environment (Fouts, 2000; Poole, 2001). Some recent studies have found that support technologies such as podcasts are used predominantly for administrative matters (Warren, 2011; Schreiber & Klose, 2013). Hence, questions like "To what extent does any form of support technology contribute to meeting most students' learning expectations?" are often neglected by the lecturers during

their online teaching. For example, many studies have been carried out about the accessibility of technology to students (Richardson, 2006). However, studies on how lecturers use particular technologies to achieve teaching and learning objectives are limited (Dede, 2008). The use of technology for high-quality teaching and learning is a critical issue that should be investigated to ensure that it contributes significantly to productive student learning.

In higher education, many demands are currently being placed on online learning with technology, as students' needs receive priority (Bonk, 2004). Together with other technologies, podcasts are understood to facilitate "unexpected logistic and pedagogical advantages" (Bonk, 2004:3). These include the "quick delivery of information at any time and everywhere, genuine possibilities for autonomous learning, more interactivity, more student-orientation, more individualisation, better quality of programmes, and greater learning effectiveness" (Burbules & Callister, 2000:10). Podcasting is described as a process in which "digital audio recordings are broadcast over the internet to users who have signed up to receive them […] like a traditional radio, only it is a cognitive medium and is available on demand for a specific topic" (Roy & Roy, 2007:481). On the other hand, podcasting is seen as a method of distributing audio files over the internet, usually in MP3 format. These audio files can then be played on several portable media players or devices, such as desktop computers, laptops and mobile phones (Rahimi & Maral, 2012). Some benefits of podcasts pointed out in research include (a) connecting students and instructors; (b) fostering student motivation; (c) personalising the learning environment and (d) offering an alternative approach to teaching and learning (Bolliger, Supanakorn & Boggs, 2010; Brown & Green, 2007; De Souza-Hart, 2011; Shamburg, 2010; O'Bannon, Lubke, Beard & Britt, 2011; Lazzari, 2009). Therefore, universities offering distance education adopted the use of podcasts because the benefits outweigh the disadvantages mentioned in the literature of podcast use. Some of the disadvantages of podcasting include the fact that they are time consuming and have accessibility problems among others (Laurillard, 2002).

2. ODeL AND STUDENT SUPPORT

Owing to environmental and economic challenges in Africa, students who wish to enrol at higher education institutions could still face barriers as they live in remote areas where education is not easily accessible. Yet, it is increasingly recognised that effective student support contributes to improved retention and success rates in ODeL institutions (Unisa, 2015). In South Africa, higher education institutions offered ODeL in their attempt to address the multitude of challenges that students face. ODeL environments are understood to be an accumulation of openness and distance in education that seeks to limit transactional distance. ODeL is characterised by two important factors, namely its philosophy and its use of technology. Most ODeL systems aim to remove barriers to education by expanding access to learning by increasing students' educational support choices. For example, the University of South Africa (Unisa) saw ODeL as a viable means of breaching barriers to higher education by broadening access and participation, as it calls for unique digital and technical support to improve retention and success rates (Unisa, 2015). Therefore, ODeL offers many opportunities for a new range of technology-based student support possibilities, such as podcasts, in their bid to improve teaching and learning.

In its attempt to bridge the gaps created by some of the challenges mentioned above, some ODeL higher education institutions, like Unisa, used technology to try to promote equity, use resources sustainably, inculcate tolerance of difference, enhance public health and develop

indigenous knowledge. As part of their vision, the institution embarked on a developmental journey "towards the African university in the service of humanity", which is guided by the principles of lifelong learning, student-centredness, innovation and creativity, and constant transformation (Unisa, 2015). Its student-centredness meant making provision for flexibility of learning that adopted blended learning techniques. The blended techniques adopted included the use of integrated and mixed media and courseware with various modalities for learning development, facilitation and support, best described by ODeL. Therefore, podcasts became an important support technology to overcome the challenges that students in ODeL environments face. However, the quality and use of podcasts needed to be managed to ensure that they contributed to effective learning. To use support technologies effectively, lecturers need knowledge of two main aspects of technology, namely, how to use technology to support learning in a subject area and how to manage student-centred and technology-supported activities (Franklin, 2007). A great deal depends on how well lecturers research, plan, structure, prepare for and evaluate the impact of technology on teaching.

