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Developing a framework for managing the quality use of podcasts in open distance and e-learning environments

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Abstract

The integration of podcasts in an open distance e-learning environment can play a crucial role in reducing transactional distance through providing quality educational opportunities and access to information through any digital devise. However, technology does not improve teaching, unless if there is a well-conceived educational process taking place. The question therefore is how lecturers can be guided towards the quality use of podcasts in order to achieve most of the learning objectives. Therefore, this paper aims to design and develop a framework that manages the quality use of podcasts for teaching and learning in ODeL environments.

Using literature review, a developmental qualitative research design was used to develop a framework. McGarr's (2009) and the revised Bloom's taxonomy (Anderson et al., 2001) were used as domain specific guiders in the development of the framework. Results provided a framework to guide academic developers, learning technologists and course designers interested in quality in online environments.

Keywords: Podcasts, quality, open distance and e-learning, ODeL, support technology, framework, higher education

Introduction

Higher education has evolved markedly over the last decade and the range of changes demand a revision in the way that students are supported as part of the greater aim of ensuring the success of the university. The 21st century is globally seen as the century of technology-supported learning options, with developments that offer many opportunities for a new range of technology-based learner support possibilities. Because of the above fact most distance education universities moved towards the open distance and e-learning (ODeL) model (Unisa, 2015). An ODeL environment is understood to be an accumulation of openness and distance in education that seek to limit transactional distance through e-learning (Unisa, 2015). The use of any electronic technology to aid in the acquisition and development of knowledge is e-learning (Sener, 2015) and transactional distance is defined as "the gap of understanding and communication between the teachers and learners caused by geographic distance that must be bridged through distinctive procedures in instructional design and the facilitation of interaction" (Moore & Kearsley, 2012, p. 223). Due to the acceptance of support technologies as part of the open distance and e-learning (ODeL) operational plan, a number of changes in the higher education sector occurred nationally, continentally and globally. These were necessary to bridge the transactional distance in ODeL higher education. For example, technology could reduce the effects of isolation and promote inclusivity for distance learners through podcasting (Lee & Chan, 2007). Therefore, the inclusion of support technologies like podcasts became an important positive advancement in ODeL universities. The integration of podcasts played a crucial role in providing quality educational opportunities and access to information through any digital devise.

Podcasting is an Internet technology that distributes audio files, commonly in MP3 format, over the Internet, which educators can use to provide students with course materials, which they can use at anytime and from anywhere, even when they are not connected to a computer (Rahimi & Katal, 2012). The use of podcast technology in education is a widespread occurrence, and its benefits in teaching and learning environments are extensively documented (Schreiber, Fukuta & Gordon, 2010;

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Campell, 2005; Huann & Thong, 2006). Podcasts have several advantages such as lecturers using it to augment their teaching and to teach without restrictions in regard to time or place (Schreiber et al., 2010). However, using podcasts become less meaningful without appropriate objectives and goals for its use, structures for its application, trained and skilful deliverers, and clearly envisioned plans for evaluating its effectiveness (Bolliger, Supanakorn & Boggs, 2010). The successful implementation and suitability of podcasts, to support online teaching and learning, are guaranteed if a pedagogical model for using podcasts for academic learning is properly planned and reflected upon in order to engage the students and support their understanding of the individual modules.

As universities continue to emphasise the need for technology integration in teaching and learning, this has, in turn, increased the expectation placed on the role that technology can play in harnessing effective learning (Roblyer, McDaniel, Webb, Herman & Witty, 2010). The role of technology should be to enhance education by, for example, helping to organise and provide structure to the material consumed by students. Technology like podcasts should help to improve teaching and learning in higher education, as it can reach across racial, gender and geographic divides and serve as an extension and enhancer for handicapped students (for example, a blind student). Though the most suitable technology to use for different modules, time and space in online environments can be easily identified, not much attention is given to the lecturers who use the technology and what guides the quality use of the technology by the lectures (Education Week, 2003). There is a need to manage how the use of technology is applied across the expected knowledge, tasks and activities of the students. Therefore, for the lecturers at ODeL universities to be effective and efficient in the use of support technologies, like podcasts, the universities should offer the lecturers with practical ideas that can be used efficiently to direct and enhance desired learning outcomes for the students.

The quality use of podcasts for teaching and learning

There is great interest in podcasts in higher education, but relatively little evidence in the educational literature to support quality use of podcasts for teaching and learning in distance education (Abdous, Facer & Yen, 2012; Bolliger et al., 2010; O'Bannon, Lubke, Beard & Britt, 2011). Quality, in this paper, is defined as a process of qualitative change (fitness for purpose) or quality in results as the impact "on the students' knowledge and personal development and on the faculty members' scholarly and pedagogical ability and productivity" (Astin, 1985, in Bogue, 1998, p. 9). Therefore, a proactive intervention needs to be put in place to empower academics to take full advantage of using podcasts to achieve online pedagogical principles in their teaching.

Though innovations in technology, together with the use of the Internet, have transformed teaching and learning practices within ODeL institutions, technology does not improve teaching, unless there is a well-conceived educational process taking place that will enhance the teaching process (Mayer, 2009; Gibson, 2001). In fact, there is some evidence that online learning, unless carefully planned, can encourage students to focus on lower level cognitive skills (James, McInnis & Devlin, 2002). Podcasting has brought about new, ongoing social phenomena and, therefore, a new learning paradigm (Ractham & Zhang, 2006). Hence, podcasting for teaching and learning should usher in a new learning paradigm through a series of design iteration, innovation and collaboration among the participants in the academic world (Ractham & Zhang, 2006). All these developments must happen more qualitatively than quantitatively. If there are no proper plans in place for the use of podcasts, students may be less engaged in the learning and their motivation to learn may suffer.

The choice and use of a technology must closely align with the intent of the learning and teaching transaction. This goes hand in hand with the claim that the "media does not influence or motivate learning, but that learning is influenced by the content and instructional strategy" (Clark, 1994,

p. 21). An approach that holistically considers students' knowledge and the use of technology can inform lecturers to support and monitor students' needs in a holistic way. Support technologies (e.g. podcasting) must be grounded by sound educational goals, not by ambitious expectations (Edirisingha & Salmon, 2007). The focus should be shifted from not only the benefits of podcasts, but to also the quality use of podcasts. Therefore, there is a need to develop evidence-based strategies for technology integration that will contribute to high achievement for all students.

The concept of teaching and learning is a lot more complex than simply the transmission of knowledge and skills from a teacher to students. It is rather the integrating of many kinds of knowledge and skills, and the management of and sensitivity to many different variables, that merge to create an environment conducive to e-learning (Sfard, 2007; Hammerness et al., 2005). Therefore, there is a need for a systematic and reflective process to translate the principles of learning and instruction into plans for activities, information resources, and so forth (Gagne, Wager, Golas & Keller, 2005).

Research in the use of podcasts

The purpose behind the use of podcasting falls into three broad categories, namely to enhance the flexibility of learning; to increase accessibility to learning (particularly in relation to enabling mobile access) and to enhance the student's learning experience (Lane, 2006; Nie, 2006; Rachtham & Zhang, 2006). However, much that is written about podcasting in literature, refers only to its ability to enhance convenience through flexibility and accessibility to learning (Frydenberg, 2006; Nathan & Chan, 2007). The use of podcasts as a key element to broaden and deepen students' understanding is rarely highlighted in most research (Laurillard, 2002; Copley, 2007). Though a few models have been created to guide some other types of technologies in the achievement of students' learning goals, few guiding models have been designed particularly for podcasts (Laurillard, 2002; Abt & Barry, 2007; Kay, 2012). Studies that have looked at podcasts have focused on student perception, satisfaction, achievement and the accessibility and functionality of podcasts in education (Fouts, 2000; Hill & Nelson, 2011). Furthermore, only a very small proportion of studies have centred on the quality use of podcasts by the lecturer in ODeL (Nwosu, Monnery, Reid & Chapman, 2017).

In a study by Makina, Tshivhase and Madiope (2013), students were asked to indicate the types of podcasts that they were receiving from the lecturers in their modules. In addition, extensive research was done to identify all possible uses of podcasts in online teaching and learning. The results are shown in diagram 1.