3. QUALITY USE OF PODCASTS

Unisa has adopted an agenda for transformation that embraces a range of new technology-based student-support options in its bid to satisfy its vision of an African university in the service of humanity. In this agenda, the entire institution's "transactional environment" with students is transformed so that all aspects of that environment are fully digitised and thus underpinned by robust, effective and integrated ICT applications (COL, 2017). Therefore, the inclusion of support technologies, like podcasts, has become key to the university's positive advancement of teaching and learning. Given that students learn in different ways in ODeL environments, support technologies like podcasts can provide learning experiences that appeal to and work for a greater range of students. A notable feature of communication technologies, such as audio podcasts, is their ability to support effective synchronous/asynchronous learning and communication. This is especially important for open and distance learning students who are often separated from their lecturers, tutors and education organisation. Therefore, most ODeL universities require access to some form of digital application, like podcasts, to digitise their services and systems.

Designing and developing a support technology that is accepted by the lecturers and students must ensure that effective, successful teaching and learning takes place. When technologies such as podcasts are employed by a university, "the agreed-upon principles and goals of an institution's core business and values, the nature of the intended student market, and the needs of the curriculum" must be supported (Davis, Little & Stewart, 2015:140). However, the choice and use of the technology should be closely aligned to the pedagogical intent of the learning and teaching transaction. Therefore, before embarking on the development of podcasts, in part or in whole, the needs of prospective students, the curriculum to be offered and the learning context and expectations must be carefully considered (Davis *et al.,* 2015). The facilitation of podcasts must be determined by the subject pedagogy and the students' learning expectations rather than by the technology.

4. CONTEXT OF THE STUDY

This paper is the culmination of the analysis of the results of a study by Makina and Madiope (2016). In this study, students at a higher education institution were asked to participate in a survey to find out what types of podcast they had received from their lecturers

for two successive academic years to support their learning (Makina & Madiope, 2016). A total of 300 students completed a podcast survey and all students who had received one or more academic podcasts during the two academic years were asked to participate in the study. They had to respond to the following:

1. Describe in a few words the types/uses of podcasts that were sent to you by your lecturers for the learning of your modules.

2. How did you experience and feel about the podcasts that were sent to you for learning purposes?

The results showed that students were concerned about the quality of the podcasts sent to them. They indicated that the podcasts either repeated what was written in the study guide or dealt with technical issues that had nothing to do with their direct learning of the subject. Students indicated some podcasts seemed to have no purpose, or some were boring as the lecturers seemed to lack enthusiasm for their subject. Data on the types of podcasts that students received was categorised and is listed, as shown in Table 1. The study by Makina and Madiope (2016) further analysed the literature on the uses of podcasts in distance education (see Table 1). The results of this comparative analysis are shown in Table1. In the analysis, the types of podcasts identified by the students (Makina & Madiope, 2016) were much less and more technical than the general uses of podcasts that were derived from the literature (Salmon & Edirisingha, 2008; McGarr, 2009; Lazzari, 2009; Popova, Kirschner & Joiner, 2008) and thus resulted in the need for this study.