Benefits derived from research	**Responses from the students survey (Makina et al., 2013)**
• Prior to presenting a new topic, podcast provided a general overview as an advanced organiser • Before teaching a complex skill or procedure, it provided a mental framework from which to approach it • Explained difficult concept, principle or abstract process • Provided a lead-in to an assignment or learning activity • Provided some variety in the learning environment • Welcoming students at the beginning of the semester • Teaching of complex and difficult topics • Limitations of conventional feedback approaches, like print tutorial letters • Provide timely module supplements • Alleviate broad issues faced by ODL students • Giving immediate assessment feedback • Giving support before writing exams-examination tips	• Arouse interest and curiosity about a new topic • Inform you of the learning outcomes or benefits of learning new content • Influence my feelings and attitudes about a topic • Influence my feelings and attitudes about an assignment • Was motivated to learn • Was introduced to the subject • Was introduced to the lecturer

Diagram 1: Comparing The Uses/Benefits Of Podcasts.

The results, in the diagram 1 indicate the types of podcasts students were receiving for their study. The results from literature (Makina et al., 2013) indicate that there were more uses for podcasts that were not being taken into consideration by the lecturers. It seemed that lecturers were not making maximum use of podcasts to enable students to understand their subjects. Further informal studies were also done by Makina (2018), at the same institution, that confirmed that 80% of the podcasts were used for technical issues and only the remaining 20% were used for the benefit of students' learning (Makina, 2018). Future uses of podcasts should be guided by sound educational goals that aim to improve students' learning.

Lecturers and podcasts for teaching

The challenges and role expectations related to supporting students through the use of podcasts are complex and demand robust guidance for the lecturers to achieve productive student learning. The focus should be to design and promote the use of podcasts in circumstances that will be beneficial to student learning. An invaluable source of support to lecturers, and the university at large, in the advancement of the scholarship of quality teaching and learning should be offered. Therefore, a proactive intervention needs to be put in place to empower academics to take full advantage of using podcasts for online pedagogical principles in their teaching. This can be done through specific recommendations about how to manage the effectiveness of technologies like podcasts in the enhancement of teaching and learning for students' achievement. It is against this background that this paper seeks to develop a framework that can guide the lecturers in the quality use of podcasts, in order to meet most of students' learning expectations that are aligned to productive learning.

Studies of some lecturers in higher education institutions to date, show many to be digitally unsophisticated and limited in the reality of teaching and learning online (Brown & Green, 2007; Kay, 2012). For the lecturers at ODeL universities to be effective and efficient in online environments, the university must offer the lecturers practical ideas that can be used efficiently to directly enhance desired learning outcomes. The lecturers should be able to identify learners' needs and goals in such a way that the use of podcasts can be beneficial. Through the podcast, the lecturers should be able to create podcasts that enable the learning goals to be met. A proactive intervention needs to be in place to empower academics to take full advantage of the use of podcasts that is in alignment with online pedagogical principles. Therefore, any genuine attempt at improving the quality use of podcasts for teaching and learning should probably start with providing proper guidance for lecturers. This is required since, with the availability of new technologies, there is a need to create new ways of teaching and learning to include these technologies. Such a statement presupposes that a framework must exist to guide academics in that process. It was against this background that the development of a conceptual framework for managing the quality use of podcasts for teaching and learning in open distance and e-learning (ODeL) was initiated.

Statement of the problem

Based on the background of the problem, outlined above, it appears that podcasts are not being used to fulfil the maximum purpose of teaching as per students' learning objectives.

The research question

The question therefore is: "How can lecturers use podcasts efficiently and effectively to achieve most expected students learning objectives?" Therefore, the aim of this paper is to design and develop

a framework that manages the quality use of podcasts (to variate or spread the use of podcasts) in order to achieve expected learning outcomes for modules or courses.

Methodology

A developmental qualitative research design was used in the design and development of the first prototype of the framework by using insights derived from a literature review, literature on reflective practices and researcher experiences in the management of quality podcasts for teaching and learning. The literature review in this paper focused only on published studies about podcasts used in higher education (Uddin, Onah & Samuel, 2019; Nwachokor, Abu & Arasi, 2019; Nwosu et al., 2017; Supanakorn & Bolliger, 2014; Bolliger et al., 2010; De Souza-Hart, 2011; Lazzari, 2009; Lonn & Teasley, 2009). The overall uses of podcasts that were obtained from literature are shown in appendix 4. Two useful teaching and planning tools, namely McGarr's (2009) uses of podcasts for teaching and the revised Bloom's taxonomy (1956; Common Sense Education, 2015) model by Anderson et al. (2001) (Appendix 2), which illustrates the interrelation of the taxonomy to the expected knowledge dimensions of students, were used in the design of the framework in this paper. McGarr (2009) categorised the uses of podcasts into three broad types: substitutional, supplementary and creative. Six categories were then adapted from McGarr's (2009) categories and were related to the four expected competences of the students. The four expected student competences of knowledge are: practical, conceptual, perceptual and affective. The qualitative data analysis method chosen for this paper was thematic content analysis (TCA). TCA entails identification, analysis and reporting of themes within data. The development was in five stages:

> ***Stage I:*** This stage categorically put together all the uses of podcasts found in the literature of podcasts for teaching and learning in higher education literature (Salmon & Edirisingha, 2008; McGarr, 2009; Lin, Zimmer & Lee, 2013; Lazzari, 2009; Popova, Kirschner & Joiner, 2008) (appendix 4).
>
> ***Stage 2:*** Data was classified into six categories that were derived from the literature review (appendix 2) and McGarr's educational uses of podcasts (appendix 1) and then described in line with the objectives and outcomes of expected student learning. Each of the six categories had expected student learning within a podcast environment (appendix 2).
>
> ***Stage 3:*** The categories with the real student knowledge dimensions were then aligned to the revised Bloom's taxonomy (appendix 3) model. The categories were adapted to the real student knowledge dimensions, while providing reflection opportunities for discussion.
>
> ***Stage 4:*** A proposed framework was then developed that is ready for use (diagram 2).
>
> ***Stage 5:*** The framework was made available, to be presented at group conversations or conferences to allow critical analysis of the idea. This will prompt cycles of revisions and refinements until the framework is deemed satisfactory enough to guide institutions during the process of change towards the use of podcasts.

The theoretical framework

Insights that guided the design of the framework were the revised model of Bloom's taxonomy by Anderson et al. (2001) (diagram 2), Bloom's Digital Taxonomy (Common Sense Education, 2015) and McGarr's (2009) educational uses of podcasting to enhance the lecture (diagram 3). The revised model of Bloom's taxonomy has been linked to the expected knowledge dimensions.

Bloom's taxonomy	**Knowledge**	**Comprehension**	**Application**	**Analysis**	**Synthesis**	**Evaluation**
Revised taxonomy	Remembering	Understanding	Applying	Analysing	Evaluating	**Creating**
Bloom's definition	Remember previously learned information.	Demonstrate an understanding of the facts.	Apply knowledge to actual situations.	Break down objects or ideas into simpler parts and find evidence to support generalisations.	Compile component ideas into a new whole or propose alternative solutions	Make and defend judgments based on internal evidence or external criteria.

Diagram 2: Category of the adapted revised Bloom's taxonomy (Anderson et al., 2001).

The bloom's taxonomy has not been used in its original form (1956) but in its revised form that is referred to as Bloom's Digital Taxonomy (Common Sense Education, 2015). This is because a group of cognitive psychologists, curriculum theorists and instructional researchers, and testing and assessment specialists published a revision of Bloom's Taxonomy in 2001 with the title "A Taxonomy for Teaching, Learning, and Assessment". It draws attention away from the static notion of "educational objectives" (in Bloom's original title) and points to a more dynamic conception of classification (Koppelman, 2013, Traxler, 2017).

The purpose of Bloom's Digital Taxonomy is to inform instructors on how to use technology and digital tools to facilitate student learning experiences and outcomes (Koppelman, 2013). It expands upon the skills associated with each level as technology becomes an essential part of learning in open distance learning. Aligning the bloom's taxonomy to podcasts act as a vehicle for transforming student thinking at different levels. Connecting characteristics of Bloom's Revised Taxonomy is necessary for creating online learning activities that are in accordance with the students' needs in open distance learning (Traxler, 2017). The revised model of Bloom's taxonomy (Common Sense Education, 2015) classifies educational learning objectives into levels of complexity, specificity and originality, with three levels of knowledge: factual, conceptual and procedural. According to the revised model of Bloom's digital taxonomy (Common Sense Education, 2015), cognitive processes seek to teach learners how to remember, understand, apply, analyse, evaluate and create. These are the basic elements students must have in order to acquaint themselves with a discipline and be able to solve the problems. All the issues in Bloom's taxonomy should be taken into consideration during the use of podcasts for a particular course or module.