Table 1:   Comparing the benefits of podcasts

Benefits of podcasts according to the literature on the topic	Students' responses to Unisa's survey (Makina & Madiope, 2016)
• Possible uses of podcasts: • Provide a general overview and serve as an advanced organiser before a new topic is introduced. • Provide the mental framework needed to acquire the subject skills. • Help students to master the procedure before a complex skill is taught. • Explain difficult concepts, principles or abstract processes. • Introduce an assignment or learning activity. • Provide variety in the learning environment. • Welcome students at the beginning of the semester. • Teach complex and difficult topics. • Provide timely module supplements. • Alleviate the broad issues faced by ODeL students. • Provide assessment feedback. • Provide immediate feedback on assessment. • Support students before examinations. • Provide study tips. • Summarise seminar discussions.	• Podcasts do the following: • Arouse students' interest and curiosity about a topic. • Inform students about learning outcomes and objectives. • Inform students about the benefits of learning new content. • Affect students' feelings and attitudes about a topic. • Motivate students to learn. • Introduce the subject to students. • Introduce the lecturers or tutors to the students.

The comparative analysis of the results of the study by Makina and Madiope in Table 1 shows that there are great disparities between the possible uses of podcasts according to the literature, and the use of podcasts as reported by students. These disparities have demonstrated that there was a gap in the literature that deals with the efficient use of podcasts

to facilitate teaching and learning. From the results of the study, it appeared that lecturers were not achieving the teaching and learning goals of podcasts that were similar to those identified in the literature. Therefore, the problem was that students did not benefit sufficiently from the podcasts that they received from their lecturers as support for their learning. Based on the findings of this study, the current study therefore aimed to investigate the types of podcasts that the lecturers at an ODeL university used to support teaching and learning. Thus, the study's research questions are:

- What types of podcasts are produced and distributed by lecturers to students at an ODeL higher education institution?

- What are the gaps between the actual use of podcasts and what the literature suggests that must be bridged to support effective teaching and learning in an ODeL environment?

5. METHODOLOGY

In a case study, the researcher deliberately and purposively selected a total of 431 podcast scripts generated during staff development sessions from different modules, departments and subjects at Unisa, an ODeL university in South Africa. Staff development was initiated at Unisa to help academics and support staff to design and develop podcasts for effective online teaching. The process of a podcast recording and uploading always began with the writing of the audio podcast script that was structured in a specific way. Prescribed in a particular way, a podcast script included a purpose, outcomes, a word of welcome, an introduction, a breakdown of the presentation and a conclusion. The podcast script template that was used during staff development is shown in Appendix 1. Through purposive sampling, 200 willing lecturers provided podcast scripts to the researcher for one year during staff development. It must be noted that one lecturer could send more than one podcast script for review. The University Ethics Committee approved the study. The research design for the study followed the following four summarised steps:

- Willing lecturers and support staff prepared podcast scripts from their different modules, courses or areas before sending them to the researcher.

- The researcher collected the podcast scripts and recorded the purpose within each podcast script during the quality checks.

- The use of podcasts per purpose from the podcast scripts was then tallied and quantified against the identified categories.

- The percentage use of podcasts per purpose was then analysed and discussed.

After receiving the prepared scripts from the staff members, the trainer would then record information from each podcast script manually in a table. Manual tallying was used, and the numbers were recorded at the end of each training week. About 30 staff members attended the staff training per day during the week of the scriptwriting workshop. This gave rise to about 30 scripts made available per week.

Data analysis

Quantitative methods supported by qualitative data were used to analyse the research data. The purpose was to identify the types of podcasts that were designed and developed for the achievement of student learning objectives during the year of study. Podcasts were recorded per subject domain (Table 2) and purpose (Table 3).

The following were considered:

- The demographic information within the study.
- The purpose and subject areas of the podcasts.
- The number of podcasts used per purpose.

6. RESULTS AND DISCUSSIONS

A description of participants' demographic information is presented, followed by a presentation of research findings according to the identified percentage themes.

Results of the demographic profile

The podcast scripts were collected from 200 willing staff participants with the following demographics:

Gender

Males	Females	Total
158	42	200

Age (in years)

31–40	41–50	51–60	+61	Total
122	35	23	20	200

Experience (in years)

5	5–10	11–15	16–20	21–25	26–30	>30	Total
49	38	31	28	18	26	10	200

The demographic profile of 200 lecturers who produced podcast scripts shows that 158 male lecturers and 42 female lecturers used podcasts. This appears to imply that either there are more male lecturers than female lecturers at the university or that more male lecturers prefer to use podcasts than their female counterparts. Staff members aged 31 to 40 years used more podcasts for teaching and learning than those older than 40 years. Those who are relatively new to the teaching profession used more podcasts than those who are more experienced.