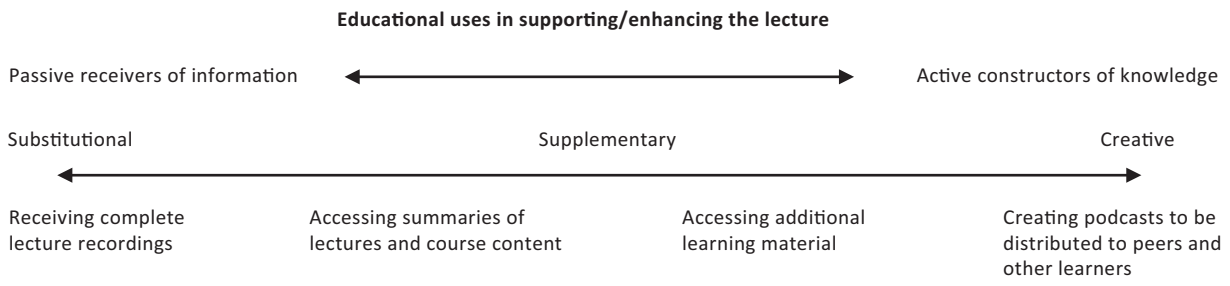

Diagram 3: Educational uses of podcasting in supporting/enhancing the lecture (McGarr, 2009) Educational uses in supporting/enhancing the lecture.

McGarr (2009) categorised the uses of podcasts into three broad types of uses: substitutional, supplementary and creative. These categories were further unpacked into six categories that fitted into a podcast environment. The categories were adapted to improve future policies and practices for using podcasts, bearing in mind the expected student competences from Bloom's taxonomy. The uses of podcasts, gained from the literature review (diagram 1; appendix 1), provided the suggested categories and were adapted to align with McGarr's (2009) uses of podcasts, which provided the six categories for the framework (diagram 4).

1.	2.	3.	4.	5.	6.
Technical issues	**Substitute for classes (substantial)**	**Summaries of lectures and course content (supplementary)**	**Accessing additional learning materials**	**Provide reflection (creative)**	**Using the learned knowledge**
• Welcome students to the course • Introducing the lecturer • Overview of the module • Guidance to the tools used in the management system • Orientate students around the course • Pace student studies • Motivate and hold students' interest • -Announcement of critical issues (e.g. temporary breakdown of the learner management system) • Alleviate broad issues faced by ODL students • Provide guidelines	• Teaching complex and difficult topics • Presenting a short lecture • Provide further explanations • Support students who are "at-risk"	• Provide guidelines for revision • Assessment feed forward and feedback • Guidance before students face their first major exam • Support students who are "at-risk"	• Provide and explain activities • An interview /dialogue podcast • Preparation before final examinations • Make available useful and authentic information • Quizzes	• Students giving feedback about an activity • Students interviewing candidates for research • Proactive academic intervention given to students • Summaries of seminar discussion	• Proactive academic intervention given to students • Make available useful and authentic information • Recall / integrate previously learned material with new content

Diagram 4: Categories and description of the educational uses of podcasts to support learning.

A holistic approach was adopted to enable the construction of the framework through a literature review. Information was also derived from, the revised model of Bloom's taxonomy –Bloom's Digital Taxonomy (Common Sense Education, 2015)– and the expected knowledge dimensions from McGarr's (2009) model. The framework aligned Bloom's Digital Taxonomy to the quality use of podcasts. Bloom's cognitive processes were used to form a matrix (indicated in diagram 2) and thus performance objectives were created that were linked to the quality use of podcasts in student learning. Anderson et al. (2001) clarified the knowledge relationships within Bloom's Digital Taxonomy. Bloom's Digital Taxonomy could easily be adapted to the open distance learning environment.

Results, discussion and recommendation

The framework was partly designed to address recommendations made by Kay (2014), which called for the creation of video podcasts that contain effective instructional guidelines. The study was initiated with the assumption that podcasts are not being used effectively for teaching and learning. It builds upon previous research on the relationship between the uses of podcasts as a tool and the cognitive theories about teaching and learning (Laurillard, 2002; Copley, 2007). The paper presents a

framework that can guide the use of podcasts for teaching and learning in an open distance learning environment.