A total of 431 podcast scripts from different modules/courses within different departments, management and support units were collected during staff development sessions. The different departments exist within seven different colleges at the ODeL institution. They are the College of Law, College of Human Sciences, College of Economic and Management Sciences, College of Accounting Sciences, College of Science, College of Engineering and Technology and the College of Agriculture and Environmental Science. There were 19 subject areas within the different departments. The university management and support units included the vice chancellor's section, the recognition of prior learning unit, the institutional transformation unit, the quality assurance unit, the curriculum and learning development unit and other smaller university support units. The number of podcast scripts per subject domains is shown in Table 2.

Table 2:   Number of podcasts per subject domains

	Subject Domain	Number of podcasts	approx. %
1.	Education	62	14
2.	Science	39	9
3.	Social Sciences	34	8
4.	Open and Distance Learning	33	8
5.	Humanities	54	12
6.	Commerce and Management:	27	6
7.	Computers and IT	36	8
8.	Engineering and Technology	26	6
9.	Health Sciences	24	6
10.	Agriculture	23	5
11.	Interdisciplinary Studies	8	2
12.	Anthropology and Archaeology	10	2
13.	Development Studies	7	2
14.	Religion and Spirituality	4	1
15.	Sociology	11	3
16.	Afrikaans	8	2
17.	African Languages	7	2
18.	Library and Information Science	8	2
19.	Other university management units	10	2
	Total	431	100

Table 2 shows that 116 of the 431 podcasts scripts produced were from the subject areas of education and humanities. Among these podcast scripts,14% were from education while 12% were from the humanities. Generally speaking, it was encouraging to see that in addition to the support units, lecturers from almost all subject areas were participating in the staff development sessions for the production of podcasts at the ODeL institution. This is good news for podcasting as it shows the link between the academic departments and the support units in their endeavour to use podcasts. This is also a tipping point because, when most academics from different subject areas are in favour of podcasts, adoption usually picks up speed. This has been an important shift from open distance learning (ODL) where podcasts were rarely used to ODeL where podcasts become key in the support of teaching and learning of subject areas. This, in turn, implies that students could start to appreciate the use of podcasts more than previously. The purpose of staff development was to highlight the importance of preparation in the production of podcasts for teaching and learning.

The results of the frequencies of types of podcasts used

After data analysis, the study identified 13 purposes of podcasts mentioned in the podcast scripts in percentage form. The results are summarised in Table 3.

Discussion

Table 3 summarises the 13 key purposes that were identified in the case study regarding the use of podcasts at an ODeL institution. 349 of the 431 podcasts were used for technical issues. This means that about 80% of the podcasts' purposes suggest that podcasts are mainly used for technical issues in the ODeL institution. An interesting observation is that "welcoming of students to the course" and "module overview" generated about 48% of the podcasts used in this study. Seven out of 13 purposes are for technical issues. The other six purposes can

be directly attributed to the improvement of teaching and learning, which only contribute to 19% of the total podcast scripts analysed. For example, an important aspect of teaching and learning, which is assessment, contributed to only 7% of the podcasts presented. This should be worrying since only 30 podcasts out of 431 were used for assessment purposes. Overall, about 20% of the podcast purposes reviewed suggest that university staff use podcasts minimally for improving the student's academic success. The results could imply that students can still do well without accessing these podcasts. Some studies indicate that students' habits must change because of the availability of podcasts since the use of podcasts has a direct and positive impact on test and skill performance (Kay, 2012).

Table 3: The number of podcast scripts per purpose of podcast

	PURPOSE OF PODCASTS	PODCAST SCRIPTS	%
1.	Welcoming students to the course	130	30.2
2.	Module overview	75	17.4
3.	Course orientation	33	7.6
4.	Student motivation and holding their interest	50	11.6
5.	Identification of the learner management system tools to be used	43	10
6.	Special units' notices	10	2.3
7.	Protocols for accessing university systems	8	1.9
8.	Assessment feed-forward	7	1.6
9.	Assessment feedback	23	5.3
10.	Final examination preparation (technical issues)	20	4.6
11.	Pacing of studies	14	3.2
12.	Further explanations	12	2.8
13.	Tackling difficult sections of the module	6	1.4
	Total	431	100

About 5% of the podcasts aimed to prepare students for their final examination. The podcast purposes for the final examination included information about the number of questions that would be asked, the time allocated to questions, the examination venue, the need to arrive early at the examination venue, the need to be confident, and so on. These purposes did not contain any information aimed at improving students' knowledge and understanding of the content in the study material. There was nothing in the purposes that could explain how students could improve their marks. Only about 1% of the podcasts were used to explain difficult concepts or topics in the subjects. It might have been of great value to students if more podcasts aimed to improve their knowledge and understanding of the subject area.

About 30% of the analysed podcast scripts (130 out of 431 podcasts) were used to welcome students to the courses or modules. For example, lecturers prepared the welcoming podcasts to introduce themselves to the students, to give students their contact details and to inform them about office hours. Welcoming podcasts further motivated students towards their subject areas and encouraged them to have a positive attitude towards assessment. Although it is important to welcome students to the modules or sections of modules, it is equally important to produce podcasts that can lead students to a better understanding and knowledge of course contents. They might not have done much to help students to focus on the subject or section. These podcasts contained important information, but students could have benefited more from podcasts that aimed at helping them to master the outcomes of modules.

About 17% of podcasts gave an overview of the module. These overviews mostly dealt with the number of chapters in the module, what the chapters were about, how to access the module on a student management platform, and so on. Although this would get the students started with the module, the information contained in the overview might not help students to focus on important issues in the individual modules. Furthermore, 12% of the podcasts aimed to motivate students, but they mainly contained information about the pitfalls of plagiarism and reminding students to work hard to pass the module. Much more could have been done in producing podcasts that help students to isolate important information for their examination preparation. Additional explanations and clarifications of the subject matter can motivate students to study consistently, yet only about 3% of the podcasts offered such information.

Finally, Table 3 shows that about 80% of the podcasts were used to communicate motivation information, technical issues and management matters. These podcasts did not contain information that could improve students' knowledge or understanding of the module contents. Only 25% of the podcast scripts included important information that could contribute to productive learning. The results in Table 3 confirm Abrami's (2010) research results that technology is predominantly used for informative (internet and CD-ROM), expressive (word processing), and administrative and evaluative (data-keeping, lesson planning and testing) purposes. It was disappointing to observe that very few lecturers used podcasts to engage students in collaborative or creative activities. Podcasts have the potential to increase student engagement and learning. For example, not one lecturer designed an activity that required students to produce podcasts. Podcasts have the potential to increase student engagement and learning if, and only if, their support is well thought out and spread evenly across the modules (Armstrong, Tucker & Massad, 2009; Lee, McLoughlin & Chan, 2008).

7. IMPLICATIONS

An effective podcast is one in which, if students *do not* listen to it, some aspects of their learning or performance are disadvantaged and may result in their failure to achieve the objectives of the course. If a higher percentage of podcasts were focused and effective, students would make an effort to listen to them as they cannot afford to miss them. They would further focus on the dates when the podcasts would be available. The results in Table 3 show that this was not the case with most of the types of podcasts offered within the modules at the ODeL university of study. This goes hand in hand with the idea that if instructional material is not properly designed, the use of support technology will be ineffective for students' learning (Supanakorn-Davila & Bolliger, 2014). If students realise the benefits of podcasts for their learning, and that podcasts can improve the understanding of their individual subject areas, they will appreciate the use of podcasts. It would be unfair to have students who pass with flying colours but never had access to the podcasts, as this indicates the ineffectiveness of the designed podcasts. Such results could support the ideas that generally podcasts do not have a significant impact on learning performance.