	Category (revised Bloom's taxonomy) (Anderson et al., 2001)	Knowledge expected	Quality spread of podcast use (Appendix 1)
1.	**Remembering**	Learnt by heart; recall or retrieve present or previously learned information	**Technical issues**
2.	**Understanding**	To be able to explain, in your own words; comprehending the meaning, translation, interpolation, and interpretation of instructions and problems; state a problem in one's own words.	**Substitute for classes (substantial)**
3.	**Applying**	Using ideas and methods; use a concept in a new situation or unprompted use of an abstraction; application of learning in the classroom into real situationsn	**Summaries of what has been taught (supplementary)**
4.	**Analysing**	Taking an idea or thing apart and explaining how it functions; separates material or concepts into component parts so that its organisational structure is understood; distinguishes between facts and inferences	**Provide reflection**
5.	**Evaluating**	Critiquing ideas or things; make judgments about the value of ideas or materials	**Using the learned knowledge**
6.	**Creating**	Putting different ideas or things together to create new wholes; builds a structure or pattern from diverse elements; put parts together to form a whole, with emphasis on creating a new meaning or structure	**Generated by learners (creative)**

Diagram 5: The framework for the quality use of podcasts.

A practical model for the missing link in the offer of quality podcasts for e-teaching and learning was provided. The framework (Diagram 5) is a designed tool for the use of podcast in higher education, through which key characteristics of teaching and learning objectives have been identified and synthesised. It is a direct output from the survey findings from previous papers and a discussion of relevant literature (Nerantzi, 2017; Makina, 2018; Makina et al., 2013; McGarr, 2009). The framework consists of six dimensions that have been adapted from Bloom's Digital taxonomy, the students' knowledge expectations (diagram 3). They are related to the quality spread that is suggested for podcast use (appendix 1). The characteristics are unpacked, using the general categories of outcomes that are required for the students to achieve in any discipline. The important objectives to be achieved with podcasts include the four key areas summarised by Kay (2014), which are as follows: establishing context, creating effective explanations, minimising extraneous cognitive load and maintaining student engagement. The results of the framework in this paper suggests that guiding principles can be given to the academics using podcasts to teach online. Future research needs to examine in more detail whether the suggested criteria, outlined in the designed framework, can contribute to effective student learning.

The framework is a self-explanatory tool, clarified in all the different categories and can be adapted and described in more detail in any relevant context. Diagram 5 is a visualisation of the framework and a quick reference guide intended to be used by, for example, academics, course leaders, instructional designers or designers.

Discussion

This study designed and created a research-based framework for the use of podcasts for teaching and learning. Students perceive online learning and its associated technologies, like podcasts,

as a strategic advantage to them. This is because it is beneficial, convenient and enhances their communication and interaction with their immediate learning environment (Ciampa & Revels, 2012; Hill & Nelson, 2011). For example, Agina-Obua (2005) shows that instructional materials, like podcasts, have an important influence on students' academic achievement. Lucas (2015) sees instructional materials as objects that can help the academic to make learning more meaningful to the learner. The use of podcasts in teaching and learning should, therefore, assist students to learn more and to retain better what has been taught or what is to be taught. A podcast, as an instructional technology, is seen as a didactic instrument that makes learning and teaching possible. The framework shows the direct relationship between instructional material and the teaching methodology, which is of great importance for students' academic achievement.

The framework serves as an educational tool that acts as a sign post for managing the quality use of podcasts, in order to monitor the quality of online learning experiences in an open distance and e-learning environments. To prevent the degradation of the podcast service, the framework sets minimum quality requirements for the use of podcasts for online learning. The focus is to clarify the validation and reliability of the framework to guarantee the quality use of podcasts in online modules. The development of this framework is aimed at providing an educational tool, which will help universities to use podcasts productively in the achievement of expected student knowledge. The objective of the framework is to identify a pedagogy and course design approach that will develop and monitor quality online learning experiences in open distance and e-learning environments. The framework offers academics with practical ideas that can be efficiently used to directly enhance the desired learning outcomes in online environments. It can therefore act as a learning object review instrument (LORI) that evaluates learning objects or e-learning resources, like the podcast, against several defined criteria. LORI is an instrument that enables learning objects users to create reviews consisting of ratings or some dimensions of quality (Nesbit, Belfer & Leacock, 2004).

The aim of the framework is to transform and guide the practices of the lecturers in the use of podcasts by offering lecturers practical ideas that can be efficiently used to achieve a variety of students' knowledge expectations that result in productive learning. A framework that allows the effective capture of the knowledge requirements and expectations of students is the best way to verify the appropriateness of the podcast as a support technology. Nwachokor et al. (2019) point out that educational software, like podcasts, should have these five functions: drill, practice, tutorial, simulation/games and problem solving. The question of how users can create, distribute and share knowledge via podcasting is pertinent (Mugwanya, Marsden & Boateng, 2011). This is because the roles that podcasts have in the production and sharing of knowledge can improve the student's online learning performance. Knowledge is situated in part as a product of the activity, context, and culture in which it is developed and used and therefore the framework will help instructors apply the right tool to the right learning goals (Koppelman, 2013). The framework designed in this paper will serve as an eye-opener to the numerous advantages to using podcasts as instructional material. Lecturers will benefit from this paper in that the framework will provide them with adequate techniques to effectively teach with technology.

The findings of this paper also provide curriculum planners with the information needed to enrich future trends in the curriculum that aims to reduce the declining overall performance of students (Jarvis & Dickie, 2010). The pedagogical skills of lecturers will improve, if the findings in this paper are well implemented. Although it has yet to be formally tested, its potential usefulness, in practice, has been noted. Further work is needed to consolidate the usefulness of the framework designed in this study. This paper shows that by clearly managing the use of podcasts, it is possible to design settings and standards that are theoretically grounded, practically feasible and adequate for the specific purposes and goals. Although managing the effectiveness of support technologies in higher

education is still very intimidating and appears complex, it is a good return on technology investment, as the expenditure on podcasts must be accounted for and deliver on its promise.

Recommendation

The results of this paper have several implications for professional development in the future use of podcasts. It highlights some of the more general issues that lecturers face when attempting to use support technologies and new skills in their practice. The framework guides lecturers to utilise podcasts for the benefit of productive student learning. Staff or professional development can therefore be complemented by showcasing the relationship between pedagogical knowledge and the quality use of podcasts, to support quality student learning in ODEL and other environments that use support technologies. Lecturers can gain skills and experience in the quality use of podcasts by using the standards that talk to the expected quality of instruction and learning. This goes hand in hand with Sandholtz and Reilly's (2004) idea that professional development programmes that focus on instructional rather than technical issues are more effective in the productive and creative uses of technology.

The need to transform and guide the practices of the lecturers regarding the use of technology in teaching and learning is a key issue for further research. Educational leaders and policymakers, at all levels, need to carefully plan the use of podcasts, in conjunction with key technology stakeholders, who have the practical information at hand. Based on the findings and results, it is recommended, among others, that higher education institutions organise capacity building workshops, centred on the quality use of technology for effective learning in the 21st century education. The university should motivate lecturers to employ technological tools in teaching, using the guidance provided by the framework.

It can be concluded that the framework proposed in this study is a reasonable starting point for providing a useful guide and design tool to academic developers, learning technologists and course designers interested in quality online teaching and learning. If the framework is discussed on several curriculum and learning development platforms, it can be improved on, to the point of having the findings generalised to other education institutions. The framework needs to be piloted through a trial implementation process, using real data, before it can be recommended for adaptation in higher education institutions.

Limitation

Recent literature review of quality in the use of podcasts in open distance learning environments in higher education was not easily available. The designed framework will require contextualisation and adaption before application. It has not been used in practice.

Conclusion

The provision of quality education in higher education institutions can be undermined by the lack of an organised use of support technologies for teaching and learning. This paper demonstrates that Bloom's taxonomy can be used to evaluate the quality use of podcasts. It provides an assessment of the quality use of podcasts for those who want to provide a benchmark for its use. In addition, higher education institutions might also assist teacher educators, school district personnel and researchers to better understand the value, challenge, and benefits of using podcasts in courses or programmes. The framework may also be of interest to other disciplines and professional areas, in higher education contexts, and could be considered as a tool for further research about online learning.