8. RECOMMENDATIONS

It is very challenging and complex to understand the nature and use of podcasts for teaching and learning in an ODeL environment. Yet, producing podcasts requires that lecturers acquire new skills to guide them towards the production of useful and quality podcasts for teaching and learning. Acquiring those skills and producing podcasts can be a very complex and time-consuming process for already overloaded lecturers. Therefore, lecturers need

a proper understanding of the context in which they are working to organise their podcast activities responsibly and effectively. Technology is a tool that should help lecturers to meet the educational needs of all students through the consideration of the intended consequences of a learning experience (Palloff & Pratt, 2010).

Lecturers need information to fulfil their role in the use of podcasts while remembering that instruction is a goal-directed teaching process that is more or less pre-planned. This is because the types of learning offered through podcasts vary depending on instructional needs, learning objectives and timing of instructional events (Frydenberg, 2002). Frydenberg looked at the three main theoretical approaches of how students learn, how students are supported and how lecturers teach to promote effective learning with podcasts. Lecturers could use this information to fulfil their role when they use podcasts as a support technology for teaching and learning, remembering that instruction is a goal-directed teaching process, which is more or less pre-planned. More so, teaching requires exploring available training opportunities, technical and instructional design support by other responsible institutions when podcasts are considered for the online teaching of individual subjects (Palloff & Pratt, 2010).

It can be beneficial to create reusable learning objects (RLO) in the form of podcasts. RLOs are types of self-contained online digital and multimedia educational resources that can be reused, scaled and shared from a central online repository in the support of instruction and learning as they address a focused learning goal or aim (Wiley, 2002). RLOs are a great way to share lecturers' stories and expertise since they represent an alternative approach to content development where content is reused as an open resource that everybody can share (Seo, 2007; Willey, 2002). From a pedagogical perspective, RLOs are the centre of e-learning as they can be reused repeatedly in a variety of different e-learning activities, modules and courses with each having its own learning objective (Jarvis & Dickie, 2010). As RLO podcasts are flexible, versatile and multifunctional, a library of podcasts can be reused or re-purposed multiple times to save time and reduce the workload. This can be a valuable asset to online teaching and learning.

The evaluation of the use of podcasts should be an ongoing process within institutions. There is a need for useful and effective teaching and learning podcasts. Therefore, research must be carried out to guide the quality use of podcasts in ODeL universities. Research with students as participants on the quality of podcasts is needed. Students' feedback about the types of podcasts that they prefer can give lecturers an idea of the quality of the podcasts. Students' feedback on the problems with the existing podcasts can further help with how podcasts' development can be improved. This type of research guides lecturers to determine whether their podcasts are valuable to the students.

9. STUDY LIMITATIONS

The study had some limitations. It was conducted at only one university and therefore the geographical area was limited. In future, research from multiple universities might be important to analyse the use of podcasts as this would increase our knowledge of the overall quality and use of podcasts. In addition, the sample size was small because a limited number of educators attended podcast training at the time of the study. Lecturers were still resisting the use of podcasts because the technology was new to ODeL universities. It must be noted that the researcher had no control over the quality of the actual podcast scripts since the purpose of the paper was to quantify podcasts per purpose.

10. CONCLUSION

The provision of high-quality education in higher education institutions can be undermined by the poor or haphazard use of support technologies like podcasts for teaching and learning. Technology is neutral until it delivers content and loses its effectiveness if it is not applied in a planned and systematic manner (Boulos, Maramba & Wheeler, 2006). Careful reflection and research are needed to find the best ways to leverage emerging support technologies like podcasts so that they can boost teaching and learning productivity, foster better communities of practice and support continuous learning.