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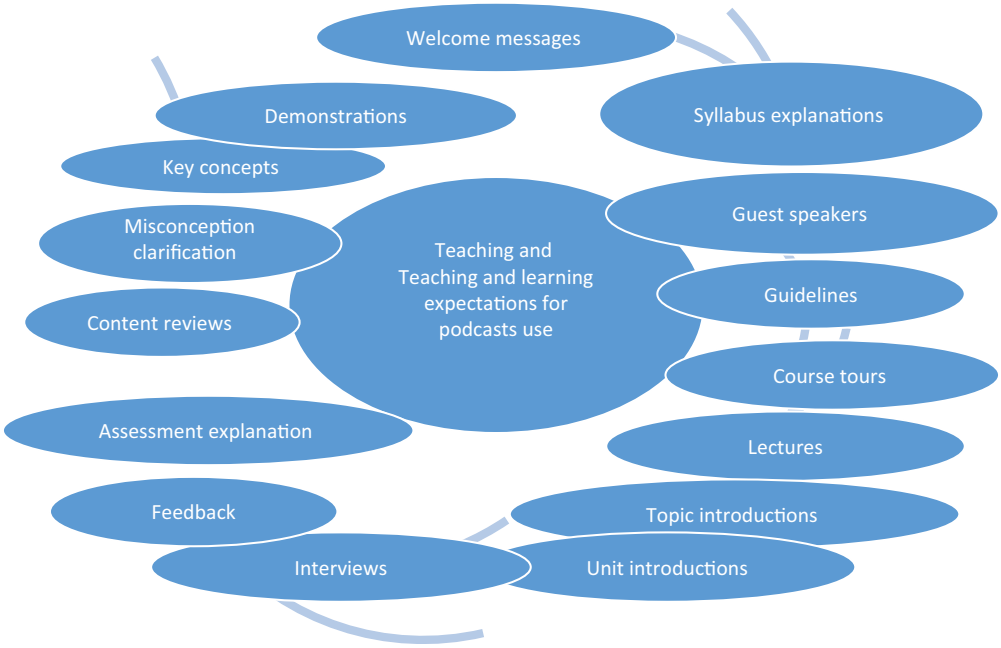
Appendix 1

Uses of podcasts from literature



Appendix 2

Categories and description of the educational uses of podcasts to support learning

1.	2.	3.	4.	5.	6.
Technical issues	**Substitute for classes (substantial)**	**Summaries of lectures and course content (supplementary)**	**Accessing additional learning materials**	**Provide reflection (creative)**	**Using the learned knowledge**
• Welcome students to the course • Introducing the lecturer • Overview of the module • Guidance to the tools used in the management system • Orientate students around the course • Pace student studies • Motivate and hold students' interest • Announcement of critical issues (e.g. temporary breakdown of the learner management system) • Alleviate broad issues faced by ODL students • Provide guidelines	• Teaching complex and difficult topics • Presenting a short lecture • Provide further explanations • Support students who are "at-risk"	• Provide guidelines for revision • Assessment feed forward and feedback • Guidance before students face their first major exam • Support students who are "at-risk"	• Provide and explain activities • An interview /dialogue podcast • Preparation before final examinations • Make available useful and authentic information • Quizzes	• Students giving feedback about an activity • Students interviewing candidates for research • Proactive academic intervention given to students • Summaries of seminar discussion	• Proactive academic intervention given to students • Make available useful and authentic information • Recall / integrate previously learned material with new content

Appendix 3

Aligning the framework with Bloom's taxonomy

Category of the adapted or revised model of Bloom's taxonomy	**Knowledge expected** (McGarr, 2009)	**Examples of podcast activities and outcomes**	
1. Technical	Advertising course	• Welcome students to the course • Motivate students • Holding their interest. • Pace studies • Clarifying exam expectations	
2. Remembering	Substitutional use	• Receiving complete lecture recordings • Repeat of a lecture	•Listing of information
3. Understanding		• Provide timely academic material • Provide subject • related news to students.	• Assessment feed forward and feedback • Overview of the module • Orientate students regarding the course
4. Applying:	Supplementary use	• Providing supplementary material • Providing additional learning material	• Preparing students before they write final examinations
5. Analysing		• Providing summaries of lectures • Identifying important aspects of course content	• Presenting a short lecture on the main facts/topic • Explaining a problem • Solving the problem
6. Evaluating	Creative use	• Lecturer's opinion • Speaker's perspectives	• Syntheses of core readings and course materials. • Explaining/Solving the problem
7. Creating		• Creating podcasts by students to be distributed to the lecturer • Creating podcasts by students to be distributed to other learners	

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