Although it might be a complex task to evaluate the effectiveness of podcasts in online learning, podcasts must fulfil their promise to enhance teaching and learning in ODeL universities. This study, through the research results, concluded that podcasts were used mostly for technical issues at the expense issues that lead to students' high academic success rate. By clearly managing podcasts and considering their practical limitations, it is possible to design podcasts that are theoretically grounded, practically feasible and adequate for a specific educational purpose and goal (Supanakorn-Davila & Bolliger, 2014).

REFERENCES

Abrami, P.C. 2010. On the nature of support in computer supported collaborative learning using GsStudy. *Computers in Human Behavior*, 26(5): 835–839. https://doi.org/10.1016/j.chb.2009.04.007.

Armstrong, G.R., Tucker, J.M. & Massad, V.J. 2009. Interviewing the experts: Student produced podcast', *Journal of Information Technology Education: Innovations in Practice:* 8. https://doi.org/10.28945/174.

Bolliger, D.U., Supanakorn, S. & Boggs, C 2010. Impact of podcasting on student motivation in the online environment. *Computers & Education,* 55(2): 714–722. https://doi.org/10.1016/j.compedu.2010.03.004.

Bonk, C.J. 2004. *The perfect e-storm: Emerging technologies, enormous learner demand, enhanced pedagogy, and erased budgets*. London: UK: The Observatory on Borderless Higher Education

Boulos, K., Maramba, I. & Wheeler, S. 2006. *Wikis, blogs and podcasts: a new generation of Web-based tools for virtual collaborative clinical practice and education BMC Medical*. DOI: https://doi.org/10.1186/1472-6920-6-41.

Brown, A. & Green, T. 2007. Video podcasting in perspective: The history, technology, aesthetics, and instructional uses of a new medium. *Journal of Educational Technology Systems,* 36(1): 3–17. https://doi.org/10.2190/ET.36.1.b.

Burbules, N.C. & Callister, Jr., T.A 2000. *Watch IT: the promises and risks of information technologies for education*. Boulder: Westview Press.

Commonwealth of Learning (COL). 2017. *Planning and Implementing Open and Distance Learning Systems: A Handbook for Decision Makers*. Vancouver: COL downloaded from www.col.org 05/12/05.

Davis, A, Little, P. & Stewart, B 2015. *Chapter 5: Developing an Infrastructure for Online Learning* (pp121–142).

De Souza-Hart, J. 2011. Creative ideas for biology podcasts: The immune system as an example. *The American Biology Teacher,* 73(3): 171–175. https://doi.org/10.1525/abt.2011.73.3.9.

Dede, C. 2008. *The importance of collaboration featuring Walden University*. Minneapolis: Laureate Education, Inc.

Fouts, J.T. 2000. *Research on computers and education: Past, present, and future. A report to the Bill and Melinda Gates Foundation*. Seattle: Seattle Pacific University.

Franklin, C. 2007. Factors that influence elementary teacher's use of computers. *Journal of Technology and Teacher Education*, 15(2): 267–293.

Frydenberg, J. 2002. Quality standards in e-learning: a matrix of analysis. *The International Journal of Research in Open and Distance Learning*, 3(2). http://www.irrodl.org/index.php/irrodl/article/view/109/551. https://doi.org/10.19173/irrodl.v3i2.109.

Jarvis, C.H. & Dickie, J.A. 2010. Podcasts in support of experiential field learning. *Journal of Geography in Higher Education*, 34(2): 173–186. https://doi.org/10.1080/03098260903093653.

Kay, R. 2012. Exploring the use of video podcasts in education: A comprehensive review of the literature. *Computers in Human Behavior*, 28(3): 820–831. https://doi.org/10.1016/j.chb.2012.01.011.

Lazzari, M. 2009. Creative use of podcasting in higher education and its effect on comparative agency. *Computers & Education*, 52(1): 27–34. https://doi.org/10.1016/j.compedu.2008.06.002.

Laurillard, D. 2002. *Rethinking University Teaching. A conversational framework for the effective use of learning technologies*. 2nd ed. RoutledgeFalmer. https://doi.org/10.4324/9780203304846.

Lee, M.J.W., McLoughlin, C. & Chan, A. 2008. Talk the talk: learner-generated podcasts as catalysts for knowledge creation. *British Journal of Educational Technology*, 39(3): 501–521. https://doi.org/10.1111/j.1467-8535.2007.00746.x.

Makina, A. & Madiope, M. 2016. Staff development challenges in the adoption of e-teaching and learning in higher education. *African Educational Research Journal.* 4(4): 140–151.

O'Bannon, B., Lubke, J., Beard, J. & Britt, V. 2011. Using podcasts to replace lecture: Effects on student achievement. *Computers & Education*, 1885–1892. https://doi.org/10.1016/j.compedu.2011.04.001.

Palloff, R.M. & Pratt, K. 2010. Beyond the looking glass. In K.E. Rudestam & J. Schoenholtz-Read (Eds). *Handbook of online learning* (pp.370–386). Thousand Oaks, CA: Sage Publications.

Poole, J.D. 2001, Model-Driven Architecture: Vision, Standards and Emerging Technologies Position Paper Submitted to ECOOP. Workshop on Metamodeling and Adaptive Object Models.

Popova, A., Kirschner, P.A. & Joiner, R. 2008. Podcasts in support of epistemic thinking. *Paper presented at the ECER Pre-conference* in Vienna, Austria, 2008.

Rahimi, M. & Maral, K. 2012, The role of metacognitive listening strategies awareness and podcast-use readiness in using podcasting for learning English as a foreign language. *Computers in Human Behavior*, 28: 1153–1161. https://doi.org/10.1016/j.chb.2012.01.025.

Richardson, W. 2006. *Blogs, Wikis, Podcasts and the Powerful Web Tools for Classrooms*. Thousand Oaks: Corwin Press.

Roy, A. & Roy, P. 2007. Intersection of training and podcasting in adult education. *Australian Journal of Adult Learning,* 47(3): 478–491.

Salmon, G. & Edirisingha, P. (Eds). 2008. *Podcasting for learning universities*. Maidenhead: Open University Press. McGraw-Hill Education. CrossRefView Record in Scopus

Schreiber, C. & Klose, R. 2017. Mathematical audio-podcasts for teacher education and school. *Teachers and Curriculum*, 17(2). https://doi.org/10.15663/tandc.v17i2.161.

Seo, K.K. 2007, Utilizing peer moderating in online discussions: addressing the controversy between teacher moderation and nonmoderation. *The American Journal of Distance Education*, 21(1): 21–36. https://doi.org/10.1080/08923640701298688.

Shamburg, C. 2010. DIY podcasting in education. In Knobel, M & Lankshear, C. (Eds.). *DIY Media: Sharing Creating and Learning with New Media* (pp.51-75). New York: Peter Lang.

Supanakorn-Davila, S. & Bolliger, D. 2014. Instructor Utilization of Podcasts in the Online Learning Environment. *Journal of Online Learning and Teaching,* 10(3).

UNISA, 2015. *Strategic Plan an agenda for transformation*. Available at http://www.unisa.ac.za

Warren, K. 2011. Utilising podcasts for learning and teaching: A review and ways forward for e-learning cultures. *Management in Education*, 26(2): 52–57. https://doi.org/10.1177/0892020612438031.

Wiley, D.A. 2002. Connecting Learning Objects to Instructional Design Theory: A Definition, a Metaphor, and a Taxonomy. *The Instructional Use of Learning Objects* (Bloomington, IN: Agency for Instructional Technology).

Appendix 1

EXPECTED STANDARDS	PODCAST SERIES 1
College/Department	
Module title	
Target audience	
Length of project/timing	
Purpose	
Learning outcomes	
Welcome	
Introduction	
Purpose	
Breakdown presentation	
Conclusion